

Law and Economics of Security Interests in Intellectual Property

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Intellectuele eigendom als zekerheid:
Een rechtseconomische analyse

Proefschrift ter verkrijging van de graad van doctor aan de
Erasmus Universiteit Rotterdam op gezag van
de rector magnificus
Prof.dr. H.A.P. Pols
en volgens besluit van het College voor Promoties

De openbare verdediging zal plaatsvinden op
donderdag 30 maart 2017 om 15.30 uur
door

Min Lin
geboren te Yichang, Hubei, China

Promotiecommissie

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This thesis was written as part of the European
Doctorate in Law and Economics programme



An international collaboration between the Universities
of Bologna, Hamburg and Rotterdam.
As part of this programme, the thesis has been submitted
to the Universities of Bologna, Hamburg and Rotterdam
to obtain a doctoral degree.



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



Universität Hamburg



ACKNOWLEDGEMENTS

The day I was informed regarding the admission for defence, I was handed back the original copies of documents that I submitted for my PhD application. Between them, there were transcripts from my previous bachelor and masters as well as the picture of my younger self on the TOEFL Test Score Report. These documents made me realize how much I have changed throughout the amazing academic journey of completing this PhD research project. I was also reminded of all the help I have received over these past years. Therefore I would like to take this opportunity to sincerely express my gratitude to all these people.

First and foremost, my deepest gratitude and appreciation go to my PhD supervisors Prof. Thomas Eger and Prof. Michael Faure. Thank you both for providing me with clear guidance and pushing me to become better, while, at the same time, giving me the maximum freedom to choose my specific research questions and to do the analysis in my own way. As an expert economist in intellectual property, Prof. Eger shared with me his knowledge and perspectives on economic analysis and helped me clarify the economic logic in my analysis. He knows how to solve the problems with his good sense of humour. Whenever I came to him with a problem, he always replied to me with “no problem” and offered me his generous help towards the solution. He is extremely patient for all my requests. There was one time, we had an appointment at 3 pm in Hamburg, but my morning flight from Amsterdam was seriously delayed. Prof. Eger waited for me in the office till 8 pm and we still went through all the topics that we needed to discuss. Today, I found out that Prof. Eger is going to be officially retired from 1st April 2017, just two days after my scheduled defence. It is really my biggest privilege and honour to be one of your last students.

Moreover, Prof. Faure kept close supervision on my writing process. With lots of experience in supervising Chinese international students, Prof. Faure understands our common problems in thinking and writing. With his expertise in law and economic analysis, he helped me set the structure. His long emails, full of detailed comments and even corrections on my sloppy grammar mistakes on each single page, were an essential part of this process. He set up a routine meeting plan to meet every several months to follow up on the progress. In case there was a need for a meeting regarding urgent matters, he would always manage to squeeze it in his super busy schedule and make it happen. Without his close supervision, the completion of this project would

have taken longer. I truly thank you both for all your incredible support and patience throughout my writing process.

Furthermore, my sincere appreciation goes to the many people who led me to this PhD programme. I am truly thankful to Prof. Rostam J. Neuwirth, who was my research instructor and master thesis supervisor during my first Master of International Business in the University of Macau. He taught me how to analyse legal problems by exploring the wider context from which the problems arise and advised me to ask a research question that matters in practice. This piece of advice proved far more important than any legal knowledge I have obtained during courses. It has always been in my mind when I select my research questions. I also want to thank Prof. Patrick C. Leyens, who was my course professor in the EMLE and gave me advice on the selection of research topic for my application to the EDLE programme. He made it clear to me that, a 4-year PhD research is a long-time commitment, which is not easy to keep without sincere enthusiasm; therefore, instead of selecting a topic to impress the selection committee, I should choose one that I am truly interested in. One thing I always regret is that I have not yet had the chance to say thank you to Prof. Leyens in person, for his kind and helpful suggestions, without which I might not have been able to start the journey or make it to the very end. I hereby take this chance to express my appreciation to you.

In addition, I am deeply grateful to other scholars who have added insights to my research at different stages of my writing. I want to thank Prof. Yoshiyuki Tamura of Hokkaido University, who suggested me to explain why in practice some IP with low liquidation value have been used collateral as well. His suggestion has become the core research question for Chapter 2. Thank you to professors Alessio Paces and Ann-Sophie Vandenberghe for providing me with literature suggestions and detailed comments on Chapter 5. Special thanks to professors Louis Visscher, Pieter Desmet, Sharon Oded, Roger Van den Bergh, Luigi Franzoni and Jonathan Klick for giving me kind, on-point critique on my work, as discussants during the EDLE seminars. Particularly, I want to thank the inner committee members, Prof. Klaus Heine (Erasmus School of Law), Prof. Anselm Kamperman Sanders (Maastricht University) and Prof. Qi Zhou (University of Leeds), for their infinite patience and vast amounts of time spent on reading the manuscript and making detailed comments. Their comments have been highly appreciated and thoroughly incorporated into the final version. All your insightful suggestions helped me greatly in improving my

dissertation.

I would like to sincerely thank all members of the administrative management team of the EDLE programme, including but not limited to Marianne Breijer, Simone Rettig, Wicher Schreuders from the RILE, Lisa Verniti, Adelaide Mancini and Anastassia Naboko from Bologna, and Nina Apprecht and Jennifer Broocks from Hamburg. Without your help, I cannot imagine how could I have managed the rotation moving around Europe, figured out all issues about applications for entry visa and stay permits and stayed focus on my research.

My thankfulness is also extended to my dear friends and colleagues at the EDLE programme. I would like to thank Diogo, Enmanuel, Faiz, Ignacio, Max, Miriam, Stephan, Tobias and Yugank for your helpful comments on my work. It has been such a pleasure for me to go through this life-changing journey with all of you. I sincerely wish you all a bright future and to always enjoy life. For Alice, Maria Pia and Shilpi, I am so grateful for having experienced the highs and lows in our lives together on this journey. My gratitude also goes to Cheng, Chris, Cintia, Elena, Goran, Ifrah, Jarek, Joé, Kateryna, Marco, Nan, Sandro and Shaheen for leaving me with so many good memories in the RILE. Special thanks to our small traveling group, Long, Jing, Wenqing, and Zhenglong. All the small trips we had together all over the Netherlands brought so much fun to my everyday life.

The book is dedicated to my family members. Many thanks to my parents for their constant understanding and support to my choices in life regardless of my successes and failures, and also thanks to my younger sister, her husband and their adorable daughter Shunshun, for bringing so much happiness to our big family. Special appreciation is given to George, thanks for accompanying me through this journey as my closest friend and partner.

Sincerely,
Min

21 Feb 2017, Rotterdam

TABLE OF CONTENT

ABBREVIATIONS	xi
Chapter 1 Introduction	1
1.1 Motivation	1
1.2 Research Questions	4
1.3 Plan of Chapters	6
1.4 Methodology	9
1.4.1 Law and Economics	9
1.4.2 Comparative Law and Economics Analysis	12
1.4.3 An Integrated Approach	14
Chapter 2 Finance of R&D Projects and Security Interests in IP	17
2.1 Problems in Funding R&D Activities	17
2.1.1 Internal Funding - Appropriability Problem	18
2.1.1.1 Non-rivalry of knowledge	18
2.1.1.2 IP Protection solution	19
2.1.2 External Funding - Information Asymmetries	23
2.1.2.1 The “Valley of Death” and the “Funding Gap” for external finance	23
2.1.2.2 High uncertainty in outcomes	25
2.1.2.3 Difficulty in conveying information to external investors	26
2.1.2.4 Adverse selection problem and moral hazard problem	28
2.2 Alternative Financial Sources for Funding R&D Activities	30
2.2.1 The Financial Growth Cycle of R&D Investment	30
2.2.2 Internal Finance	33
2.2.3 Angel Finance	34
2.2.4 Venture Capital	36
2.2.5 Debt Finance	40
2.2.5.1 Adverse selection problem	42
2.2.5.2 Moral hazard problem	44
2.2.5.3 Shortage of tangible collateral	44
2.3 Overview of Using IP as Collateral in Debt Finance	47
2.3.1 General Discussion	47
2.3.1.1 Justifications for IP collateralization	47
2.3.1.2 Direct benefits of IP collateralization	49
2.3.1.3 Practice of IP collateralization	51
2.3.2 Obstacles to IP Collateralization in Practice	56
2.3.2.1 Legal uncertainties in IP collateralization	56
2.3.2.2 Uncertainties in the value of IP	62
2.3.3 Critics of the Existing Efforts	77
2.4 Theoretical Supports for IP Collateralization	80
2.4.1 General L&E Theories of Secured Transactions	80

2.4.1.1 The adverse selection problem and the signaling theory	81
2.4.1.2 The moral hazard problem and the bonding theory	83
2.4.1.3 The paradox between theories	84
2.4.2 The Advantages of IP Collateralization	85
2.4.2.1 Signalling effect	85
2.4.2.2 Bonding effect	89
2.4.2.3 Implications	91
2.5 Conclusion.....	92
Chapter 3 The Effectiveness Criteria as to the General Legal Framework for IP Collateralization	97
3.1 Uncertainties in Legal Framework	97
3.2 Introduction of Effectiveness Criteria as to the Legal Framework of Secured Transaction	99
3.3 Objectives and Functions.....	100
3.3.1 General Discussion for All Secured Transactions	101
3.3.2 Additional Considerations for IP Collateralization	104
3.3.2.1 The objective of IP laws	104
3.3.2.2 Different modes of IP collateralization.....	105
3.3.3 Functions and Functional Mechanisms.....	111
3.4 Creation.....	112
3.4.1 Transaction Structure	112
3.4.2 Scope of IP Eligible for Collateralization	113
3.4.2.1 Types of IP that can serve as collateral	113
3.4.2.2 Treatment of rights under IP license agreements.....	115
3.4.2.3 Future IP.....	117
3.4.3 Description of Collateral in Security Agreement	119
3.4.4 Pre-default Rights and Obligations of Debtors and Secured Creditors.....	122
3.5 Perfection, Publicity and Priority	124
3.5.1 Registration Schemes for Perfection and Publicity.....	125
3.5.2 Priority	128
3.6 Enforcement.....	130
3.7 Summary of the Effectiveness Criteria.....	131
Chapter 4 Comparative Study on the General Legal Framework for IP Collateralization	135
4.1 Introduction	135
4.2 China	137
4.2.1 Background: Historical Development of IP Collateralization in China.....	137
4.2.1.1 The First Phase: 1995-2006.....	137
4.2.1.2 The Second Phase: 2007-2009	140
4.2.1.3 The Third Phase: 2009 to the Present	145
4.2.1.4 The status quo.....	149
4.2.2 Creation.....	158

4.2.2.1 Transaction structure	158
4.2.2.2 Scope of IP eligible for collateralization	159
4.2.2.3 Specific description of encumbered IP in security agreements	168
4.2.2.4 Pre-default rights and obligations of debtors and secured creditors	169
4.2.3 Perfection, Publicity and Priority	173
4.2.3.1 IP-specific registry system	173
4.2.3.2 A document-based registration with substantive scrutiny	174
4.2.3.3 Priority rules	176
4.2.4 Enforcement	178
4.3 US	180
4.3.1 General Introduction and Preemption of Federal Law	180
4.3.2 Creation	182
4.3.2.1 Transaction structure	182
4.3.2.2 Scope of IP eligible for collateralization	184
4.3.2.3 General description of encumbered IP in security agreements	187
4.3.2.4 Pre-default rights and obligations of debtors and secured creditors	188
4.3.3 Perfection, Publicity and Priority	188
4.3.3.1 Dual-registration system	189
4.3.3.2 A Notice-based registration system	194
4.3.3.3 Priority rules	195
4.3.4 Enforcement	197
4.4 UNCITRAL’s Supplement on IP Collateralization	199
4.4.1 Background	199
4.4.1.1 Other international efforts	199
4.4.1.2 Drafting process of the Supplement	201
4.4.2 Creation of Security Interests in IP	204
4.4.2.1 Transaction structure	204
4.4.2.2 Scope of IP eligible for collateralization	205
4.4.2.3 The preference to the general description of encumbered IP	211
4.4.2.4 Pre-default rights and obligations of debtors and secured creditors	212
4.4.3 Perfection, Publicity and Priority	213
4.4.3.1 The co-existence of the general registry and IP-specific registries	213
4.4.3.2 Priority rule	215
4.4.4 Enforcement	220
4.5 Comparison	221
4.5.1 Creation	221
4.5.1.1 Transaction structure	221
4.5.1.2 Scope of IP eligible for collateralization	223
4.5.1.3 Collateral description in the security agreement and the use of future IP as collateral	226
4.5.1.4 Pre-default rights and obligations of debtors and secured creditors	229
4.5.2 Perfection, Publicity and Priority	234
4.5.2.1 Registration schemes	234

4.5.2.2 Registration requirements.....	236
4.5.2.3 Priority.....	238
4.5.3 Enforcement.....	239
4.6 Summary of Findings.....	240
4.6.1 Problems in US Law.....	243
4.6.2 Problems in Chinese Law.....	243
4.6.2.1 Lack of coordination among rules.....	243
4.6.2.2 Paternalistic bias.....	244
4.6.2.3 Insufficient protection.....	246
4.6.2.4 Need for a structural reform.....	247
4.6.3 Problems in the UNCITRAL’s Efforts.....	248
Chapter 5 Enforceability of Restrictive Clauses in IP Licenses in Secured Transactions.....	251
5.1 Introduction.....	251
5.2 Policy Considerations.....	255
5.2.1 Road Map of the Contractual Relations.....	256
5.2.2 Reasons to Include Restrictive Clauses in License Contracts.....	257
5.2.3 Enforceability of Restrictive Clauses.....	259
5.2.3.1 The perspective of IP laws.....	259
5.2.3.2 The perspective of secured transaction law.....	261
5.2.3.3 The tension between IP law and secured transaction law.....	263
5.3 Policy Implementation.....	263
5.3.1 China.....	263
5.3.2 UNCITRAL’s Supplement.....	265
5.3.3 US.....	266
5.4 Model Setting.....	274
5.4.1 The Original Two-Party Moral Hazard Model.....	276
5.4.2 Introducing the Third-Party – the Licensor.....	281
5.4.3 UNCITRAL Approach: Negotiations at the Time of Creation.....	284
5.4.4 American Approach: An Additional Choice for Negotiation at the Time of Enforcement.....	289
5.5 Comparison for Different Licenses.....	294
5.5.1 Public Licenses – the FCC licenses.....	295
5.5.1.1 UNCITRAL: Choice 1.....	295
5.5.1.2 US Approach: additional Choice 2.....	296
5.5.1.3 Comparison between the two choices.....	297
5.5.2 Private Licenses - IP Licenses.....	301
5.5.2.1 UNCITRAL: Choice 1.....	301
5.5.2.2 US Approach: additional Choice 2.....	305
5.5.2.3 Comparison between the two choices.....	307
5.5.3 Implications and Limitations.....	310
5.6 Conclusion.....	314

Chapter 6 Conclusions 319
 6.1 Summary of the Main Findings 319
 6.2 Main Policy Implications 323
 6.3 Limits and Future Research 324
REFERENCES 327

ABBREVIATIONS

ADB	Asian Development Bank
AIPPI	International Association for the Protection of Intellectual Property
A.R.	Administrative Regulation
CBC	Central Bank of China
CBRC	China Banking Regulatory Commission
CBRC's Guiding Opinion	CBRC's <i>Guiding Opinions for Commercial Banks on Operating IP collateralization</i>
CSBC	China Securities Regulatory Commission
CTMO	China Trademark Office
DBJ	Development Bank of Japan
D.R.	Departmental Regulation
EBRD	European Bank for Reconstruction and Development
The Guide	UNCITRAL Legislative Guide on Secured Transactions
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IP	intellectual property
IPFS	Intellectual Property Financing Scheme (Singapore)
IPOS	Intellectual Property Office of Singapore
IP Strategy	Outline of the National Intellectual Property Strategy
J.I.	Judicial Interpretation
L.	Law
LOR	License of Right
MIIT	Ministry of Industry and Information Technology of China
NCAC	National Copyright Administration
OECD	Organisation for Economic Cooperation and Development
PBC	People's Bank of China
PRC	People's Republic of China
R&D	Research and Development
SAIC	State Administration of Industry and Commerce
SIPO	State Intellectual Property Office
SME	small and medium-sized enterprise

SPV	special purpose vehicle
The Supplement	UNCITRAL Legislative Guide on Secured Transactions: Supplement on Security Interests in Intellectual Property
TRIPS Agreement	Agreement on Trade-Related Aspects of Intellectual Property Rights
UCC-9	Article 9 of the Uniform Commercial Code of the United States
UKIPO	Intellectual Property Office of the United Kingdom
UNCITRAL	United Nations Commission on International Trade Law
USGAAP	Generally Accepted Accounting Principles
USPTO	United States Patent and Trademark Office
WIPO	World Intellectual Property Organization

Chapter 1 Introduction

1.1 Motivation

As the world continues its irrevocable transition to an international information economy, investments in research and development (R&D) contribute the most to wealth creation. Besides the well-known problem of positive externalities granted by R&D projects, the high adjustment costs of knowledge investment, uncertainties related to the result of R&D projects and informational asymmetry on the projects' states make obtaining external finance for innovation and R&D projects may be more costly compared to similar funding for physical capital investment and hence lead to underinvestment in R&D.¹ Even though equity finance such as angel fund and venture capital may be able to alleviate the R&D funding problem to some extent, it has a very restricted application in several countries only. Many innovative firms, which have already obtained some valuable patents or other types of IP after the venture capital or initial public offering at the start-up stage, may still need more external financing to get the capital necessary for further development or production, but do not want dilution of ownership. The lack of established historical records, sufficient cash flow and tangible assets as collateral are their biggest obstacles for getting access to external credit. Empirical evidence shows that, *ceteris paribus*, credit rationing affects more the R&D participation decision more than the level of R&D spending decision, especially for firms that are both young and small (like small and medium-sized enterprises, SMEs).² So, many welfare-enhancing investment opportunities would be foregone because of the credit rationing instead of just being delayed.

As a solution to this R&D funding problem, the use of intellectual property (IP) as collateral to secure debts or obligations has received an increasing worldwide attention in recent years, because IP are usually the most and maybe the only valuable assets for many R&D intensive firms.³ Economic models show that the assignment of patents as

¹ See Bronwyn H. Hall, "The Financing of Research and Development," *Oxford Review of Economic Policy* 18, no. 1 (March 1, 2002): 35–51 (pointing out the existence of the "funding gap" for R&D activities and identifying the reasons for the funding difficulty).

² See Mancusi and Vezzulli (2014) "R&D and Credit Rationing in SMEs", *infra* note 113.

³ See European Commission (2014) *Final Report from the Expert Group on Intellectual Property Valuation*, *infra* note 207 at 27 ("More generally, IP assets are being increasingly written into the contracts governing broad asset-backed loans. While intangibles have always been included in a blanket lien on all assets, it is

collateral determines the savings of firms and magnifies the effect of innovative rents on investment in R&D.⁴ The survey and choice experiment of Rassenfosse and Fischer (2016) on practitioners also confirms that, on top of the signalling effect conveyed by parents, offering key patents as collateral is even more important to the lender than offering tangible assets.⁵ Nevertheless, the exploitation of IP collateralization in practice is still below the expectation.⁶

Numerous academic studies as well as policy and legal efforts have been done in exploring or removing the obstacles to the prevalence of IP collateralization in practice. In previous literature, two categories of obstacles have been discussed. One category is mainly about the liquidation value of encumbered IP, such as, severely discounted forced-liquidation value; the fluctuation in the liquidation value of IP and the lack of generally accepted valuation methodologies.⁷ However, most of the efforts take the theories used for explaining traditional secured transaction as given and try to find ways to make IP have the same characteristics as ordinary tangible assets instead of exploring the possible effects of IP's characteristics on the theories of secured transactions. So, the resulting suggestions for promoting IP collateralization are mainly about improving IP valuation methodologies,⁸ using IP with a bigger market size and greater redeployability as collateral,⁹ and using structured IP securitization to reduce the influence of IP holder on the collateral value of IP and to diversify the portfolio.¹⁰

While we acknowledge the contribution of these efforts, some limitations should be mentioned. First, these efforts reflect the caution regarding the liquidation value of IP but cannot provide enough justifications for promoting IP collateralization. The proposed suggestions are reasonable but would be applicable to a very limited range of

becoming more commonplace for creditors to focus their analysis more directly on intangibles, either as a separate asset or as an integral part of overall company value.”)

⁴ See Amable, Chatelain and Ralf (2010) “Patents as Collateral”, *infra* note 125.

⁵ See Rassenfosse and Fischer (2016) “Venture Debt Financing: Determinants of the Lending Decision”, *infra* note 250.

⁶ See European Commission (2000) “*Funding of New Technology-Based Firms by Commercial Banks in Europe*”, *infra* note 142 (positing that despite its potential for innovation financing, IP-based finance (including collateralization) is widely believed to be under-exploited, especially by those young SMEs that would need it most).

⁷ See detailed discussion on IP valuation in Section 2.3.2.2.

⁸ See the discussion on the efforts in Section 2.3.2.2 D.

⁹ See, e.g. Odasso and Ughetto (2011) “Patent-Backed Securities in Pharmaceuticals: What Determines Success or Failure?” *infra* note 193

¹⁰ See, for example, Chu (1998) “Bowie Bonds: A Key to Unlocking, the Wealth of Intellectual Property”, *infra* note 117; Gabala (2003) “Intellectual Alchemy: Securitization of Intellectual Property as an Innovative Form of Alternative Financing”, *infra* note 117.

IP or in very few countries with sophisticated finance markets for structured transactions and thus deprive many valuable IP of being used as collateral. Second, the mere emphasis on the liquidation value of collateralized IP cannot explain some phenomena in practice. If the liquidation value is the main concern of the lenders, it is difficult to explain why offering key patents as collateral is equally and sometimes even more important for many lenders than offering tangible assets, as evidenced by the survey of Rassenfosse and Fischer (2016).¹¹

Meanwhile, numerous legal efforts have been made for reducing the transaction costs. The legal efforts can be categorized into two main approaches. The first approach focuses on reminding practitioners of the issues that need attention in the due diligence process, and pointing out the problems in perfecting security interests at the registries, especially in the UK and the US.¹² The second approach of the legal efforts is from the perspective of legislators. It has been acknowledged that in this knowledge economy, the secured transaction law needs to be adapted to meet the challenges brought by IP. After realizing that the fragmentation of laws gives rise to substantial legal uncertainties and risks, the establishment of an integrated legal framework, which is comprised of unitary rules for a fair and effective management of IP assets and the safe conclusion of secured transactions, is envisaged by numerous legal initiatives at both the national level (as in China) and the international level (especially those led by the UNCITRAL).¹³ However, in the same way as the academic efforts, most of these legal efforts do not really take into account the divergences between the economic rationales underlying ordinary tangible movables and that underlying IP. They have not fully taken into account the possible effects of IP's special characteristics on the fundamental theories of the law of secured transactions.

¹¹ See Rassenfosse and Fischer (2016) "Venture Debt Financing: Determinants of the Lending Decision", *infra note* 250.

¹² See the discussion about the practical legal issues regarding IP collateralization in the UK in, for example, Lipton (2002) "Intellectual Property in the Information Age and Secured Finance Practice", *infra note* 154; Andrea Tosato, "Security Interests over Intellectual Property," *Journal of Intellectual Property Law & Practice* 6, no. 2 (2011): 93–104. See the discussion about the US in, for example, Brennan (2001), "Financing Intellectual Property Under Federal Law: A National Imperative (Electronic Version)," *infra note* 302; Murphy (2002), "Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property", *infra note* 494. See the international comparative studies in, for example, Lipton (2010) "Security Interests in Intellectual Property", *infra note* 145; Brennan (2001) "Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version)," *infra note* 302.

¹³ See, for example, Tosato (2009) "The UNCITRAL Annex on Security Rights in IP: A Work in Progress", *infra note* 591; See Brennan (2009), "International Intellectual Property Financing: An Overview," *supra note* 261.

These problems remind us that, in order to give plausible explanations to these phenomena and to find suitable legal rules and policies for promoting IP collateralization, it might be necessary to go back to the fundamental law and economics theories about secured transaction law and IP law to find out the real roles that collaterals play in the secured transactions, and to explore how the special characteristics of IP would affect these roles when IP are used as collateral. Only a further and more comprehensive exploration of the advantages and challenges brought by IP collateralization from the perspective of law and economics analysis can help us answer the basic question of why it is important to study the use of IP as collateralization in secured transactions. The reasons should lead us to find a more practical way to promote IP collateralization in practice. At the same time, this exploration can also help us get a better understanding about the fundamental theoretical issues in secured transaction law and IP law.

1.2 Research Questions

This whole project is about promoting the use of IP rights (in the general sense, including the rights of an IP owner, licensor and licensee) as collateral in debt finance, in order to solve the problem in funding R&D activities and to foster innovation.

It is worthy to clarify here that IP collateralization is just considered as a possible solution to the funding problems when certain conditions are met. IP is the intermediate result of innovation processes, and in many cases, maybe the only valuable asset of many technology-intensive firms at that stage. Allowing IP to be exploited for supporting external finance is expected to alleviate the financial constraints that R&D projects are facing in some instances. Nevertheless, IP collateralization is not the only solution and it is certainly not the solution for all projects.

Of course, not all IP possess economic impacts. The use of IP as collateral is inherently more risky compared to using other tangible assets. The lenders/creditors shall carefully select and accept those valuable IP as collateral only. This dissertation does not attempt to argue that any given IP should be used as collateral, or to specifically identify which kinds of IP are valuable to be used as collateral, or to instruct the practitioners on how to structure the transactions. These practical issues are left with financial experts in IP valuation and secured transactions to deal with.

Instead, we explore the theoretical reasons to explain two main questions. First, why has the practice accepted some IP as collateral from the perspective of law and economics? Second, why is supporting IP collateralization socially beneficial? We aim to ensure that the relevant legal issues would not be the deal-breakers when both the borrowers and the lenders have already reached a willingness of accepting some IP as collateral. Therefore, we identify the legal impediments that may obstruct transactions and expect to improve the legal framework to facilitate the transactions.

The overall research question of this dissertation is:

What is the preferred legal framework to optimize the use of IP as collateral in debt finance in order to solve the problems in funding R&D activities and to foster innovation?

To explore and answer this research question, we first need some theoretical support for the legal and policy intervention in promoting IP collateralization from the law and economics perspective. Law and economics analysis usually starts from the Coase Theorem, which holds that in a perfect market where transaction costs are negligible and costless bargaining is possible (including perfect information), the voluntary negotiations and bargains between the parties in the market can lead to socially efficient results.¹⁴ Then the law does not matter for the social efficiency but only for the distribution of wealth. For justifying law or any form of government intervention (taxes, fines, or liability), there should be reasons contributing to a market failure, such as asymmetrical information, transaction cost, and positive or negative externalities. The logic behind the analysis would be, is there any market failure? Should law intervene? If yes, then how should the law intervene?

So, the first question is: why should we advocate IP collateralization in the first place? For answering this question, we need to explore the following sub-questions.

- What are the real problems behind the difficulty of SMEs to fund their R&D activities?;

¹⁴ The mainstream law and economics literature agree that the Coase Theorem is built on Ronald Coase's eminent article on social cost in 1960, i.e., Ronald H. Coase, "The Problem of Social Cost," *The Journal of Law and Economics* 3, no. 1 (1960): 1–44, *supra* note 19, *see in*, for example, Guido Calabresi, "Transaction Costs, Resource Allocation and Liability Rules--A Comment," *Journal of Law and Economics* 11 (1968): 67–74; and Richard A. Posner, "Law and Economics in Common-Law, Civil-Law, and Developing Nations," *Ratio Juris* 17, no. 1 (2004): 66–79.

- What are the alternative options that high-tech SMEs can go for with financial needs?
- What are the advantages and drawbacks of the other financial alternatives?
- What are the advantages and drawbacks of IP collateralization?
- What characteristics of IP make IP good collateral?

Then, when we want to discuss how we should design surrounding laws and policies to support IP collateralization, we need find answers to the following sub-questions.

- What are the legal problems?
- What are the reasons causing these problems?
- How do the characteristics of IP make differences?
- What should be our guiding principles in solving these problems?
- What should be the criteria for assessing the effectiveness and efficiency of the legal framework for IP collateralization?

In the end, as our main purpose, we want to know whether the current Chinese rule, US rule and the UNCITRAL supplement have met the criteria? If not, what legal suggestions can we propose?

The answers to these research questions are expected to contribute to the debate on the reforming legal rules for IP collateralization in general and on the ongoing reform efforts in China in particular.

1.3 Plan of Chapters

For addressing the research questions described above, this dissertation is composed of six chapters.

After this introductory chapter, Chapter 2 lays the theoretical foundations for supporting the promotion of IP collateralization. It firstly gives an overall picture of the funding problem that small and medium high-tech firms face in funding research and development activities. It briefly explores how information asymmetry gives rise to funding problems and affects the availability of funding alternatives. Then it examines the pros and cons of each practical funding alternative and how they address the information asymmetry problems. The examination points out how the importance of debt finance in funding R&D has been neglected in previous literature and

identifies the cases where debt finance is preferred. Then it gives a detailed discussion on the potential pros and cons of using IP as collateral in debt finance, the under-expected performance in practice and the possible impediments to its practical application. For further exploration of the economic reasons for promoting IP collateralization, it goes back to the basic theories of debt finance and recalls the role of collateral in solving the informational asymmetry problems. It then examines how the characteristics of IP can fit into the basic theories of debt finance and actually make IP good collateral in solving the informational asymmetry problems. It illustrates why promoting IP collateralization for innovating firms is an important topic in need of further research.

The general background discussion in Chapter 2 has pointed out that transaction costs are the major factor that can affect the effective use of IP as collateral. The legal framework governing IP collateralization directly determines the transaction costs, the contracting time, the certainty of the transaction result and the incentives of relevant parties. IP collateralization, however, involves legal issues in both IP laws and secured transaction laws. The main legal problem is caused by the tension between IP laws and secured transaction laws. The tension comes from the dogmatic separation and fragmentation among national laws. Chapter 3 reviews the economic theories of credit access and that of IP protection to clarify the ultimate economic objectives and function that the legal framework of IP collateralization wants to achieve and fulfill. It discusses how the economic rationales and legal regime of IP protection are different from those of other assets; and how the differences determine the need of IP collateralization for special legal rules. Then it establishes the general efficiency criteria regarding the creation, perfection, and enforcement of the security interests in IP. The review, on the one hand, points out the issues where IP law and secured transaction law may cause potential conflicts when establishing a unitary legal regime for IP collateralization; and on the other hand, also helps us establish a conceptual assessment framework for the comparative study in Chapter 4.

The comparative examination in Chapter 4 is carried among the corresponding domestic laws in China and the US, and the international efforts made by the UNCITRAL on the document, i.e., UNCITRAL Legislative Guide on Secured Transactions: Supplement on Security Rights in Intellectual Property (the *UNCITRAL Supplement*). The comparative study is expected to show the difficulties in coordinating the two sectors of laws and to shed light on our understanding of how to

build up an efficient legal regime for IP collateralization. In the theoretical part, the main L&E theories regarding secured transaction law will be re-examined in the context of IP collateralization with taking into account the special characteristics of IP.

After this overall examination on the general legal framework for IP collateralization, Chapter 5 addresses a specific legal issue in practice to illustrate and further explore the divergences between IP law and secured transaction law. It looks into the enforceability of anti-assignment or anti-attachment clauses in the IP licenses in the case of IP Collateralization. It is an excellent example of illustrating the case where IP law and secured transaction have different tendencies when addressing the same issues. It shows that the secured transaction law, with the objective of expanding the scope of assets eligible for being used as collateral for provision of low-cost credit, tends to invalidate anti-assignment clauses in IP licenses in order to enable licensees to use the full value of their interests under IP licenses as security to finance their profitable projects. But invalidating the anti-assignment clauses may reduce the licensor's control over their innovations. On the other hand, with the objective of awarding the innovators and providing incentives for innovation, IP laws tend to enforce the anti-assignment clauses so that the licensors can keep their control over the exploitation of the invention underlying the license and also the license counterparty. However, enforcing anti-assignment clauses could also allow licensors to hold-up its consent in order to drag profits from the licensee's use of license as collateral. The failure to internalize all the profit of using IP license as collateral would be a disincentive for licensees to borrow and invest. The licensor's hold-up can change the equilibrium of the lending decision and result in less available credit. This chapter uses a formal debt finance model to show the negotiations among licensors, licensees, and creditors when they make license decisions and lending decisions. The analysis shows how different legal rules, i.e., the UNCITRAL Supplement rule, US UCC-9 rule and Chinese rule, can change the time of negotiation and the bargain powers among parties, and consequently change the equilibrium of the lending decision, and eventually have an impact upon investment decisions and the total social welfare.

Chapter 6 concludes this dissertation by summarizing all key findings, highlighting the contributions for theory and practice, pointing out what is missing in this dissertation and suggesting the avenues for future research.

1.4 Methodology

Throughout the thesis, various methodologies are employed for serving different purposes. In some chapters, several methodologies are employed at the same time.

1.4.1 Law and Economics

The economic analysis of law, or law and economics, as a methodology, may be defined as the application of economic theory and methods to examine the “formation, structure, processes and impact of law and legal institutions”.¹⁵ It can be traced back to Bentham and Adam Smith as early as 1830s, but its current prominent influence shall be contributed to greatly by the Chicago School since the 1960s.¹⁶ The idea that the principles and reasoning of neo-classical economics can be applied to understand and evaluate legal rules and institutions is based on a crucial (but also controversial) assumption that people behave rationally for their self-interest most of the time in their social human behavior, in the same way as they are making explicitly economic decisions (i.e., the “Rational Choice Model”).¹⁷

Since the Judge Learned Hand’s first use of a formal mathematical model (the Hand Rule) to determine negligence in 1947,¹⁸ and the eminent works of Coase (1960), Calabresi (1961) and Becker (1968) in the 1960s,¹⁹ economic analysis, and especially sophisticated mathematical models, has been applied to law to interpret how law

¹⁵ See Ejan Mackaay, “History of Law and Economics,” in *Encyclopedia of Law and Economics, Volume I. The History and Methodology of Law and Economics*, ed. Boudewijn Bouckaert and Gerrit De Geest (Cheltenham: Edward Elgar, 2000), 65–117 at 65.

¹⁶ For the discussions on the early history of the law and economics movement, see Mackaay (2000), “History of Law and Economics,” *ibid*; and Richard A. Posner, “The Law and Economics Movement: From Bentham to Becker,” in *The Origins of Law and Economics: Essays By The Founding Fathers (The Locke Institute)*, ed. Francesco Parisi and Charles Kershaw Rowley (Cheltenham: Edward Elgar, 2005), 328–49.

¹⁷ See Ronald H. Coase, “Economics and Contiguous Disciplines,” *The Journal of Legal Studies* 7, no. 2 (1978): 201–11.

¹⁸ See the famous case *U.S. v. Carroll Towing*, 159 F.2d 169 (2nd Cir. 1947) (using the “Hand Rule” to test if an injurer’s precaution level is efficient).

¹⁹ See Ronald H. Coase, “The Problem of Social Cost,” *The Journal of Law and Economics* 3, no. 1 (1960): 1–44 (on externalities and legal liability); Guido Calabresi, “Some Thoughts on Risk Distribution and the Law of Torts,” *The Yale Law Journal* 74, no. 4 (1961): 499–553 (on accident law); Gary Becker, “The Economics of Crime and Punishment,” *Journal of Political Economy* 76, no. 2 (1968): 169–217 (on crime and law enforcement).

creates incentives for behavior.²⁰ Miceli and Baker (2013) address the issue that “Economic analysis differs from other approaches to the study of law most notably in its use of formal models to describe human behavior, and in particular, how people will respond to different legal rules. The usefulness of models is that they allow the analysis to focus on answering a specific question with respect to the particular rule under scrutiny, and to derive a clear understanding of what its effects will be, much as a controlled laboratory experiment allows a researcher to isolate a specific physical or chemical effect.”²¹

Economic analysis can be applied to modeling law in two distinct approaches, namely, positive and normative. A positive analysis answers the question of “what are the effects of legal rules on the behavior of relevant actors?”²² The modeling aims at understanding the economic logic and impact of a particular existing legal rule, by using economic theory to describe the incentive effects of legal rules and to predict behavior in a particular institutional setting. A normative analysis answers the question of “Are these effects of legal rules socially desirable?”²³ The modeling aims at prescribing a better outcome or policy, by employing some analysis framework of welfare economics to assess social desirability based on some articulated social norm such as (productive or allocative) efficiency, fairness, or justice. Both approaches can be employed at the same time to identify the effects and desirability of a specific legal rule and to propose a legal rule better at regulating conducts.

In Chapter 5, when exploring the enforceability of an anti-assignment or anti-attachment clause in IP license in the context of IP collateralization, we use a simple debt finance moral hazard model to examine how parties would react and make negotiation under different rules (positive analysis) and to evaluate if these rules lead to socially efficient results (normative analysis). In the analysis, Kaldor-Hicks efficiency is used as the assessment criterion.

²⁰ For the discussion on the history and expansion of economic models of law, see Thomas j. Miceli and Matthew J. Baker, “Introduction,” in *Research Handbook on Economic Models of Law*, ed. Thomas j. Miceli and Matthew J. Baker (Cheltenham: Edward Elgar, 2013), 1–13.

²¹ See Miceli and Baker (2013) “Introduction”, *ibid* at 1.

²² See Louis Kaplow and Steven Shavell, “Economic Analysis of Law,” in *Handbook of Public Economics (Volume 3)*, ed. Alan J. Auerbach and Martin Feldstein (Elsevier, 2002), 1661–1784 at 1665-1666 (defining “economic analysis of law” as “an emerging field under which standard tools of microeconomics are employed to identify the effects of legal rules and their social desirability”).

²³ See Kaplow and Shavell (2002) “Economic Analysis of Law”, *ibid* at 1666.

However, modeling law has also been criticized for its abstract assumptions, single value criterion, or exclusion of many influential factors, such as historical, political, and social factors, just in order to simplify the complex real world for fitting into the formal mathematical analysis framework. By contrast, institutional economics views the market as an evolutionary process and a result of the complex interaction among various institutions, especially economic, legal and political institutions.²⁴ Law and markets interact as alternative social institutions for coordinating human behaviors. Both law and economics, as two disciplines of social science, add different insights to our understanding of our economic activities and social policies. “Economics adds the insights of economic science; law adds the understanding of complex institutions, politics, and social policies.”²⁵

It is therefore suggested to look into the reality, by exploring the historical, political, and social, as well as economic factors, rather than relying on abstract mathematical modeling only. Legal changes on property rights should be expected to reflect economic needs and changes.²⁶ The law and economics analysis calls for a comprehensive analysis of the actual economic conditions, taking into account the institutional forms and factual or historical background within which legal rules and transactions take place.²⁷ The comprehensive analysis provides richer explanations for the phenomena under investigation. It helps in deepening the analysis to reflect the various public policy objectives of legal rules, rather than focusing on a single criterion, i.e., the “efficiency”.

In Chapter 2, we establish the reasons for policy and legal intervention in promoting IP collateralization, by looking into the real funding problems that high-tech SMEs are facing in their R&D investments, mainly the asymmetric information problems in the ex ante and ex post lending relationships and the associated high transaction costs. It explores how different alternatives solve the information problems and points out the pros and cons of each financial alternative. Then it discusses in which cases debt finance might be possible and beneficial. By going back to the basic theory of debt

²⁴ *Ibid*, at 77-80.

²⁵ See Geoffrey P. Miller, “Law and Economics versus Economic Analysis of Law,” *American Bankruptcy Institute Law Review* 19, no. 2 (2011): 459–70, at 460 (stating that “Law and economics, ..., is a genuine partnership of two disciplines, each with something to contribute. Economics adds the insights of economy science; law adds the understanding of complex institutions, politics, and social policies”)

²⁶ See Heath Pearson, *Origins of Law and Economics: The Economists’ New Science of Law, 1830-1930 (Historical Perspectives on Modern Economics)* (Cambridge University Press, 1997) at 33.

²⁷ See JLEO, “Editors’ Foreword,” *Journal of Law, Economics, and Organization* 1, no. 1 (1985): 3–4 at 3.

finance and explaining the roles of IP as collateral in solving the information problems, it provides theoretical supports to accept IP collateralization as an alternative solution to solve the funding problem.

Then, Chapter 3 explores how the law should intervene in establishing an integrated legal framework for IP collateralization, by examining the economic incentives of market participants and taking into account the institutional forms within which the IP collateralization transaction occurs. In the end, based on the criteria set in Chapter 3, we examine the effectiveness and efficiency of existing legal rules in different jurisdictions in Chapter 4 from a general framework perspective.

1.4.2 Comparative Law and Economics Analysis

Mattei et al. (2000) state that comparative law and economics “is situated at the crossroads of two different scholarly traditions, comparative law and economic analysis of the law. Comparative law and economics combines the instruments and methodologies of both these two disciplines because in this way it is possible to better understand the reasons of existing legal rules and institutions and of their evolution.”²⁸ It is based on the belief that the economic evaluation of a specific legal issue or rule cannot be done without looking into the whole legal framework setting and its historical development.²⁹

Instead of discussing the specific legal provisions only, comparative law and economics also addresses the historically evolutionary background, which can help us better understand the structural nature of different institutional settings.³⁰ The broader discussion helps in identifying the reasoning and considerations hidden behind different formal rules. It provides the background information for grasping the whole legal framework and for discussing specific legal rules. The comparative law and economic analysis usually adopts a “functionalism approach”, which “measures legal

²⁸ See Ugo A. Mattei, Luisa Antonioli, and Andrea Rossato, “Comparative Law and Economics Law,” in *Encyclopedia of Law and Economics (Volume I), The History and Methodology of Law and Economics*, ed. Boudewijn Bouckaert and Gerrit De Geest (Cheltenham: Edward Elgar, 2000), 505–538, <http://encyclo.findlaw.com/0560book.pdf> at 505.

²⁹ See Mackaay (2000), “History of Law and Economics,” *supra note* 15, at 83-86.

³⁰ *Ibid*, at 508 (stipulating that comparative law analysis can be “static” and “dynamic”. The latter “tries to give account of the mutual interactions between legal systems in the course of history and mainly focuses on legal change.”)

rules not by their doctrinal consistency but by their ability to fulfill societal needs”.³¹ It also focuses more on the resulting functional differences rather than on the formality divergence in the legal rules.

The methodology of “comparative law and economics analysis” is adopted in Chapter 4 and 5. The legal systems under analysis include Chinese law, US law and the *UNCITRAL Supplement*.

Chinese law is chosen because of China’s economic importance in the world and its urgent need for an efficient legal framework of IP collateralization for stimulating R&D investments. China has made legal changes and implemented many policies to stimulate and promote IP collateralization in recent years. Some practical observers notice that “while many banks and financial institutions remain cautious about the idea of IP assets as collateral” in many countries, both eastern and western, “China is one place where banks have not hesitated to hand out loans backed by IP assets”.³² This study would be the first literature having an overall review of the status quos of IP collateralization in China and giving critically examination on those legal changes.

US law is chosen for its influence on the modern secured transaction system all over the world and its high level of IP protection. So the conflicts between secured transaction law and IP law occurring in the US legal regime are more obvious and representative. As a typical common law jurisdiction, the US can be used as an opposite counterpart to compare with the civil law model represented by Chinese law.

The *UNCITRAL Legislative Guide on Secured Transactions: Supplement on Security Rights in Intellectual Property* (the *UNCIRAL Supplement*) is the first and also one of the most important international initiatives in addressing the legal problems in IP collateralization. The overall objective of the *UNCIRAL Supplement* is to enhance the availability of low-cost secured credits to IP right holders. Although the *UNCITRAL Supplement* has not been implemented in the national level, it reflects some of the recent achievements in the secured transaction law sector and provides plenty of basic principles for modernizing laws for IP collateralization.

³¹ See Ralf Michaels, “The Second Wave of Comparative Law and Economics,” *University of Toronto Law Journal* 59 (2009): 197–213 at 201.

³² See Jacob Schindler, “There is still a fight on to become Asia’s IP hub, but it may be an idea whose time has come and gone”, 06-05-2016, available at: <http://www.iam-media.com/blog/detail.aspx?g=a82ddfc4-cc9a-4242-9332-0465144be46b>.

By adopting a functional approach, instead of discussing the differences in terminology or formality or the legal origins, we focus on examining how the rules work in solving the divergences between IP laws and secured transactions (positive analysis) and evaluating if they are effective and efficient in risk-control and transaction cost reduction (normative analysis).

For the analysis on a specific legal matter, we also address the draft process and the evolutionary background in each jurisdiction, which contain important information for the economic analysis of legal rules. For example, in Chapter 5, in the discussion of the US rule, checking the evolutionary background of the UCC 9-408 helps us understand where this rule comes from and why this legal change works for other licenses, and helps us check if this legal change also works for IP licenses.

1.4.3 An Integrated Approach

The author is fully aware of the fact that IP is a general concept which embraces a bundle of protection regimes. There are different statutory schemes for each category of IP, such as patents, trademarks and copyrights. Although the exact economic rationales are different for various categories of IP, the fundamental economic rationale underlying the IP protection regime is similar. In principle, the IP system provides the incentive to create (or establish recognition) by granting investors with the statutory exclusive rights and rewarding successful creators through monopoly profits.

The common “monopoly profit” given by the IP protection system is the essential reason why IP can be used as collateral. IP, as a kind of intangible asset, has economic value for both of the IP holder-debtor and the secured creditor. The IP system assigns the innovators with exclusive property rights over the knowledge and information (for a certain period of time) in exchange for sufficient public disclosure of the innovative knowledge. The temporary statutory exclusivity given by the IP laws allows IP holders to restrict access to the knowledge/innovation/reputation they produce and to charge a monopoly price (or licensing fee) that exceeds the marginal cost for an authorized access. This statutory exclusivity is designed to enable innovators to cover their initial investment and to earn profits. So, IP clearly has economic value to the IP holder-debtor. Meanwhile, the statutory exclusivity might be wanted by other players in the market in order to use the underlying invention or to exclude others from using

it. IP therefore also has liquidation value to the secured creditor. In this sense, patents, copyrights and trademarks share the same economic rationale for being used as collateral.

Therefore, this dissertation adopts an integrated approach and uses the generic term “IP” in a general way. As the discussion mainly deals with the difficulties in funding R&D activities and patent is the main protection regime for the outputs of R&D activities, in the chapters for providing theoretical supports (Chapter 2, 3 and 5), the analysis will focus on patents in order to illustrate the relevant issues and have a deeper discussion of the chapters for providing theoretical supports. In most cases, the analytical reasoning can also apply to the use of other types of IP as collateral in other industries as well, since the main information problems discussed in funding the R&D activities also exist in other industries, just with different levels of severity. The other types of IP like copyright and trademarks will be briefly mentioned when the differences in the exact underlying economic rationales matter (such as at the end of Section 2.4.2.1).

In Chapter 4, the one specifically on legal issues, all the three main types of IP will be discussed in greater detail. As a matter of fact, the existence of significant disparities among legal rules for patents, copyrights and trademarks on many core issues is one of the main observations from the comparative legal study. The examination shows that, in Chinese law, the significant disparities on the rules for different types of IP are mainly the results of the absence of unitary guidance and the lack of coordination among the laws, not for catering to different economic rationales (Section 4.2 and 4.6.2.1).

Furthermore, this dissertation focuses on small and medium sized technology-driven enterprises (high-tech SMEs), since they need external funding the most (Section 2.1.2), but they suffer the most severe information problems (Section 2.1.2 and Section 2.2.5). They have fewer financial alternatives than large or more established firms. As a response to the lack of assets as collateral in debt finance, creating security interests over IP has been proposed as a solution to reduce the cost of debt finance for funding R&D projects, because IP are the most valuable but also maybe the only valuable assets of many technology-intensive SMEs. And when SMEs use IP collateralization, they may face a higher risk of litigation challenging the validity or ownership of the encumbered IP (Section 2.3.2.1 A). Therefore, we use high-tech

SMEs as a typical representative to illustrate the crucial problems. This focus does not prevent the results of the analysis from being applicable to large firms in other industries.

Chapter 2 Finance of R&D Projects and Security Interests in

IP

As a starting point, this chapter aims to capture the complexity of the problems in funding R&D, to give a comprehensive review on the existing literature and point out the problems thereof, and to draw a framework for further research in the next chapters. At first, it briefly explores the factors that contribute to the financing constraints in funding R&D projects. Special attention will be paid to the asymmetric information problems attached to technology-driven firms. The section explains how informational asymmetries affect a firm's finance choice and involves a brief review of existing, theoretical and practical solutions to the informational asymmetries problem. The second examines the pros and cons of each solution and points out how the importance of debt finance in funding R&D has been neglected in existing literature. The third section turns to a more detailed discussion on the potential pros and cons of using IP as collateral in debt finance, the under-expected performance in practice and the possible impediments to its practical application. It goes back to the basic theories of debt finance and recalls the role of collateral in solving the informational asymmetry problems. It then examines how some characteristics of IP can fit into the basic theories of debt finance and actually make IP good collateral in solving the informational asymmetry problems.

2.1 Problems in Funding R&D Activities

Although the value of R&D is substantial against the backdrop of the current knowledge-based economy, many R&D projects are suffering financial constraints. Some unique characteristics of the intangible outputs resulting from the R&D investments cause the financial constraints.

2.1.1 Internal Funding - Appropriability Problem

2.1.1.1 Non-rivalry of knowledge

The best-known reasons for the underinvestment in R&D projects are the high initial fixed investment cost and the “public good” characteristics of the main output.³³

An R&D project is typically associated with high initial fixed costs, mainly on the labour (transaction-specific human capital). The fixed cost has to be incurred in advance. If the project fails, the value of alternative uses (or by alternative users) of the intermediate results is low. In the case of success, different from most of other kinds of investment whose outputs are tangible assets, the main output of R&D projects is the result of human intellect, that is, the knowledge of how to make new goods or services.

However, knowledge is a kind of intangible asset whose consumption is “non-rival”, i.e., the use of knowledge by one firm or individual does not diminish its utility to others.³⁴ And once knowledge is created, it is difficult to keep it secret or exclude others from exploiting it. As the cost of imitating an invention is very low, the public can easily free ride on the investors or innovators’ costly efforts in developing innovations.³⁵ The inventor cannot cover their high initial fixed investment in the R&D. Therefore, the total social returns to the investment in developing the knowledge cannot be fully appropriated by its investor undertaking the R&D investments. This is a typical problem of “positive externalities” or “spill-over”. There would be underinvestment because of the lack of rational incentive for investors or

³³ See Richard R Nelson, “The Simple Economics of Basic Scientific Research,” *Journal of Political Economy* 67, no. 3 (1959): 297–306.

³⁴ See Kenneth Joseph Arrow, “Economic Welfare and the Allocation of Resources for Innovation,” in *The Rate and Direction of Inventive Activity: Economic and Social Factors*, ed. Richard R Nelson (New Jersey: Princeton, 1962), 609–26.

³⁵ See, e.g., Bronwyn H. Hall, “The Private and Social Returns to Research and Development,” in *Technology, R&D, and the Economy*, ed. Bruce L.R. Smith and Claude E. Barfield (Washington, DC: Brookings Institution and the American Enterprise Institute, 1996), 140–83 (showing the social returns to R&D is higher than its private returns); also Richard C. Levin et al., “Appropriating the Returns from Industrial Research and Development,” *Brookings Papers on Economic Activity* 1987, no. 3 (Special Issue On Microeconomics) (1987): 783–831.

innovators to invest in R&D activities for the production of innovation. The problem is also known as the “appropriability problem”.³⁶

2.1.1.2 IP Protection solution

Several solutions have been suggested and implemented to provide returns and rewards to the investment in knowledge, in order to correct the appropriability problem. These solutions include trade secrecy, governmental subsidies, public funding, prizes, R&D tax incentives, research partnerships, and the IP protection system.³⁷ Among all these solutions, the IP protection system is dominant particularly in industries with a longer product lifecycle, or more frequent employee switches, and for protecting innovations with greater value.³⁸

The IP system embraces a bundle of protection regimes. There are different statutory schemes for each category of IP, such as patents, trademarks and copyrights. Since the comprehensive Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS Agreement) was enacted worldwide by the World Trade Organization (WTO) in 1994, the statutory schemes of IP are broadly harmonized to a certain extent, despite continuing variations in the level and scope of legal protection among jurisdictions. While this thesis discusses the whole IP system in a general way, it deals with the main technological outputs from R&D activities and the remaining chapters will therefore focus on patents and with some brief references to other types of IP.

³⁶ See further discussion on the “appropriate problem” in, e.g., Sidney G. Winter, “The Logic of Appropriability: From Schumpeter to Arrow to Teece,” *Research Policy* 35, no. 8 (2006): 1100–1106; Andrés López, “Innovation and Appropriability: Empirical Evidence and Research Agenda,” in *The Economics of Intellectual Property: Suggestions for Further Research in Developing Countries and Countries with Economies in Transition* (World Intellectual Property Organization, 2009), 1–40.

³⁷ See the comparison on the pros and cons of different incentive mechanisms, including prizes, government-supported research and the patent system, in Joseph E. Stiglitz, “Economic Foundations of Intellectual Property Rights,” *Duke Law Journal* 57, no. 6 (2008): 1693 – 1724 at 1721-1724.

³⁸ See, e.g., Vincenzo Denicolo and Luigi Alberto Franzoni, “Weak Intellectual Property Rights, Research Spillovers, and the Incentive to Innovate,” *American Law and Economics Review* 14, no. 1 (2012): 111–140 (with a “ratio test” model, showing that “exclusive IP rights are preferable when competition from potential imitators is weak, the innovation attracts large R&D investments, and research spillovers are small”). See the summary of literature in Carl Benedikt Frey, *Intellectual Property Rights And The Financing Of Technological Innovation: Public Policy and the Efficiency of Capital Markets* (Cheltenham: Edward Elgar Publishing Ltd, 2013), at 22.

Although the precise economic justifications are also different for various categories of IP,³⁹ in principle, the IP system solves the “appropriability problem” by rewarding successful research through monopoly profits. It integrates the positive externalities of R&D investments into the market price system by transforming non-rival intangible knowledge into tradable property rights. The IP system assigns the innovators with exclusive property rights over the knowledge and information (for a certain period of time) in exchange for sufficient public disclosure of the innovative knowledge.⁴⁰ The IP rights empower investors with monopoly status to impose prohibitions against unauthorized exploitation of the commercially valuable knowledge they produce or to charge the access of authorized users with a price that exceeds the marginal cost of production. The higher price enables investors to cover their initial investment and to drive profits.

In addition, Schumpeter (1976) argues that the monopoly profit also creates incentives for rivals and imitators to compete for innovation, in order to replace the existing monopolist.⁴¹ The “Schumpeterian competition” implies “temporary” monopolies and intensive competition on continuous innovation. In the argument, the IP system is considered to be efficient from a dynamic perspective, because it provides investors with economic incentives to invest in R&D and to disclose information about the innovations, and subsequently promotes the final access to the innovations.

³⁹ The homepage of WTO gives a very general explanation on the social purpose of IP regime. For Copyrights, “The main social purpose of protection of copyright and related rights is to encourage and reward creative work.” For trademarks, “The protection of such distinctive signs aims to stimulate and ensure fair competition and to protect consumers, by enabling them to make informed choices between various goods and services.” For Patents, “The social purpose is to provide protection for the results of investment in the development of new technology, thus giving the incentive and means to finance research and development activities.” And “A functioning intellectual property regime should also facilitate the transfer of technology in the form of foreign direct investment, joint ventures and licensing.” available at: http://www.wto.org/english/tratop_e/trips_e/intel1_e.htm. See the precise economic justifications for various categories of IP in, e.g. Lionel Bently and Brad Sherman, *Intellectual Property Law*, 2nd ed (Oxford: Oxford University Press, 2004) at 32-7 (copyrights), 327-9 (patents), 699-702 (trademarks); Suzanne Scotchmer, *Innovation and Incentives* (Cambridge: MIT Press, 2004) at 65-91, and William M. Landes and Richard A. Posner, *The Economic Structure of Intellectual Property Law* (Belknap Press of Harvard University Press, 2003). See other non-economic justifications for the IP system in, e.g., Justin Hughes, “The Philosophy of Intellectual Property,” *Georgetown Law Journal* 77 (1988): 287–366.

⁴⁰ See the definition of IP at the WTO homepage, i.e., IP are “the exclusive rights given to creators over the use of the creations of their minds for a certain period of time.” available at: http://www.wto.org/english/tratop_e/trips_e/intel1_e.htm.

⁴¹ See Joseph A. Schumpeter, *Capitalism, Socialism and Democracy*, 6th 1976 ed. (Routledge, 2006) at 81-96 (Chapter 7 on “The Process of Creative Destruction”).

However, the statutory exclusivity granted by IP has always been questioned on the basis that it creates static inefficiency, distorted incentives and high transaction cost.

First and intuitively, allowing innovators to charge a monopoly price creates static inefficiency. With the non-rivalry nature of knowledge, from the static perspective, productive efficiency is achieved when the market price is equal to the marginal costs of production and distribution. Charging the monopoly that exceeds the marginal cost of production restricts the access to knowledge and increases the cost of using knowledge. Therefore, the term of protection⁴² and other specific eligibility requirements are brought into the legal system of IP as its basic policy, in order to achieve a balance between the social interests derived from providing economic incentives to creators and the social costs bought by limiting the free spread of knowledge and ideas. The benefits of widespread diffusion can be achieved when the term of protection expires.

Second, IP protection may misallocate resources and impede innovation. Dasgupta and Stiglitz (1980) point out that the “Schumpeterian competition” might be too optimistic because the “monopoly power, once established, can easily be perpetuated”.⁴³ The monopoly profit gives protected innovators distorted incentives to impede innovations in order to maintain or enhance their monopoly status. Instead of investing money into further R&D, monopolists may invest money into non-R&D related activities, such as marketing, raising rivals’ costs and overinvesting in applications for bad patents, only for the purpose of increasing the entry barriers to rivals.

For example, some non-practicing “patent assertion entities” (PAEs) have emerged in the market. The PAEs generate revenue by asserting patents against business that are already practicing the patented technologies. The PAEs may have positive (as an intermediary between patent holders and users) or negative (as “patent trolls”) consequences. The patent trolls adopt an opportunistic patenting strategy, just aiming to generate payments from aggressively charging against inadvertent infringers (usually large companies) a price far beyond the actual value or contribution of the

⁴² Despite the protection terms may vary in different jurisdictions, typically, copyright is protected for the author’s life plus 50 years or 70 years; a patent is protected for 20 years from the date of filing the application; a trademark in theory can last indefinitely but subject to registration renew. See the minimum standards in Article 33 of the TRIPS Agreement.

⁴³ See Partha Dasgupta and Joseph E. Stiglitz, “Uncertainty, Industrial Structure, and the Speed of R&D,” *Bell Journal of Economics* 11, no. 1 (1980): 1–28.

patents.⁴⁴ The patent trolls' misuse of the patent system brings in unnecessary and costly patent litigations.⁴⁵ On the other side, in order to circumvent monopolies and these patent trolls, the rivals may make lots of unnecessary expenditure on getting around patents rather than on innovating for improvements. All the expenditure on monopoly enhancement, opportunistic patenting or circumvention, lowers welfare. Therefore there are a bundle of legal rules for restricting the patent holders' capability of setting up a barrier to entry, such as the breadth of claims, the standard of novelty, as well as the procedures for granting and challenging patents.

Third, the statutory monopoly power allows the IP owners to hold-up or gives rise to a typical "anti-commons" problem. The IP owners may hold-up in the negotiation for licensing or assignment for further developments or alternative applications.⁴⁶ And the proliferation of fragmented IP rights may give rise to a typical "anti-commons" problem, which happens when a single object has numerous uncoordinated rights holders who can block each other and in the end no single party can make efficient use of the object.⁴⁷ The hold-up and the anti-commons problem can result in underuse of the knowledge. The anti-trust law therefore imposes restrictions on licensing practices, settlement agreements and non-disclosure policy to prohibit IP owners from engaging in abusive and anti-competitive behaviors.

Fourth, there are some other problems arising from the inherent design of the IP legal regime. From economic perspective, the optimal term of IP protection should vary from innovation to innovation (or at least from industry to industry) based on the

⁴⁴ See Tim Pohlmann and Marieke Opitz, "Typology of the Patent Troll Business," *R&D Management* 43, no. 2 (2013): 103–20.

⁴⁵ In *eBay Inc. v Merck Exchange, L.L.C.*, the US Supreme Court holds that an injunction should not be automatically issued based on a finding of patent infringement alone; instead, the plaintiff must demonstrate entitlement to a permanent injunction under a traditional "four-factor injunction test". Since *eBay v Merck Exchange* ended the Federal Circuit's practice of automatically granting permanent injunctions for patent infringement, the non-practicing patentee's capability of putting threat of an injunction simply for undue leverage in negotiations has been greatly reduced. See *eBay v Merck Exchange* (547 U.S. 388 (2006) and Jaideep Venkatesan, "Compulsory Licensing of Nonpracticing Patentees After *eBay v. MerckExchange*," *Virginia Journal of Law & Technology* 14, no. 26 (2009): 27–47.

⁴⁶ See Robin Feldman and Mark A. Lemley, "Do Patent Licensing Demands Mean Innovation?," *Iowa Law Review* 101, no. 1 (2015): 137–189 (critizing the innovation hold-up problem caused by the IP protection and questioning if the licensing can facilitate innovation or technology implementation).

⁴⁷ See Michael A. Heller and Rebecca S. Eisenberg, "Can Patents Deter Innovation? The Anticommons in Biomedical Research," *Science* 280, no. 5364 (1998): 698–701 (pointing out that the proliferation of IP rights in biomedical research may paradoxically lead to fewer useful products for improving human health).

economic value and market demand of the underlying knowledge or innovation.⁴⁸ However, the current IP regime provides the same legal framework to all knowledge and innovations. The one-fits-all protection framework lacks the flexibility to reward corresponding to the social costs or benefits of the knowledge.

Fifth, IP is a kind of intangible property created by law, without clear physical longitude or latitude. The difficulty in delineating boundaries results in numerous disputes over the ownership or infringement. The associated risks of infringement and litigation introduce uncertainty and bring high transaction cost to the enforcement of protection.⁴⁹

For all these benefits and costs, all legal rules and policies regarding IP always involve a trade-off between the dynamic efficiency derived from providing incentives for innovation and the final access to the innovations on the one hand, and the static inefficiency and other costs caused by the statutory exclusivity on the other hand. Any legal rules and policies regarding IP are justifiable only if the dynamic efficiency can offset the static inefficiency and costs.⁵⁰ This trade-off should therefore always be kept in mind and be the main criteria for evaluating various legal rules in the remaining parts of this dissertation.

2.1.2 External Funding - Information Asymmetries

2.1.2.1 The “Valley of Death” and the “Funding Gap” for external finance

Even though the “appropriability problem” has been solved or mitigated by IP protection or other incentive mechanisms, such as subsidies, tax incentives, prizes or public funding, R&D projects may still suffer the problem of getting “external” funds.

For a long time a phenomenon of “valley of death” has been observed between

⁴⁸ The literature usually use the “ratio test” originally developed in Kaplow (1984) to evaluate and discuss the optimal level of protection, *see* Louis Kaplow, “The Patent-Antitrust Intersection: A Reappraisal,” *Harvard Law Review* 97, no. 8 (1984): 1813–92.

⁴⁹ *See* Stiglitz (2008), “Economic Foundations of Intellectual Property Rights,” *supra note* 37 at 1711.

⁵⁰ At the WTO website, it emphasizes that “it should also be noted that the exclusive rights given are generally subject to a number of limitations and exceptions, aimed at fine-tuning the balance that has to be found between the legitimate interests of right holders and of users.” *See* at https://www.wto.org/english/tratop_e/trips_e/intell_e.htm.

research results and their application or commercialization.⁵¹ R&D projects usually require substantial investments and take a long period of time before generating earnings sufficient enough for further self-development. Many firms could face periodic financial deficits and need external funding when their internal funding dries up. This is especially true for those small and medium sized technology-driven firms, which have very limited internal funding. With the difficulty of getting external funding, many preliminary results from R&D projects, like publications, prototypes or patents, cannot be developed further to become real applications or products that can be exploited or distributed in the market. The valley of death obstructs research from having an actual impact on the society. Furthermore, as innovation is a dynamic process, there might be more than one “valley of death” throughout the long journey till the time of application or commercialization.⁵²

With empirical examination, Hall (2002, 2010) explains that the phenomenon of “valley of death” occurs because of the high cost of getting external finance for R&D.⁵³ There is a “funding gap” for R&D investments, i.e., the external finance providers would ask for a higher rate of return than the internal finance. The informational asymmetry problem between external investors and innovators is considered as a core reason for the funding gap.⁵⁴ The informational asymmetries are

⁵¹ See, e.g., House of Commons of the United Kingdom, “Bridging the Valley of Death: Improving the Commercialisation of Research” (London, 2013), available at: <http://www.publications.parliament.uk/pa/cm201213/cmselect/cmsctech/348/348.pdf> at 8 (defining the “valley of death” as “the point where a business, often a technology based business, has a working prototype for a product or service that has not yet been developed enough to earn money through commercial sales. The company needs to find sufficient money to develop the prototype until it can generate sufficient cash, though sales to customer, that would allow it to be self sufficient and grow.”).

⁵² See House of Commons of the United Kingdom (2013) “Bridging the Valley of Death: Improving the Commercialisation of Research”, *ibid*, at 9-11.

⁵³ See the survey of the literature evidencing the “funding gap” in Hall (2002) “The Financing of Research and Development”, *supra note 1* (positing that “it may still be difficult or costly to finance R&D using capital from sources external to the firm or entrepreneur. That is, there is often a wedge, sometimes large, between the rate of return required by an entrepreneur investing his or her own funds and that required by external investors. By this argument, unless an inventor is already wealthy, or firms already profitable, some innovations will fail to be provided purely because the cost of external capital is too high, even when they would pass the private-returns hurdle if funds were available at a ‘normal’ interest”).

⁵⁴ Another main factor is the high adjustment cost of knowledge investment, which is caused by the constitution of R&D expenditure. Salaries of highly educated scientists and engineers constitute a large percentage (in practice 50% or more) of the R&D expenditure. The departure of these crucial employees might seriously delay or completely fail on-going R&D projects. The innovators therefore tend to smooth their spending over time, for keeping their human resource stable but therefore cannot swiftly adjust their costs to market changes. The high adjustment cost increases the equilibrium rate of return required by external finance. See detailed discussions in Hall (2002) “The Financing of Research and Development”,

caused by the high degree of uncertainty regarding the outputs of R&D projects and the difficulty in exchanging useful information between innovators and external investors.

2.1.2.2 High uncertainty in outcomes

On the one hand, the nature of the output of R&D projects determines that there is high degree of uncertainty associated with the potential outcomes.

First, R&D projects are inherently risky. There are great uncertainties associated with the value of specific knowledge of how to make new goods or services. Very few R&D projects can get desirable results. Even in the case of successful development, the market value of the results depends on the future markets and consumer behaviours, which are also difficult to predict. Empirical studies provide evidence that the value distribution of innovative knowledge is highly skewed, i.e., while only very few projects result in high returns, most turn out to have little or no value.⁵⁵

Second, the value distribution also changes over time during the R&D process. The uncertainties about the value distribution have an option-like character, i.e., they tend to be greatest at the beginning and gradually decrease with further development.⁵⁶ Whereas value distribution gradually becomes more certain throughout the time, a project that does not pass the test of an expected rate of return at the beginning may turn out to be very profitable later; and vice versa. For this reason, it is not very effective to use a test of the expected rate of return to screen out projects.

supra note 1; Charles P. Himmelberg and Bruce C. Petersen, "R & D and Internal Finance: A Panel Study of Small Firms in High-Tech Industries," *The Review of Economics and Statistics* 76, no. 1 (1994): 38–51.

⁵⁵ See, e.g., Simon Kuznets, "Inventive Activity: Problems of Definition and Measurement," in *The Rate and Direction of Inventive Activity: Economic and Social Factors*, ed. Richard Nelson (Princeton University Press, 1962), 19–52 (the early literature evidencing the skewness of distribution of value among R&D projects); F. M. Scherer and Dietmar Harhoff, "Technology Policy for a World of Skew-Distributed Outcomes," *Research Policy* 29, no. 4–5 (2000): 559–566 (empirically research on the statistical distribution properties of the returns from invention and innovation); Gerald Silverberg and Bart Verspagen, "The Size Distribution of Innovations Revisited: An Application of Extreme Value Statistics to Citation and Value Measures of Patent Significance," *Journal of Econometrics* 139, no. 2 (2007): 318–339 (by using patent licensing revenue data from European Patent Office (EPO) and United State Patent and Trademark Office (USPTO) and taking the patent citations as a value indicator, showing that the overall distribution of innovations appears to be log-normal, and suggesting that the tails should be analysed by extreme value statistics).

⁵⁶ See Bronwyn H. Hall and Josh Lerner, "The Financing of R&D and Innovation," in *Handbook of Law and Economics Volume 1*, ed. Bronwyn H. Hall and Nathan Rosenberg (Amsterdam: Elsevier-North Hollan, 2010), 609–39.

Third, the actual value of the output is also exploitation-specific, i.e., some innovation might only be valuable in the hand of a specific exploiter, or with different valuations in the hands of different exploiters. Therefore, the capability of firms to realize the commercial potential and the efforts that the firms actually put in the R&D are crucial as to the resulting value.

Faced with these uncertainties, asking for high premiums to cover the uncertainties and continuing to monitor and re-assess after providing the finance might help the financiers to reduce the risk.⁵⁷ Chung et al. (2003) show evidence that, in practice, a higher ratio of outside directors on the board and more financial analysts involved in the transaction seem to be able to reduce the negative effects of uncertainties.⁵⁸ However, these methods can greatly increase the transaction cost of external finance as well.

2.1.2.3 Difficulty in conveying information to external investors

On the other hand, many factors in practice obstruct innovators from conveying information to external investors and also impede external investors from assessing the innovators.

First, it is difficult or very expensive for external financiers to make a specific evaluation. The uniqueness of innovation and the non-transparency of the markets for technology and IP (the appropriable format of innovative knowledge) make the external financiers unable to use any existing projects as references to evaluate the commercial potential of R&D investments.⁵⁹ As the actual value is also exploitation-specific, the external financiers have to access the capability of firms to realize the commercial potential. However, the assessment can be very difficult, especially for new firms without sufficient historical track records.

⁵⁷ See OECD, *Enquiries into Intellectual Property's Economic Impact (Chapter 9 - IP-Based Financing of Innovative Firms)*, 2015, available at <https://www.oecd.org/sti/ieconomy/Chapter9-KBC2-IP.pdf>, at 460.

⁵⁸ See Kee H. Chung, Peter Wright, and Ben Kediab, "Corporate Governance and Market Valuation of Capital and R&D Investments," *Review of Financial Economics* 12, no. 2 (2003): 161–172 (with an empirical study, showing that "the market valuation of the firm's capital and R&D investments depends critically on analysts following and board composition, but not on institutional holdings").

⁵⁹ Ashish Arora and Alfonso Gambardella, "Ideas for Rent: An Overview of Markets for Technology," *Industrial and Corporate Change* 19, no. 3 (2010): 775–803 (pointing out there are no available market prices to drive information about value of technology or IPR; and emphasizing the importance of looking into "the demand for external technology, the role of uncertainty in technology markets, and the dynamic interaction between industry structure and the market for technology").

Second, there is no effective way for small firms to signal their quality and credibility. Small firms are generally not publicly traded and do not have audited financial statements to share with external investors. Meanwhile, the lack of historical track records makes it basically impossible for start-up innovators to establish reputation either. Even for those firms with audited financial statements, the existing accounting standards and financial reporting standards make the corporate annual reports incapable of providing sufficient quantitative or qualitative information on intangible assets. For example, the International Accounting Standards (IAS) and the US Generally Accepted Accounting Principles (GAAP) require firms to analyse all investments in research all at once, which is against the reality that R&D expenditure is usually spent smoothly over time and embedded in the human capital of the firm's employees.⁶⁰ This requirement removes the R&D expenditure off the balance sheet immediately, without indicating the associated economic benefits that would arise later. The off-balance sheet treatment of R&D expenditure and the invisibility of many valuable intangible assets in current accounting standards result in the corporate annual reports failing to accurately reveal information about innovators.⁶¹

As a result, the market do not systematically nor correctly take into account R&D expenditure in their risk assessment and valuation, despite the fact that R&D expenses and the resulting intangible assets, especially IP, have become a dominant factor in the determination of the commercial value of businesses. The empirical study of Eberhart et al. (2004) provide that, although R&D expenses are beneficial investments, the market is slow in recognizing the extent of this benefit and investors tend to under-react, and are particularly slow in recognizing the relatively greater benefit to high-tech firms.⁶² In some countries, such as Italy, R&D investment is not valued by the equity market or by the debt market.⁶³

⁶⁰ See Frey (2013) “*Intellectual Property Rights And The Financing Of Technological Innovation: Public Policy and the Efficiency of Capital Market*”, *supra note 38* at 40; and OECD (2015) “*Enquiries into Intellectual Property’s Economic Impact*”, *supra note 57* at 460.

⁶¹ See Richard Petty and James Guthrie, “Intellectual Capital Literature Review: Measurement, Reporting and Management,” *Journal of Intellectual Capital* 1, no.2 (2000): 155-176. See further discussion on problems in accounting standards in Section 2.3.2.2 D.

⁶² See Allan C. Eberhart, William F. Maxwell, and Akhtar R. Siddique, “An Examination of Long-Term Abnormal Stock Returns and Operating Performance Following R&D Increases,” *The Journal of Finance* 59, no. 2 (2004): 623–650 (examining a sample of 8,313 US cases between 1951 and 2001 and showing that the sample firms experience significantly positive “long-term” abnormal operating performance following their (unexpected) R&D increases, which implies an under-reaction to R&D expense; and the high-tech firms have

2.1.2.4 Adverse selection problem and moral hazard problem

The aforementioned high degree of uncertainty and the difficulty of conveying/examining information give rise to the asymmetric information between the external investors and the internal innovators. The innovators are involved in the day-to-day management of their firms and thus have more information about the quality and states of their R&D projects, and the actual efforts they have invested in implementing the funded projects, than the external investors. These informational asymmetries regarding the quality of R&D projects and the innovators' actual efforts can have a great impact on the cost of external finance.⁶⁴

From an *ex ante* perspective, before making the funding decisions, the inside entrepreneur has better information on the quality of the project (including its own capability in finishing the project) than the outside investors. There is a typical application of the "adverse selection" problem in a "lemon market", which happens when the external investors cannot effectively differentiate the few good R&D projects from the large number of bad projects (the "lemons").⁶⁵ The external investors have to ask for an intermediate price at the pooling equilibrium, in order to compensate for the loss from picking a bad project and to ensure no negative payoffs on average. The

significantly higher long-term abnormal stock returns than low-tech firm, which implies an even more severe under-reaction in recognizing the relatively greater benefit to high-tech firms).

⁶³ See Bronwyn H. Hall and Raffaele Oriani, "Does the Market Value R&D Investment by European Firms? Evidence from a Panel of Manufacturing Firms in France, Germany, and Italy," *International Journal of Industrial Organization* 24, no. 5 (2006): 971–993 (showing that R&D in publicly traded Italian firms is not valued by financial markets on average). Similarly, Elisa Ughetto, "Does Internal Finance Matter for R&D? New Evidence from a Panel of Italian Firms," *Cambridge Journal of Economics* 32, no. 6 (April 9, 2008): 907–925 (with an investment on the relationship between finance and R&D for a panel of more than 1000 Italian manufacturing firms, the result shows that it is still the cash flow that plays an important role in explaining capital investment, especially for small firms. While Italy has a typical bank-based system, firms use virtually no debt to finance R&D at all).

⁶⁴ The financial constraints stemming from the informational asymmetry problem have been comprehensively discussed in theory. David De Meza and David C. Webb, "Too Much Investment: A Problem of Asymmetric Information," *The Quarterly Journal of Economics* 102, no. 2 (May 1, 1987): 281–292 (showing that, when both equity and credit are available, with an appropriate choice of financial instrument, no credit or equity rationing would occur. Investors would prefer equity in the case of information asymmetry concerning the expected return of an investment, while preferring credit in the case of informational asymmetries concerning the risk of an investment). However, Thomas Hellmann and Joseph E. Stiglitz, "Credit and Equity Rationing in Markets with Adverse Selection," *European Economic Review* 44, no. 2 (February 2000): 281–304 (demonstrating that if the informational asymmetries relate not only to the expected return but also to the risk of an investment, demonstrate that both credit and equity rationings can occur simultaneously and entrepreneurs would therefore face financing constraints).

⁶⁵ See George A. Akerlof, "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism," *The Quarterly Journal of Economics* 84, no. 3 (1970): 488–500 (using "lemons" to refer to "bad products", i.e. used cars with problems).

intermediate price includes the lemon premium against bad projects and therefore is too expensive for the good projects. But it is acceptable for the bad projects, which would have been asked for an even higher price in a separated equilibrium. So the intermediate price can trigger a chain reaction: it attracts firms with bad projects only while driving away those with good projects.

From the *ex post* perspective, after the funding has been provided, there is a principal-agent relationship between the investors (as the principal) and the innovators (as the agent). The innovators have better information on the states of their R&D projects and on their efforts than the external investors. The intrinsic high degree of uncertainty regarding the R&D projects mentioned above and the investors' lack of knowledge of the specific business allow innovators to easily justify the under-performance, additional unexpected costs, the need of shifting to riskier or conservative strategies. Since investors cannot effectively monitor and evaluate the performance of innovators, the funded innovators can take their informational advantages by acting opportunistically in their own interest at the expense of the interest of investors. For their own interests, the funded innovators may adopt riskier strategies, or be too risk-averse for short-term goals, or not work as hard as they should, or use the funds for other purposes. The asymmetric information regarding the quality of an R&D project and the actual efforts that the innovator put in the project makes it difficult for investors to know if the failure of an R&D project is a result of the project's intrinsic risks or the innovator's opportunistic behaviour. When it is the latter case, the external investors would have to bear the costs caused by the innovator's opportunistic behaviour, that is, the "agency costs". Then there would be the "moral hazard" problem, which is likely to occur when the external investors have greater interests in the firm than the internal innovators.⁶⁶

In a dynamic way, the *ex post* moral hazard problem further exacerbates the *ex ante* adverse selection. The *ex ante* concerns on the agency costs caused by the moral hazard problem push the rational external investors to require an even higher price, in

⁶⁶ See Michael C. Jensen and William H. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics* 3, no. 4 (1976): 305–360 at 333-343. It is interesting to mention that, as the most SMEs are managed by their own principal owners or partners, the conventional agency problems in corporate governance caused by the separation of ownership and control are *irrelevant* in most cases for SMEs. One exception may occur where external equity investors have greater interests in the firm than the internal managers. See Allen N. Berger and Gregory F. Udell, "The Economics of Small Business Finance: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle," *Journal of Banking & Finance* 22, no. 6–8 (1998): 613–673 at 629.

the form of a higher interest rate or expected return, for covering the agency costs. However, the higher price would drive good firms out of the market, or induce more risk-shifting behavior. Then only the less skilled or bad-faith innovators would accept those harsh conditions to finance their riskier projects. External investors would find that raising the interest rate or expected return beyond a certain level would actually reduce the profitability of an investment, because of the worse application pool and the increased possibility of default. So the investors may restrict the supply of credit or equity even when they actually have sufficient funds to provide or when the firms would like to pay a higher price. R&D projects therefore suffer financial constraints, especially those conducted by small-and-medium technology-intensive firms, which suffer more severe informational asymmetries.⁶⁷

2.2 Alternative Financial Sources for Funding R&D Activities

This thesis suggests promoting the use of IP as collateral in debt finance as a solution to the R&D external finance problem, and aims to examine and design legal rules for facilitating such use. Before discussing the pros and cons of using IP as collateral in debt finance, it would be helpful to have an overview of the alternative sources of funding available to high-tech firms. This overview will help to get a better understanding of how the problems of information asymmetry affect the cost and availability of external funding for SMEs, as well as how the other alternatives mitigate the problems. The understanding can help us to identify the conditions under which debt finance has comparative advantages over the alternatives and inspire us to explore how the use of IP as collateral in debt finance can mitigate the information problem.

2.2.1 The Financial Growth Cycle of R&D Investment

While the Modigliani-Miller Theorem implies that a firm's capital structure is irrelevant in a perfect market,⁶⁸ corporate finance theories and empirical studies agree

⁶⁷ See Hall and Lerner (2010) "The Financing of R&D and Innovation," *supra* note 56; Dietmar Harhoff, "Are There Financing Constraints for R&D and Investment in German Manufacturing Firms?" In *The Economics and Econometrics of Innovation*, edited by Encaoua David, Bronwyn H. Hall, François Laisney, and Jacques Mairesse, 399–434. Boston, MA: Springer US, 2000 (the survey of German enterprises show that "the cash flow sensitivity of investment in small firms is likely to reflect financing constraints").

⁶⁸ The Modigliani-Miller Theorem argues that, in a perfectly efficient market without informational asymmetries, taxes, bankruptcy costs or agency costs, the value of a firm is only determined by the real assets that the firm has, regardless of the firm's capital structure. How the firm's capital is raised, whether by debt

that asymmetric information between investors and firms would increase the costs of external finance and have impacts on the firms' finance choice and capital structure.⁶⁹ Nevertheless, theoretical implications and practical reality do not always perfectly match about how the firm's capital structures are affected. For example, the Pecking Order Theory implies that, where informational asymmetry is presumably an important problem, firms would prioritize their sources of financing: first internal funds, then debt, and equity as the last resort.⁷⁰ In practice, however, there is no constant preference of debt over equity.⁷¹ Instead, it is observed that there is a financial growth cycle and the companies' financial considerations on investment decisions and the available finance resources are different at various stages in the

or equity and whatever their proportions, affects only the division of cash-flows among investors, but not the firm's costs of capital. The Modigliani-Miller Theorem is also referred as the "Modigliani-Miller Capital Structure Irrelevance Principle". See the detailed discussion in Franco Modigliani and Merton H. Miller, "The Cost of Capital, Corporation Finance and the Theory of Investment," *The American Economic Review* 48, no. 3 (1958): 261–97.

⁶⁹ For a literature review on the how the asymmetric information problem have effects on firms' finance choice and capital structure, see Milton Harris and Artur Raviv, "The Theory of Capital Structure," *The Journal of Finance* 46, no. 1 (1991): 297–355. For a literature review on the empirical studies on the effects, see for example, Philippe Aghion et al., "Technology and Financial Structure: Are Innovative Firms Different?," *Journal of the European Economic Association* 2, no. 2–3 (April 2004): 277–88.

⁷⁰ According to the Pecking Order Theory, firms firstly choose to use internal funds to finance their projects. Because of the lemon premiums and agency costs caused by the problems of adverse selection and moral hazard related to asymmetric information, internal finance would be cheaper than external finance and therefore be preferred. Secondly, in the case with insufficient internal funds, if being given the choice between equity and debt, managers would prefer debt to undervalued equity. With asymmetric information, investors cannot accurately value the equity being issued for financing growth opportunities. Investors would acquire equity only if the growth opportunity turns out to have a positive net present value (NPV) and also the new shares are not overvalued. However, managers who act on behalf of current shareholders would not issue undervalued new shares, in which case the value of the existing shares would be diluted and the value would be transferred from existing shareholders to new shareholders – the equity investors. On the other hand, debt investors have a prior claim on the firm's assets and are less exposed to valuation errors. Debt investors would therefore ask for lower risk premiums. Managers, who are optimistic about the future of the firm and believe that their equity is undervalued, would therefore prefer debt to undervalued equity. For this reason, the issue of new equity can be considered as a pessimistic signal. Lastly, only if debt becomes too costly, for example, in the case that the firm has already been highly leveraged and therefore faces a high risk of bankruptcy, equity finance would be used as a last resort to avoid financial distress. See the detailed discussion in Stewart C. Myers and Nicholas S. Majluf, "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have," *Journal of Financial Economics* 13, no. 2 (1984): 187–221.

⁷¹ Actually, Shyam-Sunder and Myers (1999) find strong support for the prediction of Pecking Order Theory in a sample of 157 firms that had traded continuously over the period 1971 to 1989. See Lakshmi Shyam-Sunder and Stewart C. Myers, "Testing Static Tradeoff against Pecking Order Models of Capital Structure," *Journal of Financial Economics* 51 (1999): 219–44. However, some other empirical studies done with larger samples did not find such a constant preference, see, for example, Murray Z. Frank and Vidhan K. Goyal, "Testing the Pecking Order Theory of Capital Structure," *Journal of Financial Economics* 67, no. 2 (2003): 217–248 (by testing a broad cross-section of publicly traded American firms for 1971 to 1998, finding no such a preference of debt over equity).

cycle.⁷²

In the context of financing technological innovation, companies' financial preferences and options change throughout the financial growth cycle as follows,⁷³

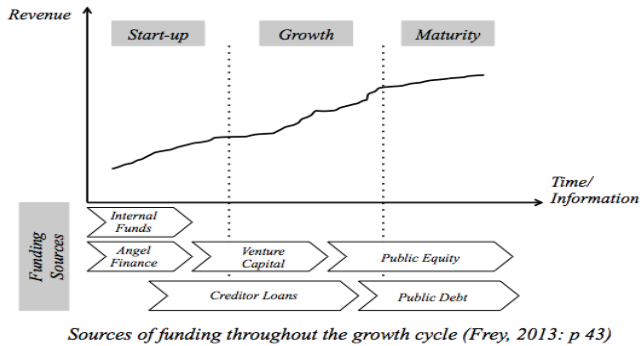


Figure 2.1 Sources of funding throughout the growth cycle

This graph shows that, while growing throughout the financial growth cycle, small technology-driven firms gain further experience and suffer less informational asymmetries. They gradually have better access to external finances. At the early start-up phase, firms mainly use internal funds to finance their projects and the external finance available at this phase is angel finance. From the late start-up phase to the middle growth phase, they can gain access to external private capital markets, including venture capital and creditor loans.⁷⁴ Then those firms that are able to survive to the middle growth phase or continue to grow till the maturity phase can get external finances from the public capital markets for instance public equity and public debt market. Although the growth cycle does not fit all small business, it shows that, in general, equity finances are used more frequently than debt finances.

⁷² See Berger and Udell (1998) "The Economics of Small Business Finance: The Role of Private Equity and Debt Markets in the Financial Growth Cycle", *supra note* 66 at 629.

⁷³ See Frey (2013) "Intellectual Property Rights And The Financing Of Technological Innovation: Public Policy and the Efficiency of Capital Market", *supra note* 38 at 43.

⁷⁴ It is noting that, in Berger and Udell (1998) "The Economics of Small Business Finance: The Role of Private Equity and Debt Markets in the Financial Growth Cycle", *supra note* 66, the scope of debt finance is broadly defined, including not only those provided by financial institutions (commercial banks, finance companies; other financial institutions); but also those by non-financial business and government (trade credit, other business, and government) and those by individuals (principal owner, credit card, other individuals). However, in reality, the financial institutions contribute most of the external debt finance.

Before looking into IP collateralization, we firstly have a brief overview of the financing alternatives that a small technology-driven firm may face. The overview helps us understand how the information and incentive problems are addressed respectively and what the role of IP is in these alternative financing mechanisms.

2.2.2 Internal Finance

At the start-up phase, firms need substantial investments to start research and the preliminary operation. At this stage, the uncertainties regarding R&D projects are the highest. The commercial potential of the projects still relies on some preliminary ideas and few concrete project results would have been developed. In addition, external investors cannot trace sufficient previous operation history or reputation record of the innovator. They thus have difficulty in evaluating the profitability of the project and the credibility of the innovator. Moreover, the performance of the project at this early-stage is not easily observable or verifiable for outsiders. External investors thus find that it would be hard to figure out whether the on-going project is doing well or not. The adverse selection problem and the moral hazard problem stemming from asymmetric information are the most serious at this stage.

The funding gap between internal finance and external finance caused by the asymmetric information problem is therefore the largest at this phase. The cost of external finance is greatly increased by the transaction costs of information disclosure and contracting. However, these costs can be avoided in the case of internal finance. So it is natural to predict that the internal finance is the main resource for firms at this stage. This predication is also evidenced by empirical studies. For example, Himmelberg and Petersen (1994) and Harhoff (2000) demonstrate that there is a significantly positive correlation between R&D projects and internal finance at this phase.⁷⁵ Companies mainly rely on their internal funds to finance their operation, such as cash flows, loans from friends and family members, as well as bank loans with personal guarantees.⁷⁶ These empirical observations are consistent with the implication of the Pecking Order Theory: internal funds are preferred first.

⁷⁵ See an empirical study in the US in Himmelberg and Petersen (1994) "R&D and Internal Finance: A Panel Study of Small Firms in High-Tech Industries", *supra note 54*; See an empirical study in Germany in Harhoff (2000), "Are There Financing Constraints for R&D and Investment in German Manufacturing Firms?", *supra note 67*.

⁷⁶ See Berger and Udell (1998) "The Economics of Small Business Finance: The Role of Private Equity and Debt Markets in the Financial Growth Cycle", *supra note 66* at 626 (noticing that despite some empirical

The funding gap between internal finance and external finance caused by the asymmetric information problem is the largest at this phase. However, the fact is that “technology companies usually have to invest heavily before they can demonstrate the potential to be profitable”.⁷⁷ Therefore, while internal funds are insufficient, the innovators have to look for expensive external finance.

2.2.3 Angel Finance

In the case of informational asymmetries, equity finance is expected to be a very expensive external financing method for R&D projects, since their equity would be systematically undervalued by external private equity investors or in the public capital market. In the standard form of the Pecking Order Theory, with inadequate internal funds and asymmetric information, debt finance would be preferred to equity finance. However, this order seems to be reversed in practice. In practice, at the early start-up phase, the main (or in many cases the only) external financial resource is angel finance, a kind of *direct private equity* investment from angel investors.

Angel investors typically consist of high net worth individuals, such as retired entrepreneurs or executives. Angel finance market is an informal market. Each angel investor or angel group has its own speciality, usually the industry sector they have stayed in for a long period. At the start-up phase, the innovators provide a formal business plan based on their preliminary production idea to angel investors for attracting investment. Angel investors rely on their business acumen and experiences to select projects in their specialized fields. In many cases, angel investors might even know the feasibility and marketability potential of the R&D projects better than the innovators themselves, who might lack prior research, production or marketing experience and tend to be over-optimistic about their projects.⁷⁸ OECD’s report (2015) points out that, in the angel investors’ selection, “the presence of IPR can be a strong signal of the firm’s potential: angel investors are typically interested in the protection

studies have shown that, although financial institutions (commercial banks, finance companies; other financial institutions) do provide a lot of business loans to small start-up firms even without tangible assets as collateral, most of these loans are pledged by personal collaterals or guarantees given by inside owners of the start-up firms. So, much of the “external” debt finance from financial institutions is in fact a kind of “internal” finance supported by the inside owners personal assets.

⁷⁷ See *House of Commons of the United Kingdom (2013)* “Bridging the Valley of Death: Improving the Commercialisation of Research”, *supra* note 51 at Report para 26, Written Evidence 123, intro, and Written Evidence 153, para 6.

⁷⁸ See Andrew Wong, Mihir Bhatia, and Zachary Freeman, “Angel Finance: The Other Venture Capital,” *Strategic Change* 18, no. 7–8 (2009): 221–230.

of the technology and the barriers to entry granted by patents of copyrights. Also, the firms that attract angel investor are normally very small, and IP could be the only asset such firms have that can be evaluated objectively”.⁷⁹

After the selection of projects, angel investors then use their own money, experience and network to provide finance, valuable management advice and important contacts. The advice and counsel that angel investors provide are considered to be quite important. However, on average angel investors do not demand as much control as venture capitalists do and bring less financial expertise to the firm; and the angel market tends to be restricted to the local area to mitigate the information problem.⁸⁰

Angel investments usually take the form of equity investments or convertible debt contracts but do not employ contractual design to safeguard their investment. They rely more on common equity claims, which do not offer any protection in case of bankruptcy.⁸¹ This is because angel investors care more about the industrial development in specific business sectors and the average return rather than the money returns on each individual investment. So, they measure risk and profit at the aggregate portfolio level rather than the specific project level. They establish project portfolio and use the high return from the rare successful projects to cover the loss in most failed projects. They typically target R&D companies with very significant upside potential and demand high returns on their exit strategy defined in the investment contract.⁸² For offsetting the extremely high risks and the potential of equity dilution from future investment rounds, angel investors demand high returns. Over the last twenty years, for reducing the search cost and expanding the fund pooling for larger investments, networks of angels have emerged in order to share deal

⁷⁹ OECD (2015) “*Enquiries into Intellectual Property’s Economic Impact*”, *supra* note 57 at 462.

⁸⁰ See Berger and Udell (1998) “The Economics of Small Business Finance: The Role of Private Equity and Debt Markets in the Financial Growth Cycle”, *supra* note 66 at 630.

⁸¹ See Catherine Casamatta, “Financing and Advising: Optimal Financial Contracts with Venture Capitalists,” *The Journal of Finance* 58, no. 5 (2003): 2059–2085.

⁸² Despite their better capacities in identifying good projects and nurturing firms, angel investors still face a high risk of project failure. For example, in the United States, 27% companies invested by angel funds ended up in bankruptcy in 2007. The “best practices” are considered to be 20-30 times return over a 5-7 year holding period. However, even requiring such a high rate of return, the actual effective internal rate of return for a successful portfolio is typically only 20-40%. And The main exit strategies include initial public offering (IPO) and merger and acquisition (M&A). In 2007, 4% angel investors exited via IPO and 65% exited via M&A. See Jeffrey E. Sohl, *The Angel Investor Market in 2007: Mixed Signs of Growth* (report of the Center for Venture Research at the University of New Hampshire), (2008), available at: https://paulcollege.unh.edu/sites/paulcollege.unh.edu/files/2007_Analysis_Report_0.pdf.

flow and due diligence work.⁸³

At the early start-up phase, because of the lack of any tangible or intangible assets, established credibility and production history, debt finance and other alternatives are basically unavailable. With the absence of an alternative choice, a firm would accept the very costly angel finance if it can be selected by angel investors. The reality is that angel investors are typically interested in small businesses in high-growth and high-risk sectors. It has developed into an important financial resource for start-up high-tech companies to finance R&D activities, especially in the UK and the US.⁸⁴ The vast majority of start-up firms in other places just simply cannot get access to angel finance and therefore may not be able to survive to the later phases.

2.2.4 Venture Capital

When it comes to the late start-up phase and the growth phase, a firm which has been in business for a certain period of time and has obtained some preliminary results from its R&D project may still need finance for further research, product development, initial marketing, or market expansion. The risks at these phases are lower than at the early start-up phase but still significant, because the firm has a short operation record and may still have not established any earning history yet. Angel finance may not be available any more, because the angel investor's high-return demand becomes too expensive for firms and angel investors are usually not interested in firms at these phases. At this phase, the firms in private ownership mainly go to the venture capital market, which is more formal than the angel finance market, for external resources.⁸⁵

⁸³ See William R. Kerr, Josh Lerner, and Antoinette Schoar, "The Consequences of Entrepreneurial Finance: Evidence from Angel Financings," *Review of Financial Studies* 27, no. 1 (2014): 20–55.

⁸⁴ For example, in the United States 2012, 268,160 active individual investors invested in total \$22.9 billion into 67,030 companies. The average angel investment size was \$341,800 and the average equity received was 12.7 percentage. See Jeffrey E. Sohl, "The Angel Investor Market in 2012: A Moderating Recovery Continues," 2013, https://paulcollege.unh.edu/sites/paulcollege.unh.edu/files/2012_analysis_report.pdf; see also OECD (2015) "Enquiries into Intellectual Property's Economic Impact", *supra note 57* at 462.

⁸⁵ Venture capital finance can be traced back to the formation of the American Research and Development Corporation in 1946. The industry boomed in the US during the late 1970s and early 1980s, mainly due to regulatory changes that allowed pension fund managers to invest in high-risk assets. In 1979 the Department of Labor reinterpreted the Employee Retirement Income Security Act (ERISA) to permit pension fund investment in venture capital, under the "prudent man rule", i.e. the managers measure risk at the aggregate portfolio level and hence the investment in venture capital is allowed provided it does not endanger the entire portfolio. See Samuel Kortum and Josh Lerner, "Assessing the Contribution of Venture Capital to Innovation," *The RAND Journal of Economics* 31, no. 4 (2000): 674–92.

Venture capital (VC) is a kind of *intermediated private equity* investment, where the VC management firms act as financial intermediary and advisory firms. The VC management firms pool funds from institutional investors and wealthy individuals, by joining partnerships for a certain long duration. In the partnerships, the general partners usually consist of senior managers of the VC management firms while the limited partners are the actual fund providers. The VC management firms channel the pooled funds to target firms by means of equity capital contributions. Empirical research shows that venture capitalists typically accompany the target firms to growth for up to ten years.⁸⁶ At the end of the period, venture capitalists exit the funding relationship and liquidate their holdings by selling these target firms to corporate acquirers or by taking the firms public via initial-public-offering (IPO). Ultimately, venture capitalists distribute the profits back to fund providers. Venture capitalists generate most of their profits by taking the very few successful firms to go public via IPO and try to time IPO when stock market valuations are relatively high.⁸⁷ If a VC management firm does not do well and the whole project portfolio turns out to be in loss, the firm may have to return the remaining back to the original investors or get liquidated.

The VC firms mitigate the information problems in funding R&D projects by their active involvements in screening, contracting, monitoring and value adding.⁸⁸ First, they are specialized in particular business sectors and diligently scrutinize young firms before providing capital. Their expertise and the positive signal from prior angel investors allow them to undertake pre-investment screening to alleviate the ex ante adverse selection problem.⁸⁹ Second, VC firms employ contractual clauses, such as representation on the board of directors, disproportionate allocation of control to VC firms and negative covenants coupled with veto power at shareholder meetings, as the control mechanisms to allow them to achieve an intense monitoring over the on-going operations and to take effective interventions in necessary situations.⁹⁰ Third, VC firms

⁸⁶ See Leslie A. Jeng and Philippe C. Wells, "The Determinants of Venture Capital Funding: Evidence Across Countries," *Journal of Corporate Finance* 6, no. 3 (2000): 241–289; Gompers et al., "Venture Capital Investment Cycles: The Impact of Public Markets," *Journal of Financial Economics* 87, no. 1 (2008): 1–23.

⁸⁷ *Ibid.*

⁸⁸ See e.g. Hall and Lerner (2010) "The Financing of R&D and Innovation", *supra* note 56; Steven N. Kaplan and Per Strömberg, "Venture Capitalists As Principals: Contracting, Screening, and Monitoring," *American Economic Review* 91 (2001): 426–30.

⁸⁹ They tend to invest in firms that have been funded by angel finance in the prior phases. See Berger and Udell (1998) "The Economics of Small Business Finance: The Role of Private Equity and Debt Markets in the Financial Growth Cycle", *supra* note 66 at 630.

⁹⁰ See Tereza Tykvová, "What Do Economists Tell Us about Venture Capital Contracts?," *Journal of Economic Surveys* 21, no. 1 (2007).

use staged capital infusion to align their interests with firms in order to control the ex post moral hazard problems. After providing the starting funds in the first stage, each subsequent stage of investment is conditional on achieving some specified “milestones” set out in the previous round. Fourth, the active involvement in the management of the target firms enables venture capitalists to transfer their expertise and add value to the target firms.⁹¹ They bring in professional management expertise, participate in strategic planning, provide managerial advice, and sometimes are even directly involved in operational decision making. Fifth, venture capitalists often hold extensive control over the personnel appointment, the recruitment and replacement of key managers, in the funded firms to protect themselves from being held-up by the insider managers.⁹² All these control mechanisms help reduce not only the lemon premium and agency costs but also the endogenous uncertainty caused by the firm’s efforts. VC funds, whether private or government-sponsored, have become necessary intermediaries to allocate resources to industries that are of paramount importance to the long-term prospects of economies but might not be able to be funded because of the high risk of failure associated with them.

However, as summarised by Hall and Lerner (2010), several problems restrict the application of venture finance as a generally applicable solution to bridge the funding gap. First, just like angel investors, venture capitalists are also very selective and mainly target several in just a few the high-risk & high-profit industrial sectors, such as software, telecommunications and biotechnology,⁹³ where VCs can provide substantial managerial contribution.⁹⁴ Second, since an active and efficient public stock market for smaller companies is essential for the VC firms to exit with profits, VC finance has a very restricted application in several countries with highly developed

⁹¹ Many empirical studies show that the firms backed by venture capital have a better performance than those funded by other alternative financial sources. The assessment has been done from many perspectives, including survival rate, employment and sales growth, stock market performance. See an overview of the empirical studies at Gordon C. Murray, “Venture Capital and Government Policy,” in *Handbook of Research on Venture Capital*, ed. Hans Landstrom (Edward Elgar, 2007), 113–154 at 132-134.

⁹² See Thomas Hellmann, “The Allocation of Control Rights in Venture Capital Contracts,” *The RAND Journal of Economics* 29, no. 1 (1998): 57–76.

⁹³ See, for example, George W. Fenn, Nellie Liang, and Stephen Prowse, “The Private Equity Market: An Overview,” *Financial Markets, Institutions and Instruments* 6, no. 4 (November 1997): 1–106 (finding that VC backed-firms going public are much more likely to be in the computer-related and medical-related industries).

⁹⁴ See Jean-Etienne de Bettignies and James A. Brander, “Financing Entrepreneurship: Bank Finance versus Venture Capital,” *Journal of Business Venturing* 22, no. 6 (2007): 808–832 (VC tends to be preferred to bank finance when VC productivity is high and entrepreneurial productivity is low).

public equity markets for IPOs only, mainly in the UK, the US and Israel.⁹⁵ Third, stock markets also suffer information problems and therefore systematically undervalue the intangible investments of technology-driven companies, although the R&D spending is associated with subsequent abnormally good operating performance.⁹⁶ Fourth, the firms should be ready to sacrifice a lot of their sovereignty in management and personnel in exchange and may have to suffer the problems caused by the conflicting interests of the VC investors.⁹⁷

In summary, VC finance is also an important but very expensive financial source with limited applications for funding R&D projects. It is most attractive to innovators who need a large amount of urgent money for their high-risk & high-profit projects and want to share the risk with less risk-averse investors, but is not suitable for innovators who have medium-risk & medium-profit projects, nor for those who want to keep ownership and control of their firms. And the VC investments are often too large for start-up firms in some fields. The overwhelming majority of technology-intensive firms just simply have no chance to get access to venture capital at all.⁹⁸

⁹⁵ See OECD (2015) “*Enquiries into Intellectual Property’s Economic Impact*”, *supra* note 57 at 462. Nevertheless, even in the two main markets, after the “.com” bubble broke at the early 2000s, raising large amounts of money through IPOs is not easy any more.

⁹⁶ See William A. Sahlman, “The Structure and Governance of Venture-Capital Organizations,” *Journal of Financial Economics* 27, no. 2 (1990): 473–521 (providing that venture capital discounts typically in the range of 25% to 50%).

⁹⁷ See *House of Commons of the United Kingdom (2013)* “Bridging the Valley of Death: Improving the Commercialisation of Research”, *supra* note 51 at Report, para 28-29 (pointing out that, after getting money from venture capital, the original entrepreneurs usually see their interest in the company diminish very fast, even to 50% only; and venture capital usually develop companies just for the sole purpose of selling them); Hellmann (1998) “The Allocation of Control Rights in Venture Capital Contracts”, *supra* note 92 (noticing that staged finance may encourage the entrepreneur to focus on short-term goals instead of wealth maximization). Sophie Manigrat, Katleen Baeyens, and Wim Van Hylte, “The Survival of Venture Capital Backed Companies,” *Venture Capital* 4, no. 2 (2002): 103–124 (taking the survival of a sample of 565 Belgian VC backed companies and 565 comparable non-VC backed companies, showing that VC backed companies do not have a higher probability of surviving than comparable non-VC backed companies, because VC companies manage their investments on a portfolio basis not a specific case, and they do not care much about reducing risk. The interests of the entrepreneur and the venture capitalist may diverge, especially when the business activities are not developing as expected).

⁹⁸ Every year, only six to eight hundred of the total two million new businesses in the United States can get venture capital funding. See Berger and Udell (1998) “The Economics of Small Business Finance: The Role of Private Equity and Debt Markets in the Financial Growth Cycle”, *supra* note 66 at 629; see the discussion on the venture capital in China in, e.g., Jun Zhang, “Venture Capital in China,” in *China as an Innovation Nation*, ed. Yu Zhou, William Lazonick, and Yifei Sun (Oxford University Press, 2016), 68–97.

IP can play a prominent role in the context of VC finance in many perspectives.⁹⁹ At the pre-investment selection stage, firms use IP to signal to the VC investors their “superior technological capabilities of the management” and the “prospect of future profits”.¹⁰⁰ During the funding period, IP can be taken as a performance criterion to assess if the funded firm has achieved the milestones set out in the staged capital infusion plan. At the exit stage, a well-defined patent strategy may help alleviate the under-pricing in the IPO process, but to a lower extent.¹⁰¹

2.2.5 Debt Finance

In the debt finance, the lending investor (as the creditor)¹⁰² provides a certain amount of capital as a loan, and the borrowing firm (as the debtor) is obligated to repay a fixed amount, i.e., the principal loan plus the agreed interest rate, at the end of the loan term. Both of the creditor and the debtor know how much they would get or repay. Compared to equity finance, debt finance does not cause a dilution of ownership or

⁹⁹ See the comprehensive summaries of the existing literature on the signaling effect of patents in attracting venture capitalists in Daniel Hoenig and Joachim Henkel, “Quality Signals? The Role of Patents, Alliances, and Team Experience in Venture Capital Financing,” *Research Policy* 44, no. 5 (2015): 1049–1064 at 1051; and also in Hanna Hottenrott, Bronwyn H. Hall, and Dirk Czarnitzki, “Patents as Quality Signals? The Implications for Financing Constraints on R&D,” *Economics of Innovation and New Technology* 25, no. 3 (2016): 197–217 at 199-200.

¹⁰⁰ See Sebastian Hoenen et al., “The Diminishing Signaling Value of Patents between Early Rounds of Venture Capital Financing,” *Research Policy* 43, no. 6 (2014): 956–989 (suggesting that the signalling effect of patents might be strong at the first round of VC investment, since the information asymmetries are most severe at this stage); David H. Hsu and Rosemarie H. Ziedonis, “Resources as Dual Sources of Advantage: Implications for Valuing Entrepreneurial-Firm Patents,” *Strategic Management Journal* 34, no. 7 (2013): 761–781 (providing that a startup's patent application stock positively correlates with the investor estimation of start-up value; and arguing that the signaling value of patents is contingent on the strength of alternative quality signals in a start-up's resource bundle, and therefore is particularly important for ventures without alternate means of conveying quality and matters more in the early rounds of VC funding). However, some other literature show different results, for example, Hoenig and Henkel (2015) “Quality Signals? The Role of Patents, Alliances, and Team Experience in Venture Capital Financing” *supra* note 99 at 1051 (after having surveyed 102 European VCs investing in German high-tech startups, finding no indication that patents serve as technology signals in attracting VC financing. Note: the authors admit that they cannot control for other signaling functions, such as professionalism or technical know-how of the entrepreneurial team; but they also think the other signaling effects are of minor importance for venture capitalists).

¹⁰¹ See Michael B. Heeley, Sharon F. Matusik, and Neelam Jain, “Innovation, Appropriability, and the Underpricing of Initial Public Offerings,” *The Academy of Management Journal* 50, no. 1 (2007): 209–225 (showing that the impact of patents on reducing information asymmetries at the IPO stage with regard to the potential value of a firm and its innovative effort is significant only when the link between patents and inventive returns is transparent).

¹⁰² For making the legal analysis in the later sections clearer and more formal, this thesis makes a distinction between pre-lending relationship and post-lending relationship. The parties in the pre-lending relationship are: borrower and lender. Their correspondents in the post-lending relationship are: debtor and (un)secured creditor.

control, and hence would be most attractive to small and medium firms, which are usually owner-managed.¹⁰³

In accordance with the Pecking Order Theory, technology-driven firms, especially those with a high intangible-to-total assets ratio, would prefer debt to equity in funding R&D projects.¹⁰⁴ Nevertheless, the reality is that equity finances like angel finance and venture capital seem to be more commonly used despite their very high costs. This discrepancy comes from the fact that, in the standard form of the Pecking Order Theory, it is implicitly assumed that debt finance is an available option and the cost of debt is generally lower than the cost of undervalued equity. However, in the case of funding R&D projects of technology-intensive firms, the implicit assumptions may not always be true.

When making a lending decision, the lender has to assess the risk of the loan and calculate the interest rate, depending on the inherent risk of the project and also the capability and efforts of the borrower. Section 2.1.2.4 has explained how the asymmetric information concerning the project, the capability and efforts of the borrower can result in the “adverse selection” and “moral hazard” problems in all kinds of external finance. The worse thing is that the highly risky nature of R&D projects and the fixed repayment nature of debt make the problems especially severe in debt finance. These problems seriously shrink the availability credit in a form of “credit-rationing”.¹⁰⁵

The seminal work of Stiglitz and Weiss (1981) explains that “the interest rate a bank charges may itself affect the riskiness of the pool of loans by either: 1) sorting potential borrowers (the adverse selection effect); or 2) affecting the actions of borrowers (the incentive effect).”¹⁰⁶ Lenders would find that raising the interest rate

¹⁰³ See House of Commons of the United Kingdom (2013) “Bridging the Valley of Death: Improving the Commercialisation of Research”, *supra* note 51, Report, para 33 (finding that even large firms find issuing debt is attractive because “they can make a return on investment over long time period and choose investors that share in their objectives, all without reducing the equity stake of existing shareholders.”).

¹⁰⁴ See the discussion on Pecking Order Theory in *supra* note 70.

¹⁰⁵ The term of “credit rationing” in the dissertation is defined the same as in Joseph E. Stiglitz and Andrew Weiss, “Credit Rationing in Markets with Imperfect Information,” *The American Economic Review* 71, no. 3 (1981): 393–410 at 394-5 (stipulating “We reserve the term credit rationing for circumstances in which either (a) among loan applicants who appear to be identical some receive a loan and others do not, and the rejected applicants would not receive a loan even if they offered to pay a higher interest rate; b) there are identifiable groups of individuals in the population who, with a given supply of credit, are unable to obtain loans at any interest rate, even though with a larger supply of credit, they would.”).

¹⁰⁶ See Stiglitz and Weiss (1981) “Credit Rationing in Markets with Imperfect Information,” *ibid.*

beyond a certain level would actually reduce the expected return, since the increased interest rate can amplify the “adverse selection” and lead to more severe “moral hazard”, which consequently increases the possibility of default. Therefore, at a certain interest rate, rational lenders would prefer to limit the supply of credits, although they actually have sufficient funds to provide and there are demands for higher interest rates.

Below we give a literal explanation on the reasoning in Stiglitz and Weiss (1981) for credit rationing. The explanation is also the foundation of the discussion in Section 2.4 for arguing why IP assets are good collateral.

2.2.5.1 Adverse selection problem

The interest rate of a loan is determined by the risk of this lending for the lender, which depends on the quality of the project to be funded and the borrower’s capacity of undertaking the project (hereafter “the quality of loan applicant”). However, in the case with imperfect information about the quality of the loan applicant, the interest rate itself can affect the riskiness of loan applicants in the pooling equilibrium.

When a borrower approaches a potential lender, the borrower typically assures the lender that - this is a good project; it has the capacity to finish the project with desired results; the investment project will generate sufficient positive net value; and it will pay back the lender. However, as the borrower has better information about the quality of the project and its capability of undertaking the project than the external lender, its assurance may not always be credible to the lender. As borrowers cannot credibly communicate their risk type through observable characteristics, it is difficult for the lender to observe the capability of the borrower or to verify the borrower’s assurance. The lender cannot effectively distinguish good projects from bad projects, or distinguish honest borrowers from dishonest ones.

Therefore, in the pooling equilibrium, the lender has to ask for an intermediate interest rate (including the lemon premium against bad projects/borrowers). The intermediate interest rate can trigger adverse selection, i.e., it attracts bad projects or dishonest borrowers (lemons) only while driving away those with good projects or honest borrowers. Lenders would find that raising the interest rate beyond a certain level would actually reduce the expected return, since the increased interest rate can amplify the “adverse selection” and lead to a worse application pool and the increased

possibility of default.¹⁰⁷

However, the high uncertainties in the outcomes of R&D investments (Section 2.1.2.2) and the difficulty of conveying/examining information (Section 2.1.2.3) give rise to more severe information asymmetries, which make the credit-rationing problem caused by adverse selection much more severe in debt finance for R&D activities.

First, the risk of lending to R&D activities is very high for the lenders. Debt finance has a feature that the repayment to the creditor is fixed in the loan contract. If the project succeeds, the lender gets the fixed amount, i.e., the principal loan plus the agreed interest rate in the loan contract; if the project fails, the lenders only gets what is recovered from the salvage value of the remaining, which might be less than the principal loan or even nothing. Therefore, unlike equity funders, lenders have no incentives to gamble on a risky investment for a higher return. They particularly prefer to fund firms that have low-risk projects, have predictable and stable cash flows, or have assets or intermediate outputs with higher redeployability in case of distress, in order to lower the probability of failure or to ensure repayment in the case of failure. However, R&D investments are highly risky by its nature. Furthermore, the majority of the investment goes to the human resources and knowledge accumulation, which have very low redeployability in case of distress. Once the projects fail, the lenders do not get much recovery from the salvage value at all. Therefore, the lender has to ask for high interest rates just for compensating for the high risks they are taking, even for good-quality borrowers.

Second, with the highly skewed distribution of outcomes from R&D investments (i.e., while a large percentage of R&D investments result in very little or no economic value, only a relatively very small portion of R&D investments would result in high value), most loan applicants would be with low quality. If a pooling equilibrium could be reached, the immediate interest rate would be particularly high for good loan applicants. More likely, the high interest rate just drives all good loan applicants out of the market, and no pooling equilibrium can be reached at all.

Debt finance is therefore either very costly for R&D investments, or even unavailable.

¹⁰⁷ See also Akerlof (1970) "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism," *supra* note 65 and the accompanying text.

2.2.5.2 Moral hazard problem

The risk of lending also depends on the borrower's actual efforts in the project after getting the loan. In the case with imperfect information about borrowers' actual efforts, a high interest rate can induce borrowers to take opportunistic decisions at the cost of the lenders.

Debt finance has a feature that the repayment to the creditor is fixed in the loan contract. The fixed debt repayment determines that, if the project succeeds, all residual gains after the repayment accrue to the borrower; if the project fails, all the loss is borne by the lender. Therefore, in the case with asymmetric information concerning the borrower's efforts in the project, an unmonitored borrower (and its equity investors) may make *ex post* opportunistic decisions, even though the strategy greatly increases the probability of failure and actually has a negative net present value. The borrower may choose to invest in riskier projects, in the hope of getting a higher return in the unlikely case of success in order to get higher expected private interests ("risk-shifting").¹⁰⁸ The lender does not share the potentially higher returns but has to bear the higher expected loss caused the increased probability of failure. Also, the borrower may choose to be lazy and exert low efforts, which can bring the borrower with the private benefits from saving the cost of exerting efforts, but can increase the probability of failure and also the lender's expected loss.

With the anticipation of the debtor's opportunistic behavior, the creditors may *ex ante* further increase the interest rates as the moral hazard premium to cover the additional risk. However, the higher interest rates, in turn, may *ex ante* amplify the "adverse selection" further by attracting lower quality borrowers and also *ex post* induce more opportunistic behaviour, which consequently increases the probability of failure and may actually lead to a reduction in profits to the lender. In the end, lenders would prefer to ration credit supply rather than increase the interest rate.

2.2.5.3 Shortage of tangible collateral

Credit rationing is an equilibrium market response for rational lenders in the case with imperfect information, but not a "desired outcome for society". The market

¹⁰⁸ See Jensen and Meckling (1976) "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *supra note* 66 (referring that the debtors have the "overinvestment" incentive to gamble with creditor's money).

equilibrium reached under credit rationing does not clear the market and leaves market with excess demand for credit at the equilibrium interest rate, even in the case with sufficient credit supply. As a result of the imperfect information on the risk type of applicants, identical applicants may be treated differently. Of all the applicants who appear to be identical, some receive a loan and others do not, and the rejected applicants would not receive a loan even if they offered to pay a higher interest rate; and in extreme cases, some groups just cannot get access to credit at all.¹⁰⁹ Credit rationing is associated with high social cost because many social wealth-enhancing transactions may be forgone just for the shirking of credit with imperfect information.

Collateral is commonly used in debt finance as a solution to alleviate the credit rationing problem. It is used as an important complementary selection criterion and disciplinary tool to mitigate the information asymmetries underlying the credit rationing (see further discussion in Section 2.4). In the secured debt finance, collateral is provided by the grantor (in most cases the borrower itself or sometimes a third party associated with the borrower) to the lender, for guarantying the payment of the debt. Then the lender (as the secured creditor) gets some legal claims or equitable rights, known as “security interests”, over the encumbered collateral. Upon the default of the borrower, the security interests entitle the secured creditor to seize, sell or follow other statutory procedures to dispose of the encumbered collateral.¹¹⁰ The essence of security interests is that the secured creditor should be vested with the priority to receive the payments from the disposition of the encumbered collateral, as being paid off the secured debt. Through this way, the secured creditor is guaranteed to receive adequate repayment in the event of the debtor’s default (or at least have some recovery, so the overall lending risk is lower).

However, providing tangible assets as collateral is one of the biggest obstacles for technology-intensive firms to get access to debt finance.¹¹¹ Technology-intensive firms often have valuable intangible assets like IP but have difficulty in providing

¹⁰⁹ See the definition of “credit rationing” in *supra* note 105.

¹¹⁰ See Lipton (2002) “Intellectual Property in the Information Age and Secured Finance Practice”, *infra* note 154 at 358 (pointing out that: “At its most basic secured [debt] finance involves the manipulation of rights and obligations in property to give a loan financier additional comfort over and above the borrower’s contractual obligations to repay the loan with interest (and penalties where applicable). What the lender fundamentally requires is some legal or equitable right in the property that will allow it to take hold of the property on default by the borrower, and on-sell it to a third party to recoup its lending losses.”).

¹¹¹ See Iwan Davies, “Secured Financing of Intellectual Property Assets and the Reform of English Personal Property Security Law,” *Oxford Journal of Legal Studies* 26, no. 3 (2006): 559–83.

sufficient traditional tangible collateral that the lenders would like to accept. Therefore, financial institutions typically constrain lending until the balance sheet of the firm contains more tangible assets. Such a credit-rationing problem is especially severe for firms that are both recently established and small, which suffer the most severe information problems, and need external funding the most but may have the least tangible assets. For these high-tech SMEs, debt finance is costly or simply unavailable. That is one of the main reasons that equity finance dominates over debt finance.¹¹²

The credit-rationing problem would result in severe macroeconomic social loss. Mancusi and Vezzulli (2014) use an economic model and empirical survey evidence to show that, *ceteris paribus*, credit rationing has a greater affect on the R&D participation decision than on the level of R&D spending decision.¹¹³ It means that when facing credit rationing, R&D investors tend to abandon some projects, instead of spreading out money and investing less on each project. This finding implies that a lot of R&D investment opportunities with great potential for knowledge creation and wealth accumulation may totally be foregone, not just be delayed.

Expanding the availability of debt finance for R&D activities are of great social importance, especially if we take into account the fact that, in almost all countries, the traditional debt market is substantively more important than the venture capital market from a quantity perspective.¹¹⁴ The most beneficial party would be these technology-intensive firms with medium-growth & medium-risk R&D projects, which are the majority of R&D projects but beyond the reach of angel finance and venture capital, especially for those in countries with bank-based financial systems. These firms do not grow exponentially any more, but they keep growing and become more stable. They can also have dramatic economic effects on “employment, tax revenue

¹¹² See Andrew Winton and Vijay Yerramillib, “Entrepreneurial Finance: Banks versus Venture Capital,” *Journal of Financial Economics* 88, no. 1 (2008): 51–79 (finding that equity finance dominates over bank finance when the firm's development strategic uncertainty is high, the probability of success is low and the liquidation value from collateral is low).

¹¹³ See Maria Luisa Mancusi and Andrea Vezzulli, “R&D and Credit Rationing in SMEs,” *Economic Inquiry* 52, no. 3 (2014): 1153–1172 (examining the effects of credit rationing on R&D investment by using survey and account data of a large sample of Italian manufactural SMEs; the result shows that crediting rationing has a signifant negative effect on both the probability of setting up R&D activities and the level of R/D investment; and the effect on the former is larger).

¹¹⁴ See, for example, Katleen Baeyens and Sophie Manigart, Follow-on Financing of Venture Capital Backed Companies: The Choice between Debt, Equity, Existing and New Investors, Vlerick Leuven Gent Working Paper Series 2006/05, 2006 (showing that, in Belgium, a country whose financial and institutional settings are bank-centered, debt is the most important source of funding for young technology-intensive firms. A firm only raises equity when its debt capacity is exhausted, as the last resort).

and everything else”.¹¹⁵ Therefore, helping these firms with medium-growth & medium-risk get funds from investors and banks can have significant economic benefit for the society.

2.3 Overview of Using IP as Collateral in Debt Finance

2.3.1 General Discussion

2.3.1.1 Justifications for IP collateralization

As a response to the lack of assets as collateral in debt finance, creating security interests over IP has been proposed as a solution to reduce the cost of debt finance for funding R&D projects, because IP are the most valuable but also maybe the only valuable assets of many technology-intensive SMEs. Harhoff (2011) points out that allowing IP, the “intermediate results of innovation processes”, to be exploited for supporting external finance can alleviate the financial constraints that R&D projects are facing.¹¹⁶ In practice, four main categories of IP-based debt finance have been employed: the mainstream IP-backed lending (otherwise also called IP collateralization), IP securitization,¹¹⁷ IP sale and lease back,¹¹⁸ and venture debt¹¹⁹.

¹¹⁵ See *House of Commons of the United Kingdom (2013)* “Bridging the Valley of Death: Improving the Commercialisation of Research”, *supra* note 51, Report, para 34 (emphasizing the social importance of helping these firms getting funds).

¹¹⁶ See Dietmar Harhoff, “The Role of Patents and Licenses in Securing External Finance for Innovation,” in *Handbook of Research on Innovation and and Entrepreneurship (Elgar Original Reference)*, ed. David B. Audretsch et al. (Edward Elgar, 2011), 55–73 (positing “If a market for intermediate results of innovation processes existed, then the financing constraints of innovative firms would presumably be less pronounced. Intermediate results could be licensed, sold, leased or become part of other financial transactions, which would relax the financing constraints problem.”)

¹¹⁷ In an IP securitization transaction, an “originator” firm transfers IP asset or the rights to its projected revenues (e.g. royalties) to a “special purpose vehicle” (SPV), which then issues securities in the capital markets in its own name but the fund raised is channeled back to the originating company. The securities issued by the SPV are in theory separated from the firm’s risks and therefore can receive more favorable credit ratings. The transaction is structured in order to help the originating firm improve the chance of getting finance or lower the cost of finance. The most famous case of IP collateralization is the “David Bowie bonds” in 1997. However, it might be a choice for large IP-portfolio with stable cash flows and in very few countries with sophisticated finance markets for structured transactions. Very few successful cases have been established. See, e.g., Nicole Chu, “Bowie Bonds: A Key to Unlocking, the Wealth of Intellectual Property,” *Hastings Communications and Entertainment Law Journal (Comm/Ent)* 21 (1998): 469–500; John M. Jr. Gabala, “Intellectual Alchemy: Securitization of Intellectual Property as an Innovative Form of Alternative Financing,” *John Marshall Review of Intellectual Property Law* 3, no. i (2003): 307–330.

¹¹⁸ In an “IP sale and lease back” transaction, the debtor sells its IP to the creditor (with a restrictive term that gives the debtor the option to buy back the IP asset at a predefined price) in exchange for immediate funding. Then the debtor get a license back from the creditor for the continued use of the underlying

In essence, the role of IP as collateral in these mechanisms is the same; the three latter mechanisms are just more advanced derivatives of the first mechanism.

In principle, for being able to be used as collateral, an asset only needs to satisfy two conditions. First, it has economic value, for both the debtor and the secured creditor. Second, it can be separated from the business of the grantor/debtor and be independently assigned in case of financial distress. Historically, the typical assets encumbered are tangible assets that meet the two basic criteria, such as real estates, plant, equipment, inventories, or automobiles. IP can be used as collateral because they also meet the two basic criteria.

For the first criterion, IP do have economic value for both the IP holder-debtor and the secured creditor. The temporary statutory exclusivity given by the IP laws allows IP holders to restrict access to the knowledge/innovation they produce and to charge for a monopoly price (or licensing fee) that exceeds the marginal cost for an authorized access. This statutory exclusivity is designed to enable innovators to cover their initial investment and to drive profits. So, it clearly has economic value to the IP holder-debtor. Meanwhile, the statutory exclusivity might be wanted by other players in the market in order to use the underlying invention or to exclude others from using it. It therefore also has liquidation value to the secured creditor.

For the second criterion, as there is no general statutory restriction on the assignability, IP can be separated from the business of the innovator and be independently assignable or disposable when the obligations cannot be fulfilled. Upon the debtor's default, the secured creditor can execute its security interests over the encumbered IP. The security interests allow the secured debtor to liquidate the encumbered IP through

encumbered IP. This kind of transaction may impose on the creditor too many burdens regarding maintaining and protecting the encumbered IP and therefore is less common in practice. See Federico Munari, Cristina Odasso, and Laura Toschi, "Patent-Backed Finance," in *The Economic Valuation of Patents: Methods and Applications*, ed. Federico Munari and Raffaele Oriani (Cheltenham: Edward Elgar Publishing, 2011), 309–36.

¹¹⁹ In a venture debt transaction, the venture debt providers combine their loans with warrants for the right to purchase equity. This structure combines the properties of debt and equity. It has the same effect as a convertible debt contract. The warrants give the debt providers the right to convert the debt claim into equity. This structure allows the debt provider to get refund from the liquidation in the case of default and to share profits in the case of success. The profit sharing helps reduce the cost of loan. Venture debt providers are specialized banks or non-bank lenders. See, e.g., Darian M. Ibrahim, "Debt as Venture Capital," *University of Illinois Law Review* 4 (2010): 1169–1210.

certain statutory procedures and to get repaid from the liquidation value prior to other junior creditors, for recouping its lending losses.

2.3.1.2 Direct benefits of IP collateralization

Using IP as collateral in debt finance has some obvious benefits. For individuals and companies that have valuable IP but lack sufficient traditional tangible assets, using IP as collateral facilitates them to gain better access to low-cost credit. First, it enables IP-intensive firms to use the “intermediate results of innovation processes” to increase the value of their collateral portfolios and consequently increases their chances of accruing a greater incremental capital at better rates.¹²⁰ Second, it offers IP-intensive firms a faster way to improve their liquidity. In the normal way of IP exploitation, materializing the cash flow from an IP licensing or sale may take years. Using IP as collateral in debt finance allows these firms to collect the present value of future cash flows in a lump sum today rather than waiting until the time of their materialization. In other words, it provides IP-intensive firms with a faster way to unlock the monetary value of their IP assets for supporting the working capital needs in times of financial difficulty. Third, it may also help IP-intensive firms to *share* some of the risk associated with the exploitation of IP to some lenders (note: not risk-shifting¹²¹).¹²² From the social perspective, this risk-sharing would be socially beneficial if lenders are in a better position in monitoring or controlling the risk associated with the exploitation of IP than the IP holders (i.e., being the cheaper risk-avoiders). Although most lenders usually do not directly get involved in post-lending monitoring or controlling, some specialized lenders may do have their advantages in these matters.

Using IP as collateral in debt finance is expected to be most helpful for those innovative firms between the late start-up phase and the growth phase. After the early

¹²⁰ See Harhoff (2011) “The Role of Patents and Licenses in Securing External Finance for Innovation,” *supra* note 116.

¹²¹ We make a distinction between “risk-sharing” and “risk-shifting”. Risk-sharing happens when both parties engage in some actions that are for some reasons not explicitly contractable. With proper contractual design, the parties are correctly induced by economic incentives to share risk aims at minimizing the efficiency loss by making both parties residual claimants. Risk-shifting happens when one party is induced to intentionally shift its own risk to another party for its own benefits, as discussed in 2.2.5 that a debtor is induced to choose highly risky actions to shift the additional cost of increased risk to the lender. See, e.g., Saltuk Ozerturk, “Risk Sharing, Risk Shifting and the Role of Convertible Debt,” *Journal of Mathematical Economics* 44, no. 11 (2008): 1257–1265.

¹²² See Joseph A. Agiato, “The Basics of Financing Intellectual Property Royalties,” in *From Ideas to Assets: Investing Wisely in Intellectual Property*, ed. Bruce M. Berman (New Jersey: John Wiley and Sons, 2002), 423 ff.

start-up phase, innovative firms might have already obtained some valuable patents. By then, the uncertainty and risk regarding their R&D still exist but have also decreased to a lower level that might be acceptable for traditional banks and financial institutions. As mentioned at Section 2.2.5, debt finance does not lead to any dilution of the ownership or dramatic change of the current equity structure, which does happen in angel finance and venture capital. Using IP as collateral in debt finance would be especially attractive for firms which have already obtained some valuable IP but still need further external finance to get the capital necessary to further their research, technological application or to expand their market, but do not want further dilution of ownership.

For lenders such as commercial banks and financial institutions, accepting IP as collateral may help them spread their investment risk and find new profit sources. This advantage is especially attractive against the backdrop of the economic development. For now, as a consequence of the global financial crisis in 2008, banks and financial institutions tend to squeeze credits and display caution vis-à-vis those traditional categories of assets that investors used to invest in during the past years, such as real estate. One of the lessons we can learn from the sub-prime crisis is that there is no completely safe collateral (the secured transaction over real estates is called a mortgage). The debt risk can be reduced by accurate risk-assessment and asset-diversity. “Some IP commentators find IP to be less correlated with the broader financial market than traditional asset classes like real estate and commodities”.¹²³ Therefore, accepting valuable IP as collateral can help lenders diversify their investment portfolios. Furthermore, accepting IP as collateral may also give fund providers an important opportunity to invest in the technological economy through lending money to IP holders, which has lower risk than directly participating in equity finance.¹²⁴

As to the development of IP as a whole, using IP as security in debt finance may have beneficial macro-economic effects. With funds secured by IP, borrowers can further their on-going R&D activities. Amable et al. (2010) employ a model to show that the assignment of patents as collateral determines the savings of firms and can magnify

¹²³ The citation is from *Singapore IP Steering Committee (2013) “Intellectual Property (IP) Hub Master Plan: Developing Singapore as a Global IP Hub in Asia,”* *infra* note 134 at Para 3.3.5.

¹²⁴ See Tao Dong, *Research on the System of Intellectual Property Securitisation (知识产权证券化制度研究)* (Beijing: Tsinghua University Press, 2009).

the effect of innovative rents on investment in R&D.¹²⁵ It reveals that, when faced with random and lumpy investment in R&D, high growth rates of innovations may be achieved with the use of patents as collateral, despite the financial constraints. Realizing the potentials of IP in attracting debt finance, innovative firms are *ex ante* incentivized to invest more in the creation and management of IP assets for future funding.¹²⁶ In order to be able to share profits from the high growth rates of innovations, banks and financial institutions are also called upon to be more enthusiastic for getting more familiar with IP in order to enhance their professional competence in evaluating and monitoring IP.¹²⁷ From the perspective of dynamic efficiency, these benefits of using IP as collateral in promoting investment in innovation would be even more obvious in the long run.

2.3.1.3 Practice of IP collateralization

Given the aforementioned benefits, IP collateralization has been practiced in many jurisdictions for a long time.

In the United States, the precedents of IP collateralization can even be traced back to the 1880s when Thomas Edison used his patent for the incandescent electric light bulb as collateral to borrow money for starting his own company, the General Electric Company.¹²⁸ The pervasive use of IP collateralization helps companies raise significant financing. Relecura (2015) reviews 896,254 patent-based transactions comprising 333,577 patents happening from 2009 to 2014, and finds several main trends: (1) the key companies securing loans using patents include General Motors, Avago, Alcatel Lucent and Kodak; (2) as banks are the primary financing entities

¹²⁵ See Bruno Amable, Jean-Bernard Chatelain, and Kirsten Ralf, "Patents as Collateral," *Journal of Economic Dynamics and Control* 34, no. 6 (2010): 1092–1104.

¹²⁶ See Jeffrey R. Kuester and Lawrence R. Thompson, "Risks Associated with Restricting Business Method and E-Commerce Patents," *Georgia State University Law Review* 17 (2001): 657 at 688 (evidencing that one of the main reasons for businesses attempting to patent e-commerce software is to increase their chances of obtaining finance from lenders); Gaétan Rassenfosse, "How SMEs Exploit Their Intellectual Property Assets: Evidence from Survey Data," *Small Business Economics* 39, no. 2 (January 13, 2012): 437–452 (based on an international survey done by the European Patenting Office, showing that attracting investors or licensing is one of the main 'monetary motivations' for the surveyed SMEs to apply for patents).

¹²⁷ See Keith E. Maskus et al., "Intellectual Property Rights and Economic Development in China," In *Intellectual Property and Development: Lessons from Recent Economic Research*, edited by Carsten Fink and Keith E. Maskus, 295–331. New York: Oxford University Press, 2005 at 295.

¹²⁸ See Shawn K. Baldwin, "'To Promote the Progress of Science and Useful Arts': A Role for Federal Regulation of Intellectual Property as Collateral," *University of Pennsylvania Law Review* 143, no. 5 (1995): 1701–1738 at 1701.

involved in these transactions, other financial institutions, like investment banking, venture capital, and financing arms of companies are also providing IP backed financing; (3) JP Morgan Chase, Bank of America, Citigroup, Wells Fargo, Wilmington Trust, and Deutsche bank are the top financing entities advancing loans to companies with patents as collateral; (4) government institutions and Union Trust, for example the U.S. Treasury and the UAW Retiree Medical Benefits Trust, have advanced IP backed loans as well; (5) the active sectors employing IP backed financing include digital data processing, digital communication, IT methods for management, telecommunication, semiconductors, and television & video transmission.¹²⁹

In Germany, preliminary statistics show that from 2001 to 2005 about 40 transactions with the amount of EUR 140 million were concluded and realized in the Landesbank Rheinland-Pfalz, which has accepted technical documentation of research projects as *additional* collateral for the financing of R&D projects of medium size companies. In addition, since 2006 Germany's Federal Financial Supervisory Authority (BaFin) has begun to allow banks to accept patents as a *sole* security for bank lending.¹³⁰

In Japan, the use of IP as collateral for bank loans was led by the Development Bank of Japan (DBJ), which is a government-related bank in charge of making and implementing national economic policies. In 1995, in order to promote the cultivation and development of start-up companies, the DBJ in cooperation with private financial institutions began to provide IP-based long-term loans to Japanese SMEs to assist them in "utilizing their IP for bridging loans and leverage purposes".¹³¹ According to

¹²⁹ The Top 10 US companies raising financing from patents-backed transactions (by the number of patents used as collateral) are: General Motor (15,866), Avago Technologies (12,946), Alcatel Lucent (10,023), Kodak (8,438), Freescale (8,149), Seagate (5,910), Dell (4,609), Avaya (3,162), Chrysler (2,914), Ps4 Luxco (2,313). And the Top 10 financing entities providing funds with accepting patents as collateral (by the number of patents used as collateral) in the US are: JP Morgan Chase (48,804), Bank of American (46,897), Citigroup (34,658), Wells Fargo (32,716), Wilmington Trust (31,369), Deutsche Bank (27,172), Credit Suisse (18,758), The Bank of New York Mellon (16,142); GE Capital (12,774); US Treasury (12,212). Digital data processing (11.33%), digital communication (9.79%) followed by medical devices (5.76), semiconductors (5.36%) and transportation (5.23%) are the key industries involved in the transactions related to IP backed financing. See the report at Relecura, "Relecura IP Intelligence Report: IP Backed Financing Overview of Trends," 2015, https://relecura.com/reports/IP_Backed_Financing.pdf.

¹³⁰ See Shigeki Kamiyama, Jerry Sheehan, and Catalina Martinez, "Valuation and Exploitation of Intellectual Property," in *OECD Science, Technology and Industry Working Papers, 2006/05*, 48. OECD Publishing, 2006.

¹³¹ See Masatoshi Kuratomi, "Intellectual Property and Bridging Loans: Their Emerging Roles in Venture Finance and Business Rehabilitation in Japan," in *Risk Management and Innovation in Japan, Britain and the United States*, ed. Ruth Taplin (New York: Routledge, 2005), 162-74.

preliminary statistics, from 1995 to March 2004, more than 230 IP-based loans with a total amount of ¥13.2 billion had been granted by the DBJ to facilitate venture firms. Moreover, another loan program was established by the DBJ in 2004 to advance its achievements in IP collateralization.¹³²

For large firms in the United Kingdom, IP secured finance has been a common practice. For instance, “large organisations including Philips, GKN, Costain, Diageo and TUI have adopted imaginative structures that leverage IP and/or the income streams derived from it.”¹³³

And many other jurisdictions have adopted different policies to promote IP collateralization.

For example, in Singapore’s plan of becoming a “Global Hub of IP” for IP transactions and management in 2013, “introducing an IP financing scheme, where the value of the IP assets of the borrower would be partially underwritten by the Government to encourage banks to accept them as collateral in support of the loan” has been included in the main strategies of increasing access to IP financing.¹³⁴ In 2014, a US\$70 million Intellectual Property Financing Scheme (IPFS) was launched by the Intellectual Property Office of Singapore (IPOS) to support local businesses to use their granted patents, granted trademarks and copyright related rights as collaterals for bank loans.¹³⁵ Within the scheme, the IPOS decided to partially underwrite the loans issued by participating financial institutions (PFIs), including the AFC Merchant Bank, DBS Bank Ltd, Oversea-Chinese Banking Corporation Ltd and United Overseas Bank Ltd. With the underwriting of the government, banks do not need to bear all the risk in case of default. The IPOS has also established a panel of nine valuers to help local companies discover the worth of their intangible assets.¹³⁶ In the end of May 2016, the first case of

¹³² See Masatoshi Kuratomi (2005), *ibid*.

¹³³ See “Intellectual Property Awareness Network (IPAN) Briefs on Topical Intellectual Property Issues-Brief 18: Intellectual Property, Finance and the Economy,” no. April (2016): 58–64, http://ipaware.net/sites/default/files/IPAN_Issue-briefs_2016_003503_apr16.pdf, at 62.

¹³⁴ See Singapore IP Steering Committee, “Intellectual Property (IP) Hub Master Plan: Developing Singapore as a Global IP Hub in Asia,” April 2013, https://www.ipos.gov.sg/Portals/0/Press_Release/IP_HUB_MASTER_PLAN_REPORT_2_APR_2013.pdf, at Recommendation 2-1 and Para 3.3.10.

¹³⁵ See more information about the Intellectual Property Financing Scheme of Singapore at the website of the Intellectual Property Office of Singapore, available at, <http://www.ipos.gov.sg/IPforYou/IPforBusinesses/IPFinancingScheme.aspx>.

¹³⁶ The nine valuers are: Baker & McKenzie, Wong & Leow, CONSOR Intellectual Asset Management, Deloitte & Touche Financial Advisory Services Pte Ltd, Duff & Phelps Singapore Pte Ltd, Ernst & Young

loan application using IP as collateral was approved in Singapore to a local company, Masai Group International, funded by DBS Bank Ltd, one of the four PFIs supported by the IPFS scheme.¹³⁷ The IPOS has extended the IPFS scheme for another two years till 31 March 2018, as expecting more applications for IP collateralization.

Similarly, in 2013, the Malaysia Government also launched an Intellectual Property Financing Scheme, with the support of a US\$65 million fund administered by Malaysia Debt Venture, specifically for enabling SMEs to “use their IPRs as an additional source of collateral to obtain funding and spurring more investments for companies with technology capabilities, in turn encouraging innovation.”¹³⁸ The scheme allows companies to leverage their IP to secure financing of up to US\$2.25 million, or 80% of the value of their IPR, whichever is lower, for the maximum period of 5 years. Under the scheme, the government provides a 2% interest subsidy and a guarantee of 50% of the loan via the Credit Guarantee Corporation Malaysia Berhad. The Intellectual Property Corp of Malaysia was mandated to handle the related IP valuation matters.

Among all these promoting efforts from the government, the results in China are the most significant. Since 2008, the Chinese government initiated a national pilot-scheme on exploring different policies encouraging IP collateralization, such as using mechanisms like interest subsidies and intermediary services to reduce the cost of IP collateralization for SMEs, establishing professional financing service platforms, and promoting cooperation between valuation institutions and banks. With the facilitation of these efforts, IP collateralization has achieved remarkable growth. In 2015 alone, the total amount of loans secured by patents reached RMB 56 billion (approximately US\$8.1 billion) (see more detailed discussion in Section 4.2.1).

Many Chinese practitioners have accumulated substantial experience in handling IP collateralization. For example, in October 2006, the Beijing Branch of the Bank of Communications, the Jingwei Law Office of Beijing, the Liancheng Assets Appraisal

Solutions LLP, EverEdge Global (NZ) Ltd, KPMG Services Pte Ltd, PricewaterhouseCoopers Advisory Services Pte Ltd, Valuation Consulting LLP. *Ibid.*

¹³⁷ See more information at the IPOS IP Financing Scheme Media Release 2 June 2016: Cash for intellectual property through loan financing now a reality in Singapore, available at, <http://www.ipos.gov.sg/MediaEvents/Readnews/tabid/873/articleid/340/category/Press%20Releases/parentId/80/year/2016/Default.aspx>

¹³⁸ See more information about the key features of the Intellectual Property Financing Scheme at the homepage of the Malaysia Debt Venture (MDV), available at, <http://www.mdv.com.my/en/product-services/government-schemes/intellectual-property-financing/>.

Co., Ltd and the Beijing Zihexin Insurance Ltd. formally signed a four-party agreement to build a united service platform named *Zhanyetong* to carry out a routine finance service concerning IP collateralization.¹³⁹ Throughout the years, the platform has developed a routine procedure for IP collateralization (with the use of facilitation from the government). The routine procedure has been employed by many other Chinese banks as well.

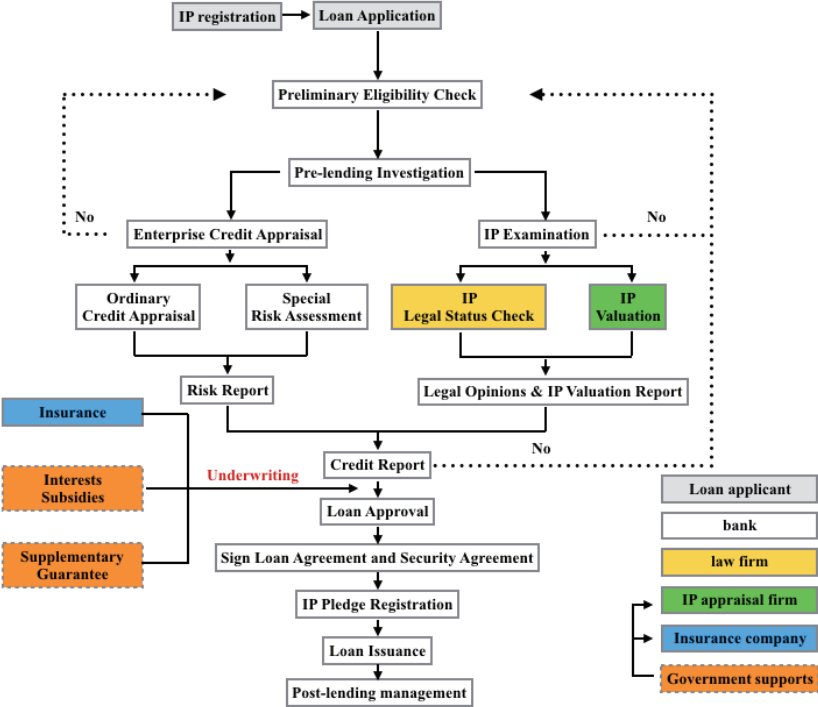


Figure 2.2 Event flowchart of IP Collateralization in China (*Zhanyetong Platform*)

At the global level, IP collateralization has been accepted as a way of exploitation in law. A survey conducted in 2006 by the International Association for the Protection of Intellectual Property (AIPPI) on contracts regarding IP rights, such as assignments, licenses and security interests, shows that “in the great majority of countries IP rights

¹³⁹ See more information at the website of Bank of Communications: <http://www.bankcomm.com/jh/cn/newRecommend/zyt.html>;

can be used to provide security.”¹⁴⁰ Another survey conducted by the World Intellectual Property Organization (WIPO) in 2009 on the practice of IP financing also shows that the laws in 40 out of the 66 respondent Member States do have legal provisions addressing using IP as collateral in debt finance.¹⁴¹

2.3.2 Obstacles to IP Collateralization in Practice

Although IP collateralization may appear promising and has been practiced for a long time in many jurisdictions, its prevalence in practice is still below expectation. The European Commission’s survey on European commercial banks in 2000 shows that, although with permission in the legal text, none of the 50 respondent banks “routinely accepts intangible assets as collateral for loans to new technology-based firms” at that time.¹⁴² Scholars have long studied the factors that contribute to the reluctance of financial institutions to accept IP as collateral, mainly the associated legal risks and the uncertainty in the value of IP.

2.3.2.1 Legal uncertainties in IP collateralization

A. Risk of litigation over the encumbered IP

When a lender accepts an IP as collateral, he has to realize that he might have a high risk of facing litigations over the ownership, validity or infringement. As discussed in Section 2.1.1.1, knowledge itself is non-rival and non-exclusive. The regime of IP protection is designed to establish the statutory exclusivity to enable the innovators to gain profits, in order to solve the appropriability problem in R&D investment. However, this kind of statutory exclusivity has no clear physical boundary. The difficulty in delineating boundaries results in numerable disputes.

¹⁴⁰ See Luis-Alfonso Duran, “Question 190, Guidelines for National and Regional Group Reports,” *International Association for the Protection of Intellectual Property (AIPPI)*, 2006, available at: <https://www.aippi.org/?sel=questions&sub=listingcommittees&viewQ=190#190>.

¹⁴¹ See WIPO, “WIPO Questionnaire on Security Interests in Intellectual Property,” in *WIPO Information Paper on Intellectual Property Financing & Annex, WIPO/IP/FIN/GE/09/7* (Geneva, 2009), 129–157, at http://www.wipo.int/edocs/mdocs/copyright/en/wipo_ip_fin_ge_09/wipo_ip_fin_ge_09_7-annex1.pdf.

¹⁴² See European Commission, *Funding of New Technology-Based Firms by Commercial Banks in Europe* (Luxembourg: Office for Official Publications of the European Communities, 2000), at 44 (this survey interviewed branches of 50 commercial banks in Europe which are geographically close to science parks where one would expect to see many new technology-based firms. The bank interviewed include large national banks and small regional institutions. The survey shows that “good practice ... does not extend to accepting IP as security primarily because banks feel unable to realise any residual value”).

As a starting point, not all forms of IP are subject to registration; for example, the copyright protection over creative expressions is granted without prior registration. This kind of automatic protection system is created for providing effective protection to creators, but also gives rise to the difficulty for potential lenders to ascertain the ownership and content of the encumbered IP.

For registered IP, a successful registration and a grant of IP protection do not necessarily guarantee the validity of the IP protection. There still exists the risk of being challenged or being invalidated subsequent to the initial grant. For example, a registered trademark may be challenged as being “generic”, while a patent may be challenged as lacking novelty, inventiveness or industrial applicability.¹⁴³ The technological boundaries described in the patent claims which “are too broad or not detailed enough can increase the likelihood of overlapping with other patents and can create doubts regarding the real applications of the invention.”¹⁴⁴ The risk of being challenged is actually very high nowadays, especially when invalidating IP has already become a common defense strategy used by the defendants in IP-related proceedings.¹⁴⁵ Once an IP is found invalid or unenforceable, its capability of bringing cash flow and liquidation value would just disappear.

And even for valid IP protection, the rules of joint ownership or ownership presumption, or ways of exploitation (for example, the licensing relationship can bring in the involvement of third parties such as licensors or licensees of the borrower), can multiply the complexity of the above problems (see more detailed discussion in Section 3.3.2.2), and lead to disputes over ascertaining the ownership or validity of the encumbered IP.

Allison et al. (2004) have done a comprehensive study comparing the characteristics of patents that ended up in litigation with those having not been litigated.¹⁴⁶ The

¹⁴³ Article 27 (1) of the TRIPS Agreement provides that only inventions satisfying the statutory requirements of patentability that are novel (has not been previously patented), involve an inventive step over past inventions (not be obvious), and be capable of industrial application (be useful) can be awarded valid patents.

¹⁴⁴ The citation is from the OECD (2015), “Enquiries into Intellectual Property’s Economic Impact (Chapter 9 - IP-Based Financing of Innovative Firms)”, *supra* note 57 at 466.

¹⁴⁵ See Jacqueline Lipton, “Security Interests in Intellectual Property,” in *The Reform of UK Personal Property Security Law: Comparative Perspectives*, ed. John de Lacy (Oxon: Routledge-Cavendish, 2010), 285–307 at 300.

¹⁴⁶ See John R Allison et al., “Valuable Patents,” *Georgetown Law Journal* 92, no. 3 (2004): 435–80 (The whole sample was comprised of approximately three million unlitigated patents and around 6,800 litigated patents involving in infringement litigation terminated in 1999 or 2000. The refined comparison looked into a

empirical study reveals that litigation tends to occur to patents having more total claims, independent claims, backward citations (references cited in the patent), and forward citations (references to the patent made by later patents).¹⁴⁷ These identified characteristics are also commonly considered to be the patent value indicators.¹⁴⁸ Their finding reveals a significant positive correlation between litigation and patent value. In other words, it implies that these patents that are valuable to be used as collateral are also the common targets for patent litigation. Therefore, the risk of litigation is a crucial factor that lenders have to be aware of when they accept patents as collateral. The result is consistent with the interesting observation from Hoenig (2012), who finds that the fund providers “who have experienced a patent lawsuit or hold a law degree appreciate patents much less than their peers”.¹⁴⁹

Allison et al. (2004) also show that patents issued to individuals and small companies are substantially more likely to be litigated than those originally issued to large corporations.¹⁵⁰ The observation implies a higher litigation risk in patents to small business. This phenomenon may occur because small inventors are the ones least likely to have all the resources for innovation, production and market distribution, and therefore more often to use licensing to bring revenue.¹⁵¹ The licensing practice brings in more parties and uncertainties.¹⁵² In addition, small businesses may be more often targeted for their limited resource of handling expensive litigations, or their weaker bargaining power in defending themselves or in reaching a settlement in the patent

random sample of 1,000 unlitigated patents issued between 1996-1998 by the USPTO, and 300 patents issued during the same period and involved in infringement litigation terminated during 1999-2000).

¹⁴⁷ See Allison et al. (2004) “Valuable Patents,” *ibid*, at 451-460.

¹⁴⁸ See *infra* note 172 – 174, and the accompanying text.

¹⁴⁹ See Daniel Hoenig, “The Role of Patents in Venture Capital Financing - an Empirical Analysis from Different Perspectives” (Technische Universität München, 2012), <http://d-nb.info/1031551743/34> (the main conclusion of the PhD Dissertation is that “even though patents in general play an important role as selection criterion in venture capital financing, their value contribution is in some respects clearly limited.”). The other findings were later published in Hoenig and Henkel (2015), “Quality Signals? The Role of Patents, Alliances, and Team Experience in Venture Capital Financing.” *supra* note 99.

¹⁵⁰ See Allison et al. (2004) “Valuable Patents,” *supra* note 146 (The result shows that, in the sample, as only 37% of the patents are issued to small entities, 39.2% of patents issued to individuals and small companies were litigated while only 13.6% of the patents issued to large corporations were litigated. The authors explained that the phenomena might be because of that “small entities are more innovative” and that “they are less conservative about commencing litigation”)

¹⁵¹ See Landes and Posner (2003) *The Economic Structure of Intellectual Property Law*, *supra* note 39 at 330.

¹⁵² See the detailed discussion on the additional parties and interests in Section 3.3.2.

disputes.¹⁵³ In other words, the litigation risk of using IP collateral could be comparatively higher for small business.

The associated high risk of litigation brings lenders with substantial transaction cost on hiring lawyers and introduces uncertainty in the liquidation value of IP, especially when accepting IP provided by small inventors as collateral. The lenders have to ensure that there is no dispute (or at least very low probability of litigation) over the IP rights offered as collateral. Enhancing transparency and reliability in the information about ownership, transfers and licensing of IP may help reduce information asymmetries or legal uncertainties. And the general legal environment for IP enforcement and litigation is also crucial for preserving the value of IP and for establishing the confidence of lenders in accepting IP as collateral.

B. Heavy burdens on due diligent lenders

Aside from the inherent litigation risk, some other legal aspects of IP, such as ambiguous legal boundaries, finite IP protection, and the requirements on continuous registration renewal or exploitation, also impose parties in transactions with heavy burdens on due diligence throughout the whole transaction.

First, the ambiguous legal boundary in IP law requires the active participation of lawyers and accountants in the transactions. Although the basic economic rationale under IP protection is similar, there are different statutory schemes for each kind of IP and variations in the level and scope of legal protection among jurisdictions.¹⁵⁴ Then the scope and content of IP are also continuously evolving and progressively expanding with the developments in both science and technology, for fitting new outputs of human intellect into the IP protection system.¹⁵⁵ The ambiguous legal

¹⁵³ See Allison et al. (2004), “Valuable Patents,” *supra note* 146 at 468-469 (explicating “Large companies in many industries hold patents for defensive purposes – to deter other large companies from suing them. The result is a sort of “mutually assured destruction” in which very few companies actually sue for patent infringement because they know that, if they do, their opponents will also be able to sue them for patent infringement. If there are any patent disputes at all between these companies, they tend to end in royalty-free cross-licenses.”)

¹⁵⁴ See Jacqueline Lipton, “Intellectual Property in the Information Age and Secured Finance Practice,” *European Intellectual Property Review* 24, no. 7 (2002): 358-367; Lipton (2010) “Security Interests in Intellectual Property”, *supra note* 145.

¹⁵⁵ See, for example, Lipton (2002) “Intellectual Property in the Information Age and Secured Finance Practice”, *supra note* 154.; Howard P. Knopf, “The Database Dilemma in Canada: Is ‘Ultra’ Copyright Required?,” *University of New Brunswick Law Journal* 48 (1999): 164-88. (discussing the uncertainty about the scope of IP for databases in Canada and the U.S.A).

boundary in IP law can scare away many potential debt finance providers that are not so familiar with IP as with traditional tangible assets. Although the lenders can leave the detailed issues for lawyers and accountants to deal with, they still should be aware of the evolving boundaries and have a basic idea about what rights can be categorized as IP, what rights are comprised in each type of IP, or what rights in which types of IP are valuable and are legally allowed to be used as collateral. The answers to these questions directly determine the liquidation value. However, just getting the basic idea about these questions requires a case-by-case analysis and assistance from experts in IP, in cooperation with experts in secured transaction. Acquiring the expert opinions can largely increase the transaction cost.

Second, the finite IP protection requires lenders to have a careful legal check before accepting an IP as collateral. As discussed in Section 2.1.1.2, the statutory monopoly status given by IP law provides the source of economic value of IP. However, such a monopoly status is restricted by its statutory term of protection for balancing out the static inefficiency. Following the expiry date, IP protected works lose their statutory exclusivity and fall into the public domain. As these works can be freely exploited by the whole society, the liquidation value in encumbered IP is thereby vastly diminished. For this reason, checking if the remaining legal protection term of the IP to be encumbered matches the loan term or not, is an essential part of the due diligence process in the creation of security interests in IP.¹⁵⁶

Third, the requirements on continuous registration renewal or exploitation require the lenders to closely monitor over the encumbered IP after the transaction has been made. Almost in all jurisdictions the protection to patents and trademarks is subject to continuous registration renewal or exploitation.¹⁵⁷ Safeguarding the continuous valid legal protection over an encumbered IP is crucial for ensuring the realization of security interests in IP (see also Section 3.4.4). For this reason, the lenders have to closely monitor the exploitation of the encumbered IP and may have to take active actions to ensure continued valid legal protection over the encumbered IP.

All these burdens highly increase the cost of loans for lenders and eventually increase the transaction cost of IP collateralization for the borrowers.

¹⁵⁶ See Vanya Bromfield and John Runeckles, "Taking Security over Intellectual Property: A Practical Overview," *European Intellectual Property Review* 28, no. 6 (2006): 344 ff.

¹⁵⁷ See more detailed discussion in *infra* note 309 and Section 3.4.4.

C. Legal risks over the transaction

Apart from the above legal risks over the IP to be used as collateral, the lenders have to be aware of the legal risks in concluding the transaction. As noted in the survey of the WIPO in 2009, in the countries where IP collateralization has been specifically accepted in law, the relevant issues are mainly addressed by a mixture of laws, including laws on security interests, IP laws¹⁵⁸ and other relevant laws, such as bankruptcy laws or the laws on civil procedure.¹⁵⁹ The fragmentation among laws results in lots of discrepancies and uncertainties to the transactions. These divergences complicate the process of concluding an IP collateralization transaction and increase the associated legal risks and costs.¹⁶⁰

Dealing with these legal uncertainties requires a comprehensive and extremely complicated case-by-case due diligence process, which needs coordinated professional legal advice from both specialists in IP law and specialists in secured transactions law. However, a successful cooperation between specialists in IP and specialists in secured transactions is difficult to achieve in practice. The deep gap between the two different languages of finance professionals and IP professionals may make the two groups of specialists speak past each other and disagree about the meaning of relevant words.¹⁶¹ The inconsistencies between IP laws and secured transaction laws add to the difficulty of specialists to communicate, which ultimately may lead to conflicts caused by different legal systems, value orientations and business cultures. For this reason, a

¹⁵⁸ See WIPO (2009) “WIPO Questionnaire on Security Interests in Intellectual Property,” *supra* note 141. In the WIPO’s survey, “IP laws” are defined as “legislative enactments, administrative regulations, or judicial decrees that generally constitute the body of IP law in each country (including at the federal and provincial level) or region”.

¹⁵⁹ *Ibid.* In the response to Question 2 of the WIPO’s survey, among 66 respondent Member States, “a minority of 12% of responding Member States’ laws addressed security interests in IP by relying on IP law provisions only, while some 49% use a mixture of IP law and other laws. A significant proportion of responding Member States, some 43% stated that other sources of law than IP law covered the issue (and for 30% of these countries, this was only for copyright-related transactions). Finally, 22% of responding Member States did not have any law addressing the issue”. Moreover, the response to Question 3 also reveals that, in most cases, major issues regarding security interests in IP (such as, the creation or granting of security interests in IP, the methods for achieving the third-party effectiveness of the security interests in IP, the rules of priority of security interest in IP as to other assignments, licenses or security interest, and the enforcement of security interests in IP) are addressed by laws other than IP laws.

¹⁶⁰ See Iwan Davies, “Technology-Based Small Firms and the Commoditization of Intellectual Property Rights,” in *The Reform of UK Personal Property Security Law: Comparative Perspectives*, ed. J. d. Lacy (Oxon: Routledge-Cavendish, 2010), 308 at 308.

¹⁶¹ See the examples discussed in Section 3.5.2 on the terminology ambiguity as to “priority” in the context of secured transaction law and in the context of IP law; also in Section 4.2.2.2 A on the terminology ambiguity as to “moral rights” (IP law) and “personal rights” (property law) in Chinese law.

successful cooperation between experts in the field of secured financing and IP law will depend upon ‘cultural exchange’ and ‘bilingualism’. Unfortunately, very few lawyers are familiar with these two sectors of laws at the same time and know how to make an appropriate legal arrangement to guarantee sufficient protection to either the borrower or the lender. These problems make the transactions much more expensive than they need to be.

And in many other cases, legal uncertainties may simply preclude socially welfare-enhancing IP collateralization transactions from happening. Neither borrowers nor lenders would accept IP collateralization without the assurance of sufficient legal protection. The legal problems over the transaction are also the focus of the following chapters of this dissertation (Chapter 3-5).

2.3.2.2 Uncertainties in the value of IP

In secured transactions, lenders are protected against the lending risk by the liquidation value of the collateral. Therefore, when it comes to the issue on using IP as collateral for obtaining debt finance, the first intuitive concern of many people is about the high level of uncertainty related to the value of the encumbered IP. The uncertainties mainly come from the legal nature and purpose of the IP protection system.

A. The highly skewed distribution of value

First of all, similar to the distribution of value among R&D projects,¹⁶² the distribution of value among patents is also highly skewed, i.e., while a large percentage of issued patents have very little or no economic value, only a relatively small portion of patents actually have any value at all.¹⁶³ With the skew of the distribution of patent value or importance, the mere “number of patents” adds little explanatory power for sales, profits, or market value. The fear of accepting valueless patents as collateral might be one of the major impediments for lenders to accept

¹⁶² See *supra* note 55 and accompanying text.

¹⁶³ See e.g., F. M. Scherer, “Firm Size, Market Structure, Opportunity, and the Output of Patented Inventions,” *The American Economic Review* 55, no. 5 (1965): 1097–1125 (as the first economic literature empirically demonstrate that the distribution of value among patents is highly skewed, showing that the distribution of value among patents is with most of the observations lying in the range of low profit values but ‘with a very long tail into the high value side’).

patents as collateral.

The highly skewed distribution of patent value does not necessarily mean that “acquiring a patent is almost like buying a lottery ticket.”¹⁶⁴ There are many reasons for the existence of so many valueless patents. First, some patents cover worthless inventions or contain badly drafted claims incapable of protecting the underlying valuable invention.¹⁶⁵ This type of patent intrinsically has no value at all. Second, many patents are not applied for application, but for other purposes, for instance, for signalling technological capability to external investors,¹⁶⁶ for being used as defensive mechanisms or “bargaining chips” in cross-licensing negotiations,¹⁶⁷ or for increasing the entry barriers to rivals.¹⁶⁸ This type of patent is actually valuable but just has no direct value of application. And for the third type of patents, they may potentially be valuable, but fail to be applied for realizing their value because of the owners’ mismanagement or negligence.¹⁶⁹ Therefore, “some patents really do have no value whatsoever” and “some patents are intrinsically more valuable than others”.¹⁷⁰ In fact, many patent owners have a strong sense of which specific patents of their portfolio are “truly core”; and in many cases, “the value of patents is often evident early in the process”.¹⁷¹

¹⁶⁴ See F. M. Scherer, “The Innovation Lottery,” in *Expanding the Boundaries of Intellectual Property: Innovation Policy for the Knowledge Society*, ed. Rochelle Cooper Dreyfuss, Diane Leenheer Zimmerman, and Harry First (Oxford University Press, 2001), 4–21 (arguing that the patent system is a giant lottery and getting a patent is almost equivalent of buying a lottery ticket). The author of this dissertation does not agree with this view.

¹⁶⁵ See Allison et al. (2004) “Valuable Patents”, *supra* note 146 at 437 (giving examples of patents covering worthless patents; and pointing out that many “patent claims are drafted narrowly and require for infringement the inclusion of an element that is easy to design around”).

¹⁶⁶ See *infra* note 240 - 241 and the accompanying text in Section 2.4.2.1

¹⁶⁷ See, e.g., Bronwyn H. Hall and Rosemarie Ham Ziedonis, “The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979-1995,” *The RAND Journal of Economics* 32, no. 1 (2001): 101–28 (showing that the purposes for defense and bargain chips are particularly prevalent in the industries driven by complex and cumulative technologies, such as semiconductors or telecommunications, but might be negligible in others).

¹⁶⁸ See Stiglitz (2008), “Economic Foundations of Intellectual Property Rights,” *supra* note 37 (discussing the misuse of patent system for increasing the entry barriers to rivals).

¹⁶⁹ See Kevin G. Rivette and David Kline, *Rembrandts in the Attic: Unlocking the Hidden Value of Patents* (Harvard Business Press, 2000) (arguing that many valuable patents are simply overlooked by their owners).

¹⁷⁰ See Allison et al. (2004) “Valuable Patents.” *supra* note 146, footnote 10 and its accompanying text.

¹⁷¹ See Allison et al. (2004) “Valuable Patents.” *supra* note 146, at 461 (positing that “patent value is not just something that academics can identify after the fact, but something that patent owners themselves can predict in advance.”); at footnote 111 (the interview with the general counsel of a major software company reveals that “my R&D guys know which twenty of our 600 applications are truly core, and which 580 would be nice

The difficulty is that, with the information asymmetry that the lenders would know less about the value of the patents than the patent holders/borrowers, how can the external lenders effectively identify these valuable patents. For now, there have been extensive academic and practical efforts on identifying objective value indicators to distinguish the small percentage valuable patents from the massive valueless patents at least to a meaningful degree. It has been commonly accepted that some patents having particular characteristics, such as more total claims,¹⁷² more backward citations (references cited in the patent) or forward citations (references to the patent made by later patents),¹⁷³ or a larger patent families (the collections of all documents filed in different jurisdictions with coverage of the same invention)¹⁷⁴ are more likely to have higher value. These value indicators are also commonly adopted in IP valuation methodologies to evaluate IP.¹⁷⁵

We need to re-emphasize the position of this dissertation stated at the beginning in Section 1.2 “Research Question” that “this dissertation does not attempt to argue that any given IP should be used as collateral”. Not all IP possess economic impacts. The use of IP as collateral is inherently more risky compared to using other tangible assets.

to have. For those twenty, the sky’s the limit [in prosecution fees]”); and *see also* footnote 9, 107-114 and accompanying text.

¹⁷² The logic is that the number of claims is related to the breadth of protection and the investment in drafting claims reflects the inventor’s perception of the value of the invention. *See e.g.*, Allison et al. (2004) “Valuable Patents.” *supra* note 146, at footnote 58 (positing that “the average number of claims in a set of patents is related to patent value”).

¹⁷³ The “claims” in a patent describes the specific features of the innovation that are novel. The logic is that the number of citations indicates the validity of the patents and the practical significance of the underlying inventions. *See, e.g.*, Dietmar Harhoff, Frederic M Scherer, and Katrin Vopel, “Citations, Family Size, Opposition and the Value of Patent Rights,” *Research Policy* 32, no. 8 (2003): 1343–1363 (by using over 1,100 German patents in 1977 and via survey with each patent-holder for a subjective financial range of valuations, empirically showing that large international families, the number of references to the patent literature as well as the citations a patent receives are positively related to its value); Bronwyn H. Hall, Adam Jaffe, and Manuel Trajtenberg, “Market Value and Patent Citations,” *The RAND Journal of Economics* 36, no. 1 (2005): 16–38 (exploring “the usefulness of patent citations as a measure of the ‘importance’ of a firm’s patents, as indicated by the stock market valuation of the firm’s intangible stock of knowledge’ and showing that patent citations indicate important extra information in addition to R&D and simple patent counts, in the determination of value); Mark Hirschey and Vernon J. Richardson, “Are Scientific Indicators of Patent Quality Useful to Investors?,” *Journal of Empirical Finance* 11, no. 1 (2004): 91–107 (empirically showing that “patent citation information may indeed help investors judge the future profit-earning potential of a firm’s scientific discoveries”).

¹⁷⁴ The logic is that a large patent family means greater market coverage and reflects the applicant’s willingness and determination of securing the sell in the respective markets with bearing the additional costs of application. *See, e.g.*, Peter Neuhäusler and Rainer Frietsch, “Patent Families as Macro Level Patent Value Indicators: Applying Weights to Account for Market Differences,” *Scientometrics* 96, no. 1 (2013): 27–49 (empirically showing that patents representing large international patent families are particularly valuable).

¹⁷⁵ *See* more detailed discussion on IP valuation in Section 2.3.2.2 D.

The lenders/creditors shall carefully select and accept those valuable IP as collateral only.

The market has developed many ways to control the risks. As a matter of fact, IP assets have a long history of being included in a “blanket lien on all assets”,¹⁷⁶ it is just “becoming more commonplace for creditors to focus their analysis more directly on intangibles (like IP), either as a separate asset or as an integral part of overall company value”.¹⁷⁷ Gambardella et al, (2011) show that, while “which particular patent or invention is most valuable is harder to predict”, it has been a common practice for firms to “create value by raising the number of patents or inventions that they produce”.¹⁷⁸ The diversification may help the lenders to lower the risk of accepting valueless IP.

B. Susceptibility to market changes

While in general the value of an IP comes from the monopoly status given by the IP laws, the actual value of a specific given IP is also determined by the IP holder’s capability of exploiting its monopoly status, which is heavily contingent on the competitive position of the holder and the demand for the protected invention.

Firstly, the IP holder can exploit its monopoly status only if the IP represents some technological advantage that cannot be easily circumvented by the competitors.¹⁷⁹ With the rapid development in the sectors of science and technology, IP holders have to face severe competition in the market and may suddenly lose their competitive advantages. A quick depreciation may be a result of the technological innovation of the competitors, which may suddenly reduce the demand for the invention protected under

¹⁷⁶ See European Commission (2014) *Final Report from the Expert Group on Intellectual Property Valuation*, *infra* note 207 at 29 (positing that “The general consensus amongst those interviewed is that IP is too risky to be used as collateral for traditional loans. Some respondents noted that while IP is too risky as a sole basis for lending decisions, it may be considered as part of a loan package.”).

¹⁷⁷ See European Commission (2014) *Final Report from the Expert Group on Intellectual Property Valuation*, *infra* note 207 at 27.

¹⁷⁸ See Alfonso Gambardella, Dietmar Harhoff, and Bart Verspagen, *The Determinants of the Private Value of Patented Inventions (WIPO/IP/ECON/GE/2/11/INF.1)* (Geneva: WIPO Seminar Series on “The Economics of Intellectual Property”, 2011), available at http://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_econ_ge_2_11/wipo_ip_econ_ge_2_11_determinants.pdf.

¹⁷⁹ See, e.g., Nancy T. Gallini, “Patent Policy and Costly Imitation,” *The RAND Journal of Economics* 23, no. 1 (1992): 52–63 (positing that the difficulty of inventing around a patent is important in determining its value.)

the IP.

Meanwhile, with the trend of globalization, lenders should also be aware of the fact that the territorial nature of the protection of IP may also seriously erode the value of the encumbered IP. Other parties may be able to encroach on the right in another jurisdiction and exploit a similar product in an increasingly global market without directly breaching the domestic laws of the place where the secured transactions were concluded. Thus, not only the competition from domestic competitors but also those from foreign competitors should be taken into account ahead at the lending decision time.

Furthermore, mismanagement, infringements from third parties and compulsory licensing obligations pursuant to the law or even some product accidents beyond the control of the IP holders can quickly depreciate the value as well.¹⁸⁰

Therefore, in reality, most IP has a much shorter commercial life than the maximum legal life. For example, in China, although the invention patents are given a maximum protection of 20 years (with continuous payment for the annual maintenance fee),¹⁸¹ just 49.2% of the granted invention patents have been kept for longer than 5 years while only 7.6% for more than 10 years.¹⁸² Many patent holders give up their patents by simply stopping paying for the annual maintenance fee, either because these patents are inherently with low value, or they have lost their commercial value very fast with the passage of time, or both.¹⁸³

As the value of IP is so susceptible to changes in the market, the lenders should not only check the remaining legal life of the encumbered IP but also consider the risk that the encumbered IP may experience severe value depreciation during the loan term because of the market change. A good evaluation of IP requires an accurate forecast of future revenues, depending on a correct assessment of the exploiting capability of the IP holder and a good judgment about the market change.

¹⁸⁰ See James Bessen and Michael J. Meurer, *Patent Failure - How Judges, Bureaucrats, and Lawyers Put Innovators at Risk* (Princeton: Princeton University Press, 2008);

¹⁸¹ Article 43, Patent Law of China (2008).

¹⁸² Planning and Development Department of SIPO (国家知识产权局规划发展司), "Annual Report of Patents in Force in China 2014 (中国有效专利年度报告 2014)" (2015), <http://www.sipo.gov.cn/tjxx/yjcg/201512/P020151231619398115416.pdf> at 10-12.

¹⁸³ See Zvi Griliches, "Patent Statistics as Economic Indicators: A Survey," *Journal of Economic Literature* 28 (1990): 1661-1707 (the patent-renewal rates are used to determine that "the majority patents are either of low value, or that their value depreciates (obsoletes) rapidly, or both").

C. Severely discounted liquidation value

In secured transactions, the lenders are secured by the repayments from the liquidation value of collateral. Nevertheless, when accepting an IP as collateral, the lenders need to know the differences in the three valuations of an IP: the value to the current IP holder (value in use), the fair market value of the IP, and the liquidation value of the IP.

Firstly, the *fair market value* of an IP is different from its *value to the IP holder*. Fair value is the amount at which an asset could be bought or sold in a current transaction between willing parties. In contrast to typical tangible goods, the true value of a specific IP is based on its “value in use,”¹⁸⁴ and highly idiosyncratic, i.e., it is highly dependent on the means or strategy of exploitation and the presence of the other supplementary assets or conditions, such as the surrounding patent portfolio and the function that the patents serve within the portfolio.¹⁸⁵ Some IP may be valuable only in the hands of some specific holders, such as their creators or current holders, but have low or no value for other acquirers at all. Therefore, an IP, which is valuable to the current IP holder (i.e., the borrower), may have low fair market value. Meanwhile, it is worth noting that IP is disposed differently in merge and acquisition transaction (M&A) and in a liquidation sale. In an M&A transaction, IP in the targeted firm is transferred as an essential aspect of the whole firm. With the transfer of all supplementary assets of the targeted firm, IP usually keeps the “value in use” in a going concern.¹⁸⁶ However, in a liquidation sale, if an IP is disposed of as an individual asset independent from other supplementary assets or conditions, it can only be measured at the fair market value. Therefore, IP may be worth much less in an IP collateralization than in an M&A transaction.

Furthermore, the *liquidation value* of an IP is also different from the *fair market value*

¹⁸⁴ See Ron Laurie, “The Evolving Role of IP in M&A: From Deal-Breaker to Deal-Maker,” in *From Assets to Profits: Competing for IP Value & Return*, ed. Bruce M. Berman, 2nd edition (New Jersey: John Wiley and Sons, 2009), 215–232 at 219.

¹⁸⁵ See, e.g., Ming-Cheng Wu and Chun-Yao Tseng, “Valuation of Patent – a Real Options Perspective,” *Applied Economics Letters* 13, no. 5 (2006) (using the real options model and showing that the patent value increases with the underlying assets, measured with the total number of patents granted to a firm at a particular time). Markus Reitzig, “What Determines Patent Value? Insights from the Semiconductor Industry,” *Research Policy* 32, no. 1 (2003): 13–26 (through a survey about 127 patents held by one firm, showing that the importance of each single patent depends on its position or function in the corporate portfolio).

¹⁸⁶ See, Lanning Bryer and Melvin Seminsky, eds., *Intellectual Property Assets in Mergers and Acquisitions* (John Wiley & Sons, 2001).

of the IP. While the fair market value happens between willing parties with neither party under the compulsion to transact, the liquidation value is the value that interested buyers would pay if the IP holder was forced to liquidate assets immediately. It depends on the demand for that asset at the time of liquidation. While determining the fair market value of an IP is already very challenging, predicting the forced-liquidation value brings more challenges. In most cases, a specific IP has limited redeployability, because it can be used for a specific purpose or in a specific situation. For this reason, the market demand for a specific IP only may be very limited or even unavailable in a distressed default sale. With the limited redeployability, the *forced-liquidation value* may suffer a very severe discount from the fair market value paid in ordinary situations.

And even for those IP with high redeployability, the *forced-liquidation value* still may suffer severe discount for the weak bargaining power that the IP holder has at a liquidation sale and many other uncertainties. The sale of patents of Eastman Kodak Co. (referred as "Kodak" hereafter) in 2013 is an excellent example to illustrate all the uncertainties in a forced-liquidation sale.¹⁸⁷ In 2011, after having reported loss for 5 years, Kodak was struggling to file for bankruptcy protection. Then, 284 Partners, a consultancy company which had just helped Nortel selling a portfolio of 6000 wireless communication patents to Apple, Microsoft, and Research in Motion for \$4.5 billion in the same year, confidently "reckoned that a set of 1700 Kodak imaging and printing patents could fetch up to \$2.6 billion on the open market" for the high demand for these patents in the market. Some other firms gave similar high evaluations of between \$1.8 billion \$4.5 billion.¹⁸⁸ However, in December 2012, these patents were actually sold to a consortium of bidders, which included the world's 12 biggest technology companies, for \$525 million only.¹⁸⁹ Such a vast divergence between the estimation and the actual

¹⁸⁷ See further factual details about the Kodak transaction in Mark Harris (2014) "The Lowballing of Kodak's Patent Portfolio: The bankrupt giant found that its huge trove of IP could fetch only pennies on the dollar", IEEE Spectrum, available at <http://spectrum.ieee.org/at-work/innovation/the-lowballing-of-kodaks-patent-portfolio>.

¹⁸⁸ *Ibid.* For example, the MDB Capital Group predicted that "the digital-imaging patents owned by Kodak may be worth \$3 billion in a sale." See "Kodak Worth More in Breakup With \$3 Billion Patents: Real M&A", 2011, Bloomsburg, available at <https://www.bloomberg.com/news/articles/2011-08-17/kodak-worth-five-times-more-in-breakup-with-3-billion-patents-real-m-a>.

¹⁸⁹ The 12 companies were Apple, Microsoft, Google, Samsung, Adobe, Facebook, Amazon, Shutterfly, BlackBerry-maker Research In Motion, Fujifilm, HTC and Huawei Technologies. See further details about the transaction in "Bankrupt Kodak sells off patents to investors for \$525m", 19-12-2012, BBC News, available at

price was mainly because Kodak had a very weak bargaining power at the negotiation.¹⁹⁰ During the negotiation, Kodak was facing time pressure from the bankruptcy process so it had to settle the deal as soon as possible. And all the bidders were gathered together as a consortium and left Kodak with no alternative buyers. In the end, Kodak had to accept whatever price the consortium offered. The fire-sale price was even much less than the licensing fees Kodak had from these patents in previous years.

With all these uncertainties, both the borrowers and the lenders must be aware of the fact that the *liquidation value* of an IP is not always positively related with its *value to the IP holder*. Sneed and Johnson (2008) use data from real transactions to examine the determinants of patent value in an auction environment.¹⁹¹ Aside from confirming that forward citations are clearly associated with greater financial value, the study has some interesting findings. Firstly, patents with broader scope (measured by the number of International Patent Class assigned to the patent) do have greater value when are sold, but they might be less likely to sell, because “buyers are looking for concisely packaged lots rather than broadly defined lots”. Second, while family size is considered to be positively associated with the patent value,¹⁹² it actually decreases both the probability of sale and the sold price, maybe because it increases the maintenance fees and the risk of litigation. Third, some other factors also affect the sold price of an IP. For example, it finds that “patents from less important inventors garnered higher values than lots from important inventors, perhaps because of a suspicion that larger inventors know more about the technological space and are selling off unimportant patents while saving the critical areas for themselves.” The findings confirm that the liquidation value of IP is determined mainly by the demand side.

By contrast, the liquidation value has a more direct positive relationship with the

<http://www.bbc.com/news/technology-20787024>.

¹⁹⁰ See Mark Harris (2014) “The Lowballing of Kodak’s Patent Portfolio: The bankrupt giant found that its huge trove of IP could fetch only pennies on the dollar”, *supra* note 187. Nevertheless, Sarah Mitroff (2012) “Kodak Sells Digital Camera Patents to Apple, Google and Other Tech Giants”, available at: <https://www.wired.com/2012/12/kodak-patents/> (arguing that the low liquidation value is “also because Kodak extensively licensed these patents to other companies. “That makes the portfolio far less valuable, because there’s very little exclusivity when a patent has already been licensed to someone else,” says Harvard Business School professor and former Kodak VP Willy Shih.”).

¹⁹¹ See Katherine A. Sneed and Daniel K. N. Johnson, “Selling Ideas: The Determinants of Patent Value in an Auction Environment,” *R&D Management* 39, no. 1 (2008): 87–94 (using financial data collected at the first two Ocean Tomo live patent auctions, in April and October of 2006, which consist of 121 patent lots including 51 sales).

¹⁹² See the discussion on “family size” at *supra* note 174.

redeployability of the encumbered IP. Munari et al. (2011) study the determinants of IP-secured transactions, by using empirical data to analyze the potential of patent-backed transactions depending on the features of patents and the financial and economic context variables. Their case study in pharmaceuticals shows that patents with bigger market size and greater redeployability are more likely to be used as collateral.¹⁹³ The results also confirm that the liquidation value is the main concern that the lenders care about in practice.

All these uncertainties in liquidation value would impose heavy burdens in terms of time and transaction costs, and increase the practical difficulties of IP collateralization, which is expected to operate profitably and effectively. The survey done by the European Commission (2014) argues that the “lack of liquidity through an established, free secondary market and the perception of risk related to lending against IP assets” are the critical reasons for the under-exploitation of IP collateralization.¹⁹⁴

In order to incentivize lenders and other market participants to accept IP collateralization, different efforts have been made to reduce all the uncertainties in the liquidation value of IP. Some efforts are on improving the immature secondary trading markets, by creating new market infrastructures or trading platforms with standardization, openness and security.¹⁹⁵ These efforts in building an active market are expected to make the IP exchanges easier and faster. A quick and low-cost liquidation of the encumbered IP not only helps to ensure the realization of the collateral value of IP and alleviate the discount in liquidation, but also helps to

¹⁹³ See Cristina Odasso and Elisa Ughetto, “Patent-Backed Securities in Pharmaceuticals: What Determines Success or Failure?,” *R&D Management* 41, no. 3 (2011): 219–239.

¹⁹⁴ See European Commission (2014) *Final Report from the Expert Group on Intellectual Property Valuation*, *infra* note 207 at 33.

¹⁹⁵ Some platforms are created by private entities. For example, the website “Patentauction” (<https://www.patentauction.com>) was created to provide a free online platform for innovators to post their inventions for licensing or sale. And Ocean Tomo, a Chicago-based IP firm, introduced the world’s first public auction platform for patents, trademarks and copyrights in April 2006, exited in 2009 and re-entered the IP auction market in Spring of 2015, see more information at <http://www.oceantomo.com/auctions/>. Some exchange platforms are created by public entities. For example, the Hong Kong government in 2014 launched (originally conceived in 2011) the Asia Intellectual Property Exchange (AIPE), comprising of around 20,000-30,000 registered patents from 21 ‘strategic partners’, as a trading platform for IP, see further information at http://www.asiaipex.com/Home/Index_EN. In the United Kingdom, the government-sponsored online platform Copyright Hub (www.copyrighthub.co.uk) is designated to make making licensing simpler. Similarly, in Singapore, promoting auctions of IP assets and developing a one-stop licensing platform that allows users to easily obtain license are also included in its “Global IP Hub” plan, see *Singapore IP Steering Committee (2013) “Intellectual Property (IP) Hub Master Plan: Developing Singapore as a Global IP Hub in Asia”*, *supra* note 134. See the summary of more efforts in OECD (2015) “*Enquiries into Intellectual Property’s Economic Impact*”, *supra* note 57, at 466-471.

determine the fair market price and improve the validity of transactional methods (or market approaches) of IP valuation.¹⁹⁶ Meanwhile, some countries, like Singapore, Malaysia and China, have implemented policies to lower the risk for participants, such as establishing IP risk insurance against litigation and creating risk-sharing mechanisms against bank loans.¹⁹⁷

D. Difficulties in IP valuation and problems in accounting standards

When making their lending decisions, the lenders have to evaluate all these risks as to the borrowers' capability of generating future revenues and as to the liquidation value of the collateral. Taking into account all the aforementioned high legal and market uncertainties, an *ex ante* assessment of the future revenues and the hypothetical future forced-liquidation value of the encumbered IP in an immediate distressed default sale is very difficult.

As a matter of fact, the value of any form of asset may be subject to a certain level of uncertainty, for reasons such as physical or commercial deterioration and changes in the relevant market during the loan term. For the normal tangible assets, sophisticated asset valuation methodologies have been developed and employed to effectively reduce the uncertainties and control the relevant risks.

However, all the aforementioned high legal and market uncertainties regarding IP render the soundest methodologies for the valuation of most tangible assets less effective as far as IP assets are concerned.¹⁹⁸ For example, the *cost approach* assumes that the costs for the internal development or an external acquisition of an asset can indicate the asset's future economic value. This approach barely works for IP, since the reproduction and replacement cost of a specific IP may have little relevance to the true future revenue of that IP. Even the investment on R&D does not provide any predication for the future value. Similarly, the usual *income approach* is based on the fundamental assumption that the past performance of an asset can indicate its future development. This approach may be applicable to those kinds of IP that have a long

¹⁹⁶ See detailed discussion on market approaches in IP valuation in *infra* note 217 and its accompanying text.

¹⁹⁷ For efforts in Singapore and Malaysia, see *supra* notes 134-138 and their accompanying text; for efforts in China, see Section 4.2.1.

¹⁹⁸ See more detailed discussions on valuation methods in, e.g., Kamiyama et al. (2006) "Valuation and Exploitation of Intellectual Property", *supra* note 130 at 20.

and stable historical performance, but has little applicability to IP which lack sufficient earning history. Moreover, the *market approach* needs extensive data of comparable transactions of similar assets in the marketplace to determine the discount rate of forced-liquidation value. Unfortunately, IP assets, by nature, are creative and idiosyncratic in their scope, depth, strength and importance, so it is difficult to find comparable benchmarked transactions. Furthermore, the IP collateralization transactions are usually private between parties. The lack of sophisticated public markets for IP transactions and the absence of transparency in IP transactions make the access to the desired information for comparison extremely difficult. Nevertheless, the Nortel case in 2011 and Kodak case in 2013 show that, even in cases with “comparable” transactions, the evaluations may still fail to be informative and end up with significant divergences as to the actual transaction value.¹⁹⁹ Therefore, IP valuations may have to be on a case-to-case basis and cannot be done with a single valuation approach only.

The problems in IP valuation also make the current accounting systems hardly able to recognize or reveal the full value of IP.²⁰⁰ In order to ensure certainty in financial reports and make sure that the results are comparable, the accountings standards put strict requirements on identifying assets. For instance, the International Financial Reporting Standards (IFRS), the most prevalent internationally accepted accounting standards, permits “asset recognition” only if the intangible assets satisfy the “probability recognition criterion”, i.e. “it is probable that the future economic benefits that are attributable to the asset will flow to the entity”.²⁰¹ In other words, the IFRS

¹⁹⁹ See more detailed discussion on the Nortel case and the Kodak case in *supra* notes 187-190, and the accompanying text.

²⁰⁰ See, e.g., Roya Ghafele, “Accounting for IP?,” *Journal of Intellectual Property Law & Practice* 5, no. 7 (May 4, 2010): 521–30 at 521 (positing that “the various challenges associated with determining the value of internally held IP, paired with the inherent volatility associated with the value of some forms of IP, can be cited as major reasons why accountants have been reluctant to report fully on IP.”). However, at page 525, Ghafele also points out “tax considerations” as one of the crucial reasons for the accounting’s reluctance to fully embrace the concept of IP and recognize the value of internally generated and used IP in the accounting standards. Irena Rodov and Philippe Leliaert, “FiMIAM: Financial Method of Intangible Assets Measurement,” *Journal of Intellectual Capital* 3, no. 3 (2002): 323–36 (arguing that current “accounting is dominated by traditional factors of production and ignores the importance of proprietary knowledge as a factor for wealth creation or destruction.”).

²⁰¹ International Accounting Standard (IAS) is a part of the body of the International Financial Reporting Standards (IFRS). IAS 38 (Intangible Assets) classifies patents and trademarks as intangible assets but permits the recognition only if the intangible assets satisfy both the “probability recognition criterion”, i.e. “it is probable that the future economic benefits that are attributable to the asset will flow to the entity” and the “cost criterion”, i.e. “the cost of the asset can be measured reliably.” For IP that is acquired separately or in a business combination, the “probability recognition criterion” is always considered to be satisfied and

only recognizes IP that is clearly associated with direct revenue streams, such as those IP in licensing transactions, or IP acquired through acquisitions or business combinations; and the **licensed or acquired IP** are initially recognized at the licensing fee or purchase price, with some subsequent revaluations.²⁰²

However, the “internally generated IP for internal use only” does not satisfy the “probability recognition criterion” and therefore cannot be represented on company balance sheets as assets. When the internally generated IP assets are also used internally, they may have significant value contribution to the firm’s performance by helping IP holders maintain its competitive advantage in market, such as blocking products of competitors, being used as a bargaining chip in cross-licensing deals, and preventing or defending themselves against infringement suits. Nevertheless, they may not directly bring any explicit revenue streams or cash flows and therefore cannot be recognized as “assets” on the balance sheets. In the end, if an IP is generated for internal use only, it may appear to be worth nothing on the balance sheet. With the ignorance of the contribution of internally generated IP to business performance, the accounting reports may fail to reveal the true value of IP assets and the firm value. Ghafele (2010) cites the 2005 acquisition of Gillette by Procter & Gamble as an example to illustrate the problems.²⁰³ While the reported net book value of Gillette (with a full compliance with current accounting standards) was at \$3.5 billion only, the firm was eventually purchased at the price of \$57 billion. The significant divergences between the reported net book value and the actual purchase price mainly because the major value derived from Gillette’s internally generated patents and trademark protected brands, such as Gillette razors, Duracell batteries and Braun and Oral-B dental care products, just cannot be shown on the accounting reports.²⁰⁴

In the case where an IP is generated internally, all the costs of R&D and investments in

recognized at cost. For the IP generated internally, when the “probability recognition criterion” is not met, the relevant expenditures shall be recognized as an expense when it is incurred [IAS 38.68]. However, brands, mastheads, publishing titles, customer lists and items similar in substance that are internally generated should not be recognised as assets [IAS 38.63]. All research costs are charged as expense [IAS 38.54]. Development costs are capitalised only after technical and commercial feasibility of the asset for sale or use have been established. This means that the entity must intend and be able to complete the intangible asset and either use it or sell it and be able to demonstrate how the asset will generate future economic benefits [IAS 38.57]. IP shall be initially measured at cost and can be reevaluated to fair value. See detailed information at <http://www.iasplus.com/en/standards/ias/ias38>.

²⁰² Ghafele (2010), “Accounting for IP?,” *supra note 200*.

²⁰³ The case was first discussed in the United Nations Department of Economic and Social Affairs Conference of 2006, see Ghafele (2010) “Accounting for IP?,” *supra note 200* at 521.

²⁰⁴ *Ibid*.

generating the patents are identified as “expense” and should be reported only at one single point in time, although these expenditures are usually spent smoothly over time.²⁰⁵ This requirement also removes the expenditures off the balance sheet immediately, without indicating the associated economic benefits that would arise later. If these resulting IP assets are also used internally, then all the R&D expenditure appears as purely costs on the balance sheet, with no direct profits that can be reflected under the current accounting standards. The efforts on R&D and IP management are therefore under appreciated. By contrast, if the IP holder later decides to **license-out or sell the internally generated IP**, then the revenues from the transaction can show up on the balance sheet as revenue, but the revenue may look like suddenly coming out of nowhere.²⁰⁶ The connection between the expenditures and the revenues is missing in the financial reports.

The different treatments of IP for various purposes of use create lots of inconsistencies.²⁰⁷ The problems also exist in other accounting standards, such as the US Generally Accepted Accounting Principles (US-GAAP) and the EU Accounting Directive.²⁰⁸

The difficulty in evaluating IP and the invisibility of many valuable IP accounting standards gives rise to two main problems. Firstly they may give rise to the existence of significant divergences between lenders’ and debtors’ perceptions as to how much the IP assets can secure. The divergences complicate the negotiation process and consequently increase the transaction cost of IP collateralization. Furthermore, the lack of trust in the valuation results often leads to over-collateralization. For example, in those Chinese banks accepting IP as collateral, the maximum amount of loan is around only 15-30% of the valuation of the encumbered IP.²⁰⁹ The over-collateralization greatly increases the cost of loans for borrowers. Secondly, they make it difficult to reveal and communicate the value of IP among market participants in a standardized

²⁰⁵ *Ibid* and see also Frey (2013) “*Intellectual Property Rights And The Financing Of Technological Innovation: Public Policy and the Efficiency of Capital Market*”, *supra* note 38 at 40; and OECD (2015) “*Enquiries into Intellectual Property’s Economic Impact*”, *supra* note 57 at 460.

²⁰⁶ See Ghafele (2010), “Accounting for IP?,” *supra* note 200 at 525.

²⁰⁷ See further discussion on the problems of recognizing IP in accounting standards in European Commission, *Final Report from the Expert Group on Intellectual Property Valuation* (Luxembourg, 2014), at https://ec.europa.eu/research/innovation-union/pdf/Expert_Group_Report_on_Intellectual_Property_Valuation_IP_web_2.pdf.

²⁰⁸ See the comparison with the US-GAAP and the EU Accounting Directive in European Commission (2014), *Final Report from the Expert Group on Intellectual Property Valuation*, *ibid*.

²⁰⁹ See *infra* note 402 and the accompanying text.

language. With the information asymmetry regarding the quality of projects and IP assets, IP holders cannot make credible declaration and explanation of the value of their IP assets and firms, whereas the external investors cannot understand nor make effective *ex ante* assessments of the future revenues and the liquidation value of encumbered IP.²¹⁰ The external investors therefore have to ask for higher premium against the risk of accepting valueless IP or funding in bad projects, which increases the cost of debt finance for IP-intensive firms or simply makes debt finance impossible.²¹¹

The problems in valuation and accounting standards intensify the difficulties of using IP as collateral. However, they are not the reasons to prevent IP from being used as collateral. Improving IP valuation and accounting standards is equally important for mergers and licensing transaction, for insurance, bankruptcy and liquidation, for litigation, for the determination of taxable value and for providing an actuarial basis for establishing robust markets for all kinds of IP transactions.

In recent years, many efforts have been taken to improve the IP valuation methodologies in order to increase the assessment certainty. For example, the World Intellectual Property Organisation (WIPO) has published a number of documents specifically for IP valuation and has organized several training programs to provide valuation guidance for practitioners.²¹² Similarly, the Organisation for Economic Cooperation and Development (OECD) also started a programme entitled “Creating

²¹⁰ See, e.g., David Aboody and Baruch Lev, “The Value Relevance of Intangibles: The Case of Software Capitalization,” *Journal of Accounting Research* 36 (Stude (1998): 161–91 (arguing that “the volatility of technology stocks is further nourished by accounting standards that make it hard for investors to track how innovation relates to business.”). European Commission (2014) *Final Report from the Expert Group on Intellectual Property Valuation*, *supra note 207* at 31 (positing that “Better informed lending decisions – obtaining insights into off-balance sheet assets (which generally include most, if not all, of a business’s IP and intangibles) provides lenders with a more representative picture of a company’s resources and value. Lenders need to gain confidence in managing the particular risk profiles associated with these assets. This involves familiarisation, training, and the adoption of recognised standards for intangible asset value management. Banks are not equipped with sufficient knowledge relating to IP assets and IP value. Risk assessment does not consider the valuation of IP as a supporting process. Internally generated IP is seldom represented on company balance sheets. It is therefore incumbent on a company’s directors to understand and explain their IP and intangibles in language a lender will understand.”)

²¹¹ See also the discussions on the adverse effects of the informational asymmetry for external investments in Section 2.1.2.3, 2.2.5 and 2.4.

²¹² See the list of documents issued by the WIPO on improving IP valuation at: <http://www.wipo.int/sme/en/documents/valuationdocs/index.htm>; and see the detailed information as to the training programs at: http://www.wipo.int/sme/en/index.jsp?sub_col=sme-doc&cat=ip%20financing.

Value from Intellectual Assets” to develop more effective valuation criteria for IP.²¹³

The IP valuation industry has grown and matured to develop with the development of the knowledge-based economy. For now, the common IP valuation methodologies can be categorized into four main families of methods: transactional methods, income methods, replacement cost methods, and some other non-traditional methods.²¹⁴ The **transactional methods** (or market approaches) measure the value of an IP by the actual price paid for a similar intangible under similar circumstances.²¹⁵ The “fair market value” and “arm’s length standard” are the most common valuation criteria. The “relief from royalty approach” is a transactional method.²¹⁶ These efforts to improve the immature marketplaces for IP transactions help the determination of fair market price and the validity of the transactional methods.²¹⁷ The **income methods** measure the value based on the ability of IP to directly or indirectly generate future income, by measuring the projected cash flows, the economic life of the IP, and discounted with the expected cost of financing the IP in question. The **replacement cost methods** are based on the “principle of substitution” and measure the estimated cost to create a replacement asset with similar commercial utility by designing around the legal protection of the subject IP. Furthermore, in the past years of practice, some option-like **non-traditional methods** were developed for evaluating the expected value of IP in question, based on the occurrence of future contingent events. The expected value is usually calculated by the employment of various mathematical models, such as real options, binomial models, and Monte Carlo simulations, depending on “the probability of the favorable event occurring that will make the IP valuable” and on “the payoff if the favorable event occurs”.²¹⁸

²¹³ See further information about the OECD’s program on “Creating Value from Intellectual Assets” at: http://www.oecd.org/document/34/0,3746,en_2649_34797_37815842_1_1_1_1,00.html.

²¹⁴ See, e.g., Paul Flignor and David Orozco, “Intangible Asset & Intellectual Property Valuation: A Multidisciplinary Perspective,” *WIPO Homepage*, 2006, http://www.wipo.int/export/sites/www/sme/en/documents/pdf/IP_Valuation.pdf.

²¹⁵ For the problems of the market approach, see discussion in *surpa* note 199 and accompanying text.

²¹⁶ In the “relief from royalty approach”, the valuation is based on the estimation of what a business would pay to license its own IP assets in a similar arm’s-length transaction. The value of IP is then calculated as the present value of the avoided hypothetical royalty charges. See, e.g., Robert F. Reilly, “The Relief from Royalty Method of Intellectual Property Valuation,” *Insights Autumn* (2008): 20–43, http://www.willamette.com/insights_journal/08/autumn_2008_2.pdf.

²¹⁷ See the detailed discussion in *surpa* note 195 and accompanying text.

²¹⁸ See Flignor and Orozco (2006), “Intangible Asset & Intellectual Property Valuation: A Multidisciplinary Perspective,” *surpa* note 214 (explaining: “the real option method is based on the successful Fischer-Black valuation model for pricing options (calls and puts) of financial stocks. The basic premise behind the real

Nevertheless, none of these IP valuation methods works for all purposes.²¹⁹ The careful selection of appropriate valuation method should be determined by a clear definition of the subject asset, the context, purpose and scope of the valuation, and shall be based on proper valuation assumptions.

2.3.3 Critics of the Existing Efforts

With so many concerns on the uncertainties in the value of IP and so many efforts to improve the IP valuation, the survey report of the European Commission's Expert Group on IP valuation reveals that - it is "striving to find a simple, risk free method that can be used by all to value IP may not be the answer to unlocking the barriers to IP backed lending."²²⁰ The expert group has asserted that in fact "the available methods for IP (valuation) are valid, consistent, and well accepted within different professional categories. The problem rests on the limited knowledge of their existence and the reciprocal lack of confidence in the results from the professional categories".²²¹ Therefore, the biggest challenge is actually on how to build and increase public awareness and help lenders gain confidence in managing the particular risk in IP collateralization.²²²

The lack of knowledge and confidence come from the absence of experience. The European Commission (2000) has confirmed that the "relatively limited experience"

option method is that an investment with an asymmetric payoff (i.e., a potentially large payoff and only limited losses) will have an increased value as the level of uncertainty, known as volatility, increases. Consequently, real option methods have been most useful where large capital investments are required with a highly uncertain and far away payoff, such as the pharmaceutical and oil exploration industries. "Monte Carlo simulations", named for the gambling games popularized at the Mediterranean resort models a low probability payoff over multiple iterations. Monte Carlo simulations are used to estimate the spread of diseases, engineering tolerances and even the probability of the Chicago Cubs winning the World Series! "The binomial expansion method", or decision tree, is the most intuitive of these methods. In the binomial expansion the required events and decisions are modeled explicitly, each with their own probabilities. An important aspect of building a binomial expansion is to ensure all potential alternatives and scenarios.).

²¹⁹ See other reviews of the models of IP valuation in, e.g., Nick Bontis, "Assessing Knowledge Assets: A Review of the Models Used to Measure Intellectual Capital," *International Journal of Management Reviews* 3, no. 1 (2001): 41–60; Kamiyama et al. (2006) "Valuation and Exploitation of Intellectual Property", *supra* note 130

²²⁰ See European Commission (2014), *Final Report from the Expert Group on Intellectual Property Valuation*, *supra* note 207 at 33.

²²¹ The citation is from the OECD (2015), "Enquiries into Intellectual Property's Economic Impact (Chapter 9 - IP-Based Financing of Innovative Firms)", *supra* note 57 at 459.

²²² See "Intellectual Property Awareness Network (IPAN) Briefs on Topical Intellectual Property Issues-Brief 18: Intellectual Property, Finance and the Economy." (2016), *supra* note 133 at 61 (positing that help lenders gain confidence "involves familiarisation, training, and the adoption of recognised standards for intangible asset value management.").

of banks in managing the relevant risks and the limited “supply of expertise” are the main reasons that keep European commercial banks from providing IP-based loans to high-tech SMEs.²²³ The unfamiliarity and lack of knowledge or confidence increase the practitioners’ caution with the use of IP as collateral. Over-cautious lenders tend to perceive an exaggerated level of risk. Another report from European Commission (2014) posits that the reluctance to accept IP as collateral can be addressed only “as the market gains greater experience in IP transactions and as IP becomes recognised as a tradable asset”, and “in order to enhance market confidence in IP having tradable value and monetise innovative ideas, market intervention is required in relation to reducing the real or perceived risk to lenders.”²²⁴

We can see that, in order to incentivize lenders and other market participants to accept and use IP collateralization, different efforts have been made, such as developing secondary market to facilitate liquidation of encumbered IP (Section 2.3.2.2 C), improving IP valuation (Section 2.3.2.2 D). Some countries have implemented policies to lower the risk for participants, such as establishing IP risk insurance against litigation and creating risk-sharing mechanisms against bank loans. For example, the Singapore government provides a specific policy scheme to partially underwrite the loans secured by IP, and the Malaysian government provides an interest rate subsidy and an additional guarantee scheme (Section 2.3.1.2). And some governments are using pilot-schemes to test different policies (like China) (Section 4.2.1). While we fully acknowledge the contribution of these efforts to reduce the “real risks” of IP collateralization, we also notice that these efforts seem to focus on the repayment function of collateral only.

These efforts may not help much in reducing the “perceived risks” of inexperienced lenders. With the mere focusing on the repayment function of collateral, lenders look into the liquidation value of IP only. Inexperienced lenders tend to exaggerate the relevant risks to a level much higher than the real risks. They typically accept IP with high liquidation value and tend to make a severe discount on the IP valuation to compensate the exaggerated risks. Many valuable IP would be deprived of being used as collateral because the heavy discount rate reduces the amount of debt they can secure. They become insufficient for the intended borrowing. Only a very limited

²²³ See European Commission (2000), *Funding of New Technology-Based Firms by Commercial Banks in Europe*, *supra* note 142, at 5, 37 and 42.

²²⁴ See European Commission (2014), *Final Report from the Expert Group on Intellectual Property Valuation*, *supra* note 207, at 33.

range of IP with very high liquidation value might be accepted as collateral. And in some cases, even IP with high liquidation value may not be used as collateral, since the heavy discount rate makes the borrowing too costly for the borrowers, especially for good borrowers. Many R&D investment opportunities with great potential may therefore be foregone because of insufficient collateral. The forgone transactions would have happened if not for the exaggerated risks. The wrong perception of risks restricts financial institutions from participating and getting familiar with IP collateralization. As expertise cannot be gained through experience, wrong perception of risks cannot be corrected. With this vicious circle, credit rationing would stay severe and few transactions would be concluded. Financial institutions would never have an opportunity to accumulate experience or to establish confidence. All the market participants, including financial institutions and IP holders, cannot realize the financial potential of IP. In the long term, IP collateralization, this profitable and valuable mechanism for funding R&D, would remain at an undeveloped level.

Second, the mere emphasis on the liquidation value of collateralized IP cannot explain some phenomena in practice. If the liquidation value is the main concern of the lenders, it is difficult to explain why offering key patents as collateral is equally and sometimes even more important for many lenders than offering tangible assets, as evidenced by the survey of Rassenfosse and Fischer (2016).²²⁵

Third, the mere focusing on the repayment function of collateral cannot provide enough justifications for promoting IP collateralization. The eminent works in secured transactions, such as Lacker (1991), find that one important condition that is required for a collateralized loan contract to be optimal in controlling the ex post misbehaving is that the collateral should be more valuable to the borrower than to the lender.²²⁶ In this case, the liquidation means a transfer of the collateral from the borrower, the party with a higher valuation, to the lender (or an assignee), the party with a lower valuation. Therefore, the liquidation sale itself is associated with social loss. As IP assets usually have severely discounted liquidation value (Section C), the social loss from the disposal of encumbered IP in liquidation can be significant. Therefore, we need more plausible justifications for supporting all these efforts of governments on promoting IP collateralization.

²²⁵ See Rassenfosse and Fischer (2016) "Venture Debt Financing: Determinants of the Lending Decision", *infra* note 250.

²²⁶ See Jeffrey M. Lacker, "Why Is There Debt?," *FRB Richmond Economic Review* 77, no. 4 (1991): 3–19; also Tirole (2006), *The Theory of Corporate Finance*, *infra* note 256 at 177-180.

Most of the efforts take the theories used for explaining traditional secured transaction as given and try to find ways to make IP have the same characteristics as ordinary tangible assets instead of exploring the possible effects of IP's characteristics on the theories of secured transactions. These efforts do not appear to have looked into the other roles that the collateral plays in the secured transactions. Examining the roles of collateral in secured transactions, and taking into account the features of IP, may help us better understand the importance and social benefits of promoting the use of IP as collateral.

These problems remind us that, in order to give plausible explanations for these phenomena and to find suitable legal rules and policies to promote IP collateralization, it might be necessary to go back to the fundamental law and economics theories about secured transaction law and IP law to find out the real roles that collaterals play in the secured transactions, and to explore how the special characteristics of IP would affect these roles when IP is used as collateral. Only a further and more comprehensive exploration of the advantages and challenges brought by IP collateralization from the perspective of law and economics analysis can help us answer the basic question of why it is important to study the use of IP as collateral in secured transactions. The reasons should lead us to find a more practical way to promote IP collateralization in practice. At the same time, this exploration can also help us get a better understanding about the fundamental theoretical issues in secured transaction law and IP law.

2.4 Theoretical Supports for IP Collateralization

2.4.1 General L&E Theories of Secured Transactions

Intuitively, with the repayment function, collateral indemnifies a secured creditor against potential loss by ensuring it has some “salvage” value if the investment fails. It is not difficult to understand why a lender would like to ask for and accept collateral. However, providing collateral is also very costly for a borrower, especially taking into account the legal restrictions on disposing of the collateral and the high costs of contracting, evaluating the collateral, filing for security registration and foreclosure in the case of default. Therefore, the reasons for which a borrower would like to use collateral and the relevant social benefits are much more complicated than the intuition and have been comprehensively examined by theoretical and empirical studies.

From the perspectives of the whole society, secured transactions are considered to be socially beneficial²²⁷ and the social benefits of secured transactions are stemming from the role of collateral in mitigating the problems caused by the information asymmetries in debt finance (see Section 2.2.5). In response to the “adverse selection” problem and the “moral hazard” problem, there are two main branches of theories in law and economics literature explaining how the information asymmetries are mitigated by collateral: the “signaling theory” and the “bonding theory”.²²⁸

2.4.1.1 The adverse selection problem and the signaling theory

From an ex ante perspective, the proponents of the “signaling theory” explain that, when faced with the adverse selection problem caused by the asymmetric information about the risk-type of the borrowers (Section 2.2.5.1), the high quality borrowers can use the provision of collateral to signal their credible commitment on repayment, by demonstrating their beliefs in the quality of the proposed projects and also their superior repayment capability to the lenders.²²⁹ In this way, high-quality borrowers can avoid being pooled with low-quality borrowers.

²²⁷ The early literature on secured transactions had a long debate over the “puzzle of security interests”. It was argued that, while secured creditors provide advantageous terms, the unsecured secured creditors provide more disadvantageous terms. So the puzzle is: if a debtor’s aggregate cost of capital is neutral, why does a debtor bother to use secured security? See a comprehensive overview of the debate in James W. Bowers, “Security Interests, Creditors’ Priorities, and Bankruptcy,” in *Property Law and Economics (Encyclopedia Law And Economics, 2nd Edition)*, ed. Boudewijn Bouckaert (Cheltenham: Edward Elgar, 2010), 270–317 at 279-283). There is also a lot of literature criticizing the “distributive effects” of secured transactions. They argue that that secured transactions are socially undesirable because of the redistribution of wealth away from the involuntary or “non-adjusting creditors”, those creditors who are unable to adjust the terms to fully reflect their subordination to secured claims and the risk they are facing, like tort claimers and employees. See, for example, Lucian Arye Bebchuk and Jesse M. Fried, “The Uneasy Case for the Priority of Secured Claims in Bankruptcy,” *The Yale Law Journal* 105, no. 4 (1996): 857–934 (the first literature that uses the terminology “non-adjusting creditors”). See also John Armour, “The Law and Economics Debate About Secured Lending: Lessons For European Lawmaking?,” in *European Company And Financial Law Review - Special Volume 2: The Future of Secured Credit in Europe*, ed. Horst Eidenmüller and Eva-Maria Kieninger (De Gruyter Recht, 2008), 3–29 (reviewing the empirical literature and arguing that the empirical findings tend to suggest that there are aggregate positive benefits, since the benefits from secured transactions greatly outweigh the social costs of any transactions motivated by redistribution).

²²⁸ See a comprehensive summary of the two theories in John Armour (2008), “The Law and Economics Debate About Secured Lending: Lessons For European Lawmaking?,” *supra* note 227. See other reviews, in, e.g., George G. Triantis, “Financial Slack Policy and the Laws of Secured Transactions,” *The Journal of Legal Studies* 29, no. 1 (2000): 35–69; Tirole (2006) *The Theory of Corporate Finance*, *infra* note 256, 164-170 and 251-254.

²²⁹ See e.g., Helmut Bester, “Screening Vs. Rationing in Credit Markets with Imperfect Information,” *The American Economic Review* 75, no. 4 (1985): 850–855; Helmut Bester, “The Role of Collateral in Credit Markets with Imperfect Information,” *European Economic Review* 31, no. 4 (1987): 887–899; Anjan V.

The signaling theory is based on the assumption that pledging collateral constitutes a costly signal. And it is less costly for a “high-quality” borrower to provide collateral than a “low-quality” borrower, because a high quality borrower faces a lower probability of losing the encumbered collateral in default. Then providing more collateral allows the high-quality borrowers to separate themselves from the low quality ones and to get advantageous loan terms for their lower risk of failure in the separating equilibrium. The signaling theory predicts a negative relationship between default risk and the presence of collateral. It is expected to see that high-quality borrowers will be more willing to provide collateral. However, the empirical evidence finds that the presence of collateral *increases* with default risk.²³⁰ Collateral is more often used by younger and smaller firms and in projects with a high probability of default, which are considered as low-quality borrowers.²³¹

Armour (2008) explains the inconsistency between theoretical prediction and the empirical observation by pointing out that the early application of the signaling model in the literature was “mis-specified” as to the real cost of using collateral.²³² It explains that, as a consequence of default, a borrower/debtor loses the asset used as collateral anyway, either to the secured creditor or other unsecured creditors. So, using assets as collateral does not increase a borrower/debtor’s cost in the case of default. A borrower/debtor’s real cost of using collateral comes from the restrictions over alienation of the encumbered collateral before the default.²³³ A security interest in collateral continues after a sale, exchange, or other disposition, unless authorized by the secured creditor. The security interest impedes the sale or other dispositions of the encumbered collateral and thereby constrains the availability of internal funds. The cost of restrictions is only incurred as long as the borrower/debtor does *not* default. In

Thakor and David Besanko, “Collateral and Rationing: Sorting Equilibria in Monopolistic and Competitive Credit Markets,” *International Economic Review* 28, no. 3 (1987): 671–89.

²³⁰ See, e.g., James R. Booth and Lena Chua Booth, “Loan Collateral Decisions and Corporate Borrowing Costs,” *Journal of Money, Credit, and Banking* 38, no. 1 (2006): 67–90 (finding that the presence of collateral *increases* with default risk).

²³¹ See, e.g., John D. Leeth and Jonathan A. Scott, “The Incidence of Secured Debt: Evidence from the Small Business Community,” *Journal of Financial and Quantitative Analysis* 24, no. 3 (1989): 379–394 (with data from two samples of over 1,000 small business loans in the US, it is found that the incidence of secured debt is *positively* related to probability of default, loan size, loan maturity and marketability of assets). Allen N. Berger and Gregory F. Udell, “Collateral, Loan Quality and Bank Risk,” *Journal of Monetary Economics* 25, no. 1 (1990): 21–42 (the presence of collateral is associated with riskier loans and/or riskier borrowers).

²³² See Armour (2008), “The Law and Economics Debate About Secured Lending: Lessons For European Lawmaking?,” *super note* 227 at 7.

²³³ See George G. Triantis (2000), “Financial Slack Policy and the Laws of Secured Transactions,” *supra* note 228.

other words, the marginal cost of using collateral is actually *decreasing* with the probability of default. A low-quality borrower, who has a higher probability of default (i.e., a lower probability of not default), actually has a lower cost of using collateral, and is therefore more willing to provide collateral.

Armour's explanation is consistent with the empirical evidence. Nevertheless, this explanation implies that providing collateral is in fact a signal of being a "low-quality" debtor and would consequently lead to more *disadvantageous* terms in the loan contract.

2.4.1.2 The moral hazard problem and the bonding theory

By contrast, from an *ex post* perspective, the "bonding theory" explains that, with asymmetric information regarding the states of an investment project and in the case of an incomplete loan contract, collateral can solve the post-lending moral hazard problem, by helping creditors achieve an alignment of interests and play a disciplinary role in the behavior of the debtors.²³⁴

On the one hand, the restrictions over alienation of the encumbered collateral limit the borrower's capability of obtaining other funds, by selling the encumbered collateral or using the collateral to borrow more, to fund the more risky strategy, which increase the probability of failure.²³⁵ On the other hand, the use of collateral increases the debtor's loss in the case of default and prevents asset substitution. So the debtors have no incentives to be lazy or indulge in *ex post* risk-shifting behavior any more, since such misbehavior can also increase the probability of failure, which consequently brings higher cost to the borrowers themselves as well. The presence of collateral ensures that the debtor cannot opportunistically avoid the cost of failure by asset substitution.²³⁶

The bonding of interests ensures that, after obtaining the debt finance, the debtor will be induced to keep its original commitment, without engaging in wealth-reducing opportunistic misbehavior. In other words, collateral is also a "self-enforcing"

²³⁴ See Arnoud W. A. Boot et al., "Secured Lending and Default Risk: Equilibrium Analysis, Policy Implications and Empirical Results," *The Economic Journal* 101, no. 406 (1991): 458–472.

²³⁵ See Alan Schwartz, "Priority Contracts and Priority in Bankruptcy," *Cornell Law Review* 82, no. 6 (1997): 1396–1419 (collateral binds debtors not to engage in future finance which may dilute the value of earlier loans).

²³⁶ See Clifford W. Jr. Smith and Jerold B. Warner, "Bankruptcy, Secured Debt, and Optimal Capital Structure: Comment," *The Journal of Finance* 34, no. 1 (1979): 247–51 (positing that the secured debt is one way of precluding asset substitution by borrowers).

mechanism of incomplete loan contract, which helps reduce the creditor's monitoring cost as well.²³⁷ In total, the disciplinary role of collateral can reduce transaction cost caused by information disclosure, contracting and monitoring.

The bonding theory predicts that more collateral will be required by the creditor in the cases with more serious information problems in the post-lending relationship, which is exactly what occurs in the case of R&D investments. From the perspective of the secured creditor, using collateral lowers the overall default risk. So, *ceteris paribus*, a secured lender would be more likely to provide credit with more advantageous loan terms, like with a larger amount, or a lower interest rate, or a longer maturity, than an unsecured one.

2.4.1.3 The paradox between theories

While both theories predict that the borrowers with more serious information problems, *ex ante* and also *ex post*, will provide more collateral, they have opposite predictions on the effect of providing collateral on the loan contract terms. On the one hand, the "bonding theory" indicates that younger and smaller firms in high-tech industries, which suffer more serious information problems in the post-lending relationship, would be asked for more collateral. The use of collateral controls misbehaving and can help the debtors to obtain more *advantageous* terms. Nevertheless, on the other hand, the "corrected signaling theory" indicates that, *ex ante*, providing collateral is a low-quality signal, which would consequently lead to more *disadvantageous* terms. Reading the two theories together indicates that some benefits brought by the disciplinary role of collateral would be offset by the cost brought by the low-quality signaling effect of using collateral.

Some empirical studies, for example, Booth et al. (2006) and Benmelech and Bergman (2009), have shown that the use of collateral does help debtors get more advantageous terms and lower the cost of debt finance.²³⁸ These empirical findings can only prove

²³⁷ See Robert J. Barro, "The Loan Market, Collateral, and Rates of Interest," *Journal of Money, Credit and Banking* 8, no. 4 (1976): 439–56. Daniel K. Benjamin, "The Use of Collateral to Enforce Debt Contracts," *Economic Inquiry* 16, no. 3 (1978): 333–59.

²³⁸ See James R. Booth and Lena Chua Booth, "Loan Collateral Decisions and Corporate Borrowing Costs," *Journal of Money, Credit, and Banking* 38, no. 1 (2006): 67–90 (finding that the presence of collateral increases with default risk, consistent with low quality borrowers reducing their risks and borrowing costs through the use of collateral). Efraim Benmelech and Nittai K. Bergman, "Collateral Pricing," *Journal of Financial Economics* 91, no. 3 (2009): 339–360 (using a data set of secured debt issued by U.S. airlines and finding that the ability to pledge collateral, and in particular redeployable collateral, lowers the cost of external

that the *advantageous* effect indicated by the bonding theory is larger than the *disadvantageous* effect indicated by the signaling theory. However, we still cannot directly observe how serious is the *disadvantageous* effect indicated by the signaling theory. If without the low-quality signaling effect, the debtor might have been able to get even more advantageous terms with the use of collateral.

2.4.2 The Advantages of IP Collateralization

Putting IP under the L&E theories of collateral can help us understand why IP can be good as collateral and the reasons for promoting IP collateralization.

2.4.2.1 Signalling effect

According to information theory, a good-quality signal as a “sorting mechanism” in debt finance (1) should be highly informative about the good quality of the borrower, (2) should be more costly for low-quality borrowers to provide, and (3) should be easily observed and verified by the potential lenders.²³⁹ We take patents as an example to show that IP satisfies all the three requirements and hence can be a highly informative signal for **good-quality** borrowers to distinguish themselves, and consequently reduce information asymmetries between the borrowers and the external loan providers. The rationality is similar for copyrights and trademarks.

A. Highly informative signal

First, patents are highly informative about the quality and potential of the borrowers.²⁴⁰

On the one hand, patents predict the applicability of the underlying technology, give the patenting firm competitive advantages and enable the patenting firm to gain profit from exploitation or licensing, so they convey “direct” information for predicting the firm’s future performance. Plenty of empirical studies show the positive correlation

financing and increases debt capacity).

²³⁹ See Myers and Majluf (1984) “Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have,” *supra note 70*.

²⁴⁰ See, e.g., Clarisa Long, “Patent Signals,” *The University of Chicago Law Review* 69, no. 2 (2002): 625–679 (one of the first examples of literature to argue the patents as an effective mean to provide quality signal for reducing the information asymmetries between the patenting firm and external investors). Annamaria Conti, Marie Thursby, and Frank T. Rothaermel, “Show Me the Right Stuff: Signals for High Tech Startups,” *Journal of Economics & Management Strategy* 22, no. 2 (2013): 341–364 (empirically showing that patents have great impact on the venture capitalist’s funding decision). The signaling effects are similar for debt providers in this regard.

between patents with a firm's cash flow,²⁴¹ survival rate,²⁴² market value,²⁴³ and growth rate.²⁴⁴ Better future performance indicates a higher probability of repayment.²⁴⁵

On the other hand, on top of the direct information, patents also have some signalling effects on indicating the borrower's capability (both managerial and technological) and confidence. The grant of a patent is conditional on the examination of the corresponding authority, i.e., patent office. Developing patents that can pass the examination require a lot of efforts and resources in R&D and management, so the presence of certain IP reveal "indirect" information about the borrower's capabilities of R&D, human resource and management.²⁴⁶ Meanwhile, the application for patents and the following maintenance are expensive both in terms of money and time. Only innovators with confidence in getting the patents and applying the technologies in practice for profit would bear the cost of getting patents in order to secure the profits.

²⁴¹ See, e.g., Edward Levitas and M. Ann McFadyen, "Managing Liquidity in Research-Intensive Firms: Signaling and Cash Flow Effects of Patents and Alliance Activities," *Strategic Management Journal* 30, no. 6 (2009): 659–678 (using a sample of 108 US-based biotechnology firms, showing that patents provide important signaling mechanisms and consequently mitigate or even lower the firm's need to hold liquid assets).

²⁴² See, e.g., Stefan Wagner and Iain M. Cockburn, "Patents and the Survival of Internet-Related IPOs," *Research Policy* 39, no. 2 (2010): 214–228 (through examining the survival rate of 356 Internet-related firms listed on the NASDAQ from the late 1990s till 2005, showing that processing patents (no such a correlation found as to business method patents) is positively associated with survival rate, because of the conferred competitive advantages (or simply a signal of the firm's quality).

²⁴³ See, e.g., Dirk Czarnitzki, Bronwyn H. Hall, and Raffaele Oriani, "Market Valuation of US and European Intellectual Property," in *The Management of Intellectual Property*, ed. Derek Bosworth and Elizabeth Webster (Cheltenham: Edward Elgar, 2006), 111–131 (by using stock market value as an indicator of the firm's expected economic results from investing in knowledge capital, showing that patent counts correlate positively with firms' market value).

²⁴⁴ See, e.g., Christian Helmets and Mark Rogers, "Does Patenting Help High-Tech Start-Ups?," *Research Policy* 40, no. 7 (2011): 1016–1027 (by using data on all high- and medium-tech start-ups in the UK in 2000, showing that patentees have higher asset growth than non-patentees of between 8% and 27% per annum).

²⁴⁵ Nevertheless, we also need keep in mind that that IP rights are merely a small component in the innovation ecosystem. Patents are one of various influences on firm market value. They do positively influence market value or profits, but patent value does not equal market value or profits. Patents are just one crucial value indicator

²⁴⁶ See, e.g., Hottenrott et al. (2016) "Patents as Quality Signals? The Implications for Financing Constraints on R&D," *supra* note 99 at 200 (pointing out that "if lenders assume that patents correlate with difficult-to-measure firm characteristics that are not necessarily directly related to the firms' patented inventions, patents may still be a useful signal. For instance, patents provide information about the firms' ability to perform valuable research as patents measure the outcome of past R&D and thus "advertise" the firms' innovation capabilities."); See Harhoff (2011) "The Role of Patents and Licenses in Securing External Finance for Innovation," *supra* note 116 (arguing that patents may signal the quality of the firms' R&D staff and its ability in the management of IP).

So, the existence of patents, and even just pending patent applications, is able to signal valuable information as to the borrower's prediction of future performance.²⁴⁷

Both the capability and the confidence imply a high probability of success. Signalling the information via patent portfolios would be cheaper than via other means. As the application and grant of copyright and trademark are comparatively cheaper and easier, their signal effects are also less informative.²⁴⁸

B. Costly signal

Second, patents are costly signals, especially for low-quality borrowers. Developing and applying for patents require a lot more efforts and resources for borrowers with low technological capability. So a high-quality borrower can use the presence of patents, even just pending patent applications, to signal its good capability in developing technologies and its confidence in applying the technologies in practice for profits. The quality signal is sent in a way different from the case of using the normal assets as collateral (discussed in Section 2.4.1.1).

When using normal assets, such as machinery, equipment, inventory, and real estate, which contain *no direct* information about the quality of the borrower, as collateral, the borrowers have to use the "amount of the collateral" to separate themselves. In this case, the legal restrictions over alienation of the encumbered collateral imposed by the security interests (which are only incurred as long as the debtor does *not* default) play the crucial role. The more collateral that is provided, the higher the cost of non-default would be. Then only low-quality borrowers would like to provide a certain amount of collateral, because of their low probability of non-default. So, willingness to provide collateral actually becomes a *bad-quality* signal.

²⁴⁷ See, e.g., Joel A.C. Baum and Brian S. Silverman, "Picking Winners or Building Them? Alliance, Intellectual, and Human Capital as Selection Criteria in Venture Financing and Performance of Biotechnology Startups," *Journal of Business Venturing* 19, no. 3 (2004): 411–436 (providing that even pending patent applications may be regarded as proxies for technological quality); Hottenrott et al. (2016) "Patents as Quality Signals? The Implications for Financing Constraints on R&D," *supra* note 99 (empirically finding that "the mitigating effect of patent applications is not due to the actual ex-post value of the patented technology" and concluding that "patents do have some signaling effect beyond the fact that they proxy for the underlying technological and economic value of the patented invention". "the (signaling) effect on external financing tends to be driven by the mere presence of patents rather than observable ex post indicators of the value of those inventions").

²⁴⁸ See OECD (2015) "Enquiries into Intellectual Property's Economic Impact", *supra* note 57.

By contrast, in this case of IP collateralization, IP contains *direct* information about the quality of the borrower. The legal restrictions and the amount of IP to be encumbered still matter because they determine the cost of transaction and the debtor's incentive to participate in the transaction. Nevertheless, in comparison, the cost of obtaining IP matters much more. With the high cost for a low-quality borrower to obtain and provide IP as collateral, the low-quality borrower cannot provide more IP in order to pretend to be of high-quality. So, the amount of IP to be encumbered ensures a *good-quality* signal, which could help the borrowers to get more advantageous terms. The paradox discussed above in Section 2.4.1.3 is solved.

C. Easily observable signal

Third, it is also easy for the potential lenders to observe and verify the good-quality sorting signal provided by patents. As the patent office has done the examination, the potential lenders can put less effort into evaluating the patents to be encumbered. As patent information is publicly available at the registry, the cost of obtaining the information is low for lenders.²⁴⁹ The good-quality sorting signals help lenders assess the quality of projects and creditability of the borrower and therefore reduce the *ex ante* information asymmetries. Accepting IP as collateral is attractive to the debt financiers when evaluating the specific IP or the IP portfolio is easier than assessing the expected profitability of the whole borrowing firm.

In a nutshell, providing IP as collateral is an effective *good-quality signal* to reduce the information asymmetries between the borrowers and external lenders. Compared to providing ordinary assets as collateral (with a bad-quality signal), *ceteris paribus*, the good-quality signal helps the borrowers to get even more *advantageous* terms on the top of (not offsetting) the benefits brought by the disciplinary role of collateral, and consequently to further reduce the cost of debt finance. Rassenfosse and Fischer (2016) have done a choice experiment over financial practitioners that are specialized in providing loans to finance growth of high-tech startups. They find that lenders have a strong preference for start-ups that offer patents as collateral. Their findings confirm that patents play an important signaling effect in venture lending decisions.²⁵⁰ The

²⁴⁹ See Long (2002), "Patent Signals," *supra* note 240.

²⁵⁰ See Rassenfosse and Fischer (2016), "Venture Debt Financing: Determinants of the Lending Decision." *supra* note 119 (the analysis relies on a discrete choice experiment conducted with 55 senior venture lenders working for companies that cover at least 60 percent of the U.S. venture debt market. The result shows that lenders have a strong preference for start-ups that offer patents as collateral and the provision of patents as

empirical study of Hottenrott et al. (2016) also shows that patents do provide good quality signals to external debtor investors that mitigate financing constraints; and small firms benefit more from patent signals than large firms because they are suffering more serious information problems.²⁵¹

The presence of IP also plays an important signaling role in attracting equity investors like angels and venture capitalists (Section 2.2.4). The first crucial difference is the focus of the investors. Equity investors share profits and care more about the future cash flow and overall profitability. They therefore mainly use IP as a crucial index to assess the expected profitability (the upside) of the whole firm and do not focus exclusively on the IP. By contrast, debt investors use IP to assess the overall default risk (the downside) and rely on the liquidation value. More attention is paid on a specific IP or the IP portfolio.²⁵² The second and also a more important difference is the content of signals. In this debt finance setting, the borrowing firms not only signal their better capability in the management of technology and repayment, but also signal their commitment in repayment (reading together with the bonding effect discussed below).

2.4.2.2 Bonding effect

Though the liquidation of collateral is often used as a backstop to offset the lender's losses upon the borrower's default, another primary function of collateral is to avoid losses in the first place, by ensuring the borrower's voluntary compliance with the terms of the loan contract.²⁵³

The eminent works in secured transactions, such as Lacker (1991), find that one important condition that is required for a collateralized loan contract to be optimal in controlling the ex post misbehaving is that the collateral should be more valuable to

collateral significantly increase the chance of obtaining venture debt. Note: this study is on venture debt, a hybrid version of debt with all the basic characteristics of debt).

²⁵¹ See Hottenrott et al. (2016) "Patents as Quality Signals? The Implications for Financing Constraints on R&D," *supra note* 99. This empirical study examines financial constraints in the market for bank finance as bank loans constitute the major external financing source for firms in most European countries. It uses a large sample of data of established R&D active firms (not start-ups), and studies the relationship between patents and external financial resources by using patents filed at the European Patent Office (rather than the US Patent Trademark Office).

²⁵² See OECD (2015) "Enquiries into Intellectual Property's Economic Impact", *supra note* 57 at 460-461.

²⁵³ See Ronald J. Mann, "Verification Institutions in Financing Transactions," *Georgetown Law Journal* 87, no. 7 (1999): 2225–2272 (discussing how a one-sided punitive hostage/collateral arrangement provides a useful solution by enhancing the cost of a breach yet minimizing the incentive to opportunism).

the borrower than to the lender.²⁵⁴ In this case, the liquidation means a transfer of the collateral from the borrower, the party with a higher valuation, to the lender (or an assignee), the party with a lower valuation. The value loss in the transfer would be eventually borne by the borrower. And all these legal restrictions imposed by the secured transaction law on the encumbered collateral make it difficult for the borrower to opportunistically substitute the collateral. The lenders can use the threat of destroying the collateral upon the borrower's default to ensure that the borrower would behave. So, the larger the difference in valuation is, the greater the disciplinary role that the collateral can play. Furthermore, the low liquidation value also reduces the lender's incentive to misappropriate the collateral, to initiate inefficient liquidation or to sabotage the investment. Economists sometimes refer to this finding as "the fairy tale of the ugly princess".²⁵⁵

So, from the perspective of the bonding theory, IP, a kind of low deployable asset whose liquidation value may suffer a very severe discount from the debtor's valuation, is actually good collateral (more like a hostage). For the lender, the higher the percentage of the IP values in the total assets of the borrower, the greater the disciplinary role that the encumbered license can play.²⁵⁶ The mere threat of foreclosure can be a powerful mean for the lenders to exert pressure upon the borrowers not to default on their obligations, because the borrowers, especially those startups, are really afraid of being deprived of such valuable assets at least to them.

This prediction is consistent with the observations in Rassenfosse and Fischer (2016), which finds that offering key patents as collateral is even **more important** to the lender than offering the ordinary tangible assets. If no disciplinary role is involved, then the lenders would prefer tangible assets for the repayment reason. Using key patents as collateral are preferred because it signals a serious commitment and allows the lender to make credible threats. The fear of losing the key patents can play a substantial self-disciplinary role.

²⁵⁴ See Lacker (1991), "Why Is There Debt?", *supra note 226*.

²⁵⁵ See Oliver E. Williamson, *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting* (New York: The Free Press, 1985) at 170-177 (the term "ugly princess" is used to describe a type of collateral/hostage that has high value to the obligor but limited direct value to the obligee). See also the discussion on the adoption of this collateral/hostage in different kinds of loans in Richard R. W. Brooks, "Credit Past Due," *Columbia Law Review* 106, no. 4 (2006): 994-1028.

²⁵⁶ See Jean Tirole, *The Theory of Corporate Finance* (Princeton: Princeton University Press, 2006) at 177-180.

2.4.2.3 Implications

Instead of focusing on the repayment function of collateral as a backup plan for default only, advocating the signaling and self-disciplinary roles that IP can play in the lending relationship can help financial institutions understand how accepting IP as collateral can alleviate the informational asymmetries and reduce the risk of default in the first place.

In the screening process prior to lending, the good-quality signaling role of IP helps financial institutions predict R&D projects with a good future and select borrowers with higher capabilities of R&D and technological management as well as greater commitment to perform. The selection can reduce the overall risk of defaulting. In the post-lending relationship, the large difference in the valuation of the encumbered IP between the borrower and the lender makes IP a good hostage. The valuation difference ensures the borrower's voluntary compliance with the terms of the loan contract and also removes the lender's incentive for initiating inefficient liquidation. The two positive effects together can reduce the overall risk of default. Consequently, the reduction of default risk help the debtors get *more advantageous* terms and make all welfare-enhancing transactions happen.

Of course the repayment function of collateral still matters in the lending relationship. A lender's expected repayment upon the debtor's default is determined by both the probability of default and the repayment from the liquidation value of the collateral. So, the liquidation value of the encumbered IP can have two opposite effects on the cost of the transaction.

On the one hand, from the perspective of the bonding effect, the liquidation value of the encumbered IP is negatively related with the probability of default. A low liquidation value may indicate a large difference in valuation between the borrower and the lender. The larger the valuation difference is, the greater the bonding effect of the collateral is, and then the lower the probability of default would be, which can consequently reduce the interest rate that the lender would charge.

On the other hand, from the perspective of the repayment function of collateral, the liquidation value of the encumbered IP is positively related to the payment that the lender would get upon the debtor's default. So, a low liquidation value indicates a high interest rate. Then it is more costly for the borrower to use the IP as collateral. As a

result, if an IP collateralization can occur, it implies that the parties believe gains from the correct alignment of incentives outweigh the costs from the adverse investment incentives that the loan creates.

2.5 Conclusion

Although IP collateralization seems to become a popular topic in IP finance and many governments have issued policies or specific funding schemes to support it as a solution to alleviate the finance constraints faced by SMEs in funding their R&D activities, the fundamental question regarding “why IP collateralization should be advocated in the first place” has not been correctly addressed.

To explore this question, we first need to understand the reasons for the finance constraints, i.e., the informational asymmetries between the inside innovators and the external investors. The literature review reveals that the informational asymmetries are particularly serious in funding R&D activities, given the high degree of uncertainty regarding the outputs of R&D projects and the difficulty of exchanging information between innovators and external investors. The amplified informational asymmetries cause a serious adverse selection problem in the *ex ante* funding relationship and a moral hazard problem in the *ex post* funding relationship. The two problems together greatly increase the cost of external finance, especially for young high-tech SMEs.

One unrealized problem in the existing efforts on promoting IP collateralization is that, these efforts seem to think IP should be treated the same as other tangible assets. Their presupposition is that, as good tangible collateral should be with high liquidation value only, the same criterion shall apply to IP as well. Most efforts are trying to solve the problems brought by the uncertainty in the liquidation value of IP and its limited redeployability at the forced-disposition, in order to reduce the risk in getting insufficient repayment. They therefore focus on the repayment function of collateral only.

By contrast, we need to go back to the basic economic theories of security interests and re-examine the roles of collateral in secured transactions. This re-examination reveals that the real reasons making secured transactions socially beneficial are not the repayment function of collateral (which is actually costly), but the signalling role of

collateral in solving the pre-lending adverse selection problem, and its self-disciplinary role in solving the post-lending moral hazard problem.

In this regard, some characteristics of IP actually make it good collateral. First, IP is highly informative about the quality, potential and confidence of the borrowers. IP is more costly for low-quality borrowers to provide, and can be easily observed and verified by the potential lenders. Therefore providing IP as collateral is sending an effective *good-quality signal* to reduce the ex ante information asymmetries and helps financial institutions select borrowers with better R&D projects, higher technological management capability as well as greater commitment to perform. Second, the uncertainty in the liquidation value of IP and its limited redeployability at the forced-disposition result in a large difference in the valuation of the encumbered IP between the borrower and the lender. The large valuation difference actually makes IP a good collateral (or more like a hostage), because it can play a substantial self-disciplinary role to ensure the borrower's voluntary compliance with the terms of the loan contract and also removes the lender's incentive for initiating inefficient liquidation. The better selection and alignment of incentives together can lower the overall risk of defaulting in the first place, and reduce information costs and monitoring costs for the lenders. In the end, more welfare-enhancing transactions might be financed with a lower cost of debt finance.

By looking into the advantages brought by the special characteristics of IP, instead of just focusing on trying to treat IP as ordinary tangible assets, our exploration has several main implications.

First, it gives better explanations to some phenomena in practice, such as why some lenders would like to accept some IP which is only valuable for the debtors as collateral and why some lenders care about IP, especially the crucial IP, even more than about other tangible assets of the debtors (as evidenced by the survey of Rassenfosse and Fischer (2016)).²⁵⁷

Second, it offers new insights into the selection criteria for accepting IP as collateral. Being aware of the roles of IP in avoiding default can alleviate the financial institutions' reluctance to participate in IP collateralization. Instead of focusing on the

²⁵⁷ See Rassenfosse and Fischer (2016) "Venture Debt Financing: Determinants of the Lending Decision", *supra note 250*.

IP with high liquidation value only, financial institutions should also pay attention to the use of IP as a “sorting mechanism” to identify good borrowers and as a “disciplinary mechanism” to engage in post-lending monitoring. They may also start to accept IP that may have low redeployability but have good signaling effects and may provide a good self-disciplinary role as collateral. The two roles in reducing the overall risk of default are not less important than the repayment of the salvage value.

This exploration allows us to provide some clarification on the differences in the selection criteria for IP collateralization and for IP securitization. In these two types of IP-based debt finance, IP plays different roles in their different transaction structures. IP securitization is a “structured finance” with more complicated transaction arrangements. The most famous case of IP securitization is the “David Bowie bonds” in 1997.²⁵⁸ In an IP securitization transaction, an “originator” firm transfers its IP assets (or the rights to the projected revenues from its IP assets, e.g. royalties) to a “special purpose vehicle” (SPV), which then issues securities or bonds in the capital markets in its own name but the fund raised is channeled back to the originating firm. The securities or bonds issued by the SPV are in theory separated from the firm’s risks and therefore can receive more favorable credit ratings. The transaction is structured to isolate the influence of IP holder on the collateral value of encumbered IP, in order to help the originating firm improve the chance of getting finance or lower the cost of finance. However, this isolation also makes the roles of IP in signaling the quality of borrowers and in disciplining the borrowers, the main advantages in IP collateralization, totally disappear. IP securitization focuses on the capability of encumbered IP in bringing income streams and their liquidation value only. It therefore particularly prefers to accept IP with stable cash flows or with high liquidation value, and typically diversifies the large IP-portfolio to reduce risks. By contrast, IP collateralization should focus more on IP with good signaling effect and self-disciplinary effect.

The new insights to the selection criteria expand the scope of IP eligible for collateralization. The expansion encourages more financial institutions to participate. Greater participation can help the practitioners to become familiar with the transaction and accumulate relevant knowledge and experience, which consequently enable them to improve the valuation methodologies so that they can assess the business risks more objectively with higher accuracy and also be able to adopt corresponding solutions

²⁵⁸ See discussion on IP securitization in *supra* note 117.

better. The legal experts can also become specialized in this specific transaction structure and know better in controlling the relevant legal issues by properly drafting the security agreements and effectively perfecting the security interests in IP against all conflicting claims. The operation of more transactions can achieve the economies of scale and lower the transaction costs. With this virtuous circle, in the long term, IP collateralization can become simple, routine and certain. More R&D projects with great potential can be financed at low cost. With the awareness of the financial potential of IP, innovative SMEs also have more incentives to improve their IP management and are more willing to patent their inventions. The whole society can benefit from the better IP management and higher incentives in innovation and information circulation.

Third, our exploration may provide some implications for policies in future. On the one hand, the government may change their policy focus. Currently, those policies on promoting IP collateralization, like providing interest subsidies for cost reduction or a supplementary guarantee fund for credit enhancement, mainly focus on sharing the risk for the lenders. Knowing the roles of IP as collateral in reducing the overall risk of defaulting, the government may want to move the policy focus towards helping lenders gain better capability in identifying that IP with strong signaling effect or with more substantial self-disciplinary role. This approach can help the lenders reduce the lending risk in the first place.

On the other hand, our exploration also provides additional reasons for the government to support IP collateralization. It has been widely accepted that the government is bad in “picking winners” in funding R&D activities, given the information problems and its lack of specialty on predicting technology. If market participants can gradually gain better capacity in identifying good borrowers (with good projects and better innovative capability) via the signaling effects of IP, the government can support “winners” via supporting IP collateralization. In this way, the government does not need to directly make choices in terms of which projects or investors to fund. It can let the market participants collect information, identify good projects, make evaluation, and conduct risk management. The market participants are more specialized in playing these roles. The government can assist the funding by sharing risks and reducing the cost for the market participants. This way of funding supports can reach the “winners” more accurately.

In any case, the intrinsic risky nature of R&D activities and the uncertainties in IP determine that IP collateralization is always associated with high risk. This dissertation is not trying to argue that all IP should be used as collateral. It reminds us that we should pay attention to other roles that IP plays in the lending relationship. In the end, it would be important for the financial lenders to be left to undertake their own due processes in assessing risk, selecting loan applicants and collateral, and conducting its loan management. This dissertation does not attempt to provide more detailed discussion on how practitioners could identify valuable IP that can be used as collateral, or instruct the practitioners to structure the transactions. In the remaining chapters, we want to ensure that the legal issues do not further intensify the difficulties. The legal framework should not become an impediment when the market actually has agreed to accept IP as collateral.

Chapter 3 The Effectiveness Criteria as to the General Legal Framework for IP Collateralization

3.1 Uncertainties in Legal Framework

Apart from the uncertainties and risks in the liquidation value of IP, which are discussed in Chapter 2 and left for financial experts to deal with, the other main factor, which precludes valuable IP assets from being used productively to secure loans, is the problems in the legal framework governing IP collateralization, which directly determine the transaction costs, contracting time, certainty of the transaction result and the incentives of relevant parties. An appropriate legal framework can help investors control financial risks.

The *World Bank Principles for Effective Insolvency and Creditors Rights Systems (Revised 2005)* has emphasized that: “[d]iscrepancies and uncertainties in the legal framework governing security interests are the main reason for the high cost and unavailability of credit.”²⁵⁹ In the case of IP collateralization, the discrepancies and uncertainties mainly come from the dogmatic separation and fragmentation among laws and the special intersectional status of IP collateralization. IP collateralization is situated at the intersection of two separated sub-fields of law, IP laws and secured transaction laws, which are traditionally subject to different legal frameworks and with various value orientations.²⁶⁰

With the aim of encouraging the creation and dissemination of new works of the mind, IP laws focus on rewarding the endeavor of creators by promoting the recognition, protection and traditional exploitation of IP. IP laws tend to favor the use of an “asset-specific approach”, which pays more attention to the specific characteristic of IP and addresses mainly the creation, exploitation, and enforcement of IP rights. They generally do not address specific issues regarding the financial exploitation of IP. However, these IP rules may have an impact on secured transactions.

²⁵⁹ Introduction, *World Bank Principles for Effective Insolvency and Creditor Rights System (Revised 2005)*, originally issued at April 2001, revised at December 2005, available at: <http://siteresources.worldbank.org/GILD/Resources/FINAL-ICRPrinciples-March2009.pdf>.

²⁶⁰ See Howard P. Knopf, “Security Interests in Intellectual Property: An International Comparative Approach,” *International Intellectual Property Law & Policy* 7, no. 90 (2002) at 13.

By contrast, the traditional secured transaction laws are developed with a view of spurring the availability of low-cost secured debt credit. They focus on establishing an effective security regime with clear rules regarding publicity, priority and enforcement to ensure the safety of transaction. They are in favor of an “enterprise-centered finance”, which emphasizes “the continuing business operations of the debtor and its shifting stock of asset rather than any one specific asset”²⁶¹ They traditionally deal with transactions regarding tangibles (and their related receivables) but do not pay enough attention to the specific characteristic of IP nor consider the uncertainty and diversity induced by the nature of IP protection.

The dogmatic separation in the legal frameworks of these two subfields results in discrepancies or gaps in the conjunction fields. The lack of coordination then gives rise to uncertainties and conflicts between various sources of laws. These divergences complicate the process of concluding an IP collateralization transaction and increase the associated legal risks and costs (Section 2.3.2.1 C). In this case, some socially welfare-enhancing IP collateralization transactions might be forgone by the legal problems, even in the case where the borrowers have valuable IP that can be used as collateral and the lenders would like to accept the IP as collateral. If mutually consented welfare-enhancing transactions were foregone simply because of legal uncertainties or restrictions, there would be a strong implication of market failure.

Therefore, the establishment of an integrated legal framework, which comprises unitary rules not only for the safe conclusion of secured transactions but also for a fair and effective management of IP assets, is expected to solve the tension between IP laws and secured transaction laws.²⁶² A more consistent legal framework for IP collateralization should be more effective and be able to facilitate IP holders to obtain better access to low cost credit, without undermining their incentives to innovation. For establishing this integrated legal framework, we need to understand how the legal framework should actually facilitate access to credit and at the same time provide incentives to innovation. This understanding requires us to have a deep knowledge of the economic effects of legal rules regarding IP collateralization.

²⁶¹ See Lorin E Brennan, “International Intellectual Property Financing: An Overview,” in *WIPO Information Paper on Intellectual Property Financing & Annex (WIPO/IP/FIN/GE/09/7)* (Geneva, 2009), 5–45, http://www.uncitral.org/pdf/english/colloquia/3rdSecTrans/Lorin_Brennan_Edited.pdf.

²⁶² See Brennan (2009), “International Intellectual Property Financing: An Overview,” *supra note 261* at 12.

3.2 Introduction of Effectiveness Criteria as to the Legal Framework of Secured Transaction

Law and economics scholars usually try to use economic analysis to describe the structure and function of law, so as to explore how the law can be improved to achieve the goal of maximizing the total social welfare. In the discussion of the essentials of legal framework for IP collateralization, this chapter follows the same approach to bridge the gap between economic analysis and legal reasoning. It aims at examining whether a legal framework for IP collateralization maximizes the total social welfare. For achieving this objective, we need firstly to answer a crucial question, i.e., what are the crucial **general** criteria for assessing the effectiveness of the legal frameworks on IP collateralization?

Different legal effectiveness criteria have been defined in some previous studies on the secured transaction legal framework for personal property. Although these studies are not exactly in the context of IP collateralization, some of their main observations would generally apply.

For instance, the European Bank for Reconstruction and Development (EBRD) has given a brief discussion on the criteria for an effective and efficient secured transaction legal framework reform. Its criteria are mainly *objective-oriented*: an efficient legal framework for secured transactions is expected to be able to (1) achieve the most basic legal function of allowing the creditors to have priority recourse to the collateral; and (2) maximize the economic benefits, by making the system for creation and enforcement of security interests work in a simple, fast, inexpensive, certain way and be able to fit to the local context.²⁶³

Meanwhile, after going through plenty of literature and legal documents, Williams et al. (2010) give a comprehensive summary of the criteria for an efficient secured transaction legal framework governing personal property.²⁶⁴ Their criteria are more

²⁶³ See Frederique Dahan and John Simpson, "Legal Efficiency of Secured Transactions Reform: Bridging the Gap between Economic Analysis and Legal Reasoning," in *Secured Transactions Reform And Access To Credit (Elgar Financial Law)*, ed. Frederique Dahan and John Simpson (Edward Elgar Publishing, 2009), 122–138 at 132.

²⁶⁴ See Mark Williams, Haitian Lu, and Chin Aun Ong, *Secured Finance Law in China and Hong Kong* (Cambridge University Press, 2010) at 13-19.

function-oriented: an efficient secured transaction legal framework should effectively fulfill four basic functions: (1) reducing the risk for creditors, (2) allowing the debtors to continue to utilize the collateral, (3) protecting the third parties against the collateral related fraud, and (4) minimizing the transaction cost of secured transaction arrangement, through four functional mechanisms, namely, (a) creation, (b) perfection, (c) publicity and (d) enforcement of such security.²⁶⁵

We can derive some important ideas from their ways of setting the effectiveness criteria.

- As the starting point, we need to have a clear and well-defined picture of the ultimate economic objectives that the secured transaction legal framework wants to achieve;
- Secondly, we need to identify the basic legal functions that the legal framework has to fulfill in order to achieve the ultimate economic objectives;
- Thirdly, the general effectiveness criteria are established by clarifying how specific legal functional mechanisms should work for fulfilling these basic functions.

Following this approach, this chapter firstly reviews the economic theories of credit access and IP protection to clarify the ultimate economic objectives and functions that the legal framework of IP collateralization wants to achieve and fulfill. Then it establishes the general effectiveness criteria regarding the creation, perfection, and enforcement of the security interests in IP. The review, on the one hand, identifies several potential and actual conflicts and inconsistencies may occur between IP law and secured transaction law when establishing a unitary legal regime for IP collateralization; and on the other hand, also helps us establish a conceptual assessment framework for the comparative study in the subsequent Chapter 4.

3.3 Objectives and Functions

The legal framework for IP collateralization is complicated, since it has to simultaneously achieve the objectives of both secured transaction law and IP law, or to make an appropriate balance when the objectives are in conflict. In essence, IP collateralization is a kind of secured transaction. So we start from the essence of secured transaction law and then discuss how the incorporation of the objectives of IP

²⁶⁵ *Ibid.*, at 12-19.

laws would give rise to changes or conflicts.

3.3.1 General Discussion for All Secured Transactions

The secured transaction law promotes a competitive and profitable debt credit industry, by spurring the availability of low-cost secured credit and guaranteeing the safety of financial funds but without imposing excessive costs. It is therefore focused on how to allow debtors to easily use the full value inherent in their assets to support credit in a safe, fair, efficient and transparent capital market.²⁶⁶

Achieving this objective requires an appropriate balance of the competing interests of all the parties that have legitimate interests in secured transactions. Security interest is mixed with *in personam* interests between the debtor and the secured creditor and *in rem* interests against third parties. Merrill and Smith (2001) classify the parties affected by a secured transaction into three groups, “in terms of the third-party interests that they do or do not implicate”.²⁶⁷

- The first group consists of the *direct* parties to the original security agreement, i.e., the **secured creditor** and the **debtor**, who are in an *in personam* relationship.
- The second group consists of those third parties who might deal with the same encumbered collateral, mainly including the **subsequent creditors and assignees**.²⁶⁸ The subsequent assignees and subsequent creditors get involved when either the secured creditor or the debtor assigns its interests in the collateral or use the collateral to secure another loan. These third parties all deal directly or indirectly with the secured creditor or debtor, but their rights are affected only *indirectly* by the security agreement. Merrill and Smith (2001) refer them as the “quasi-multital” third parties.²⁶⁹
- The third group includes those third parties who have a pure *in rem* relationship

²⁶⁶ See Investment Climate Advisory Services of the World Bank Group, “Secured Transactions Systems and Collateral Registries” (Washington DC, 2010), <https://www.wbginvestmentclimate.org/uploads/SecuredTransactionsSystems.pdf>.

²⁶⁷ See Thomas W. Merrill and Henry E. Smith, “The Property/Contract Interface,” *Columbia Law Review* 101, no. 4 (2001): 773–852 at 835-836.

²⁶⁸ In the discussion of Merrill and Smith (2001) “The Property/Contract Interface,” *ibid* at 835, the second group also includes another “compound-paucital case”, in which one lender enters into a large number of similar small-stakes contracts with debtors. This case mainly happens in consumer finance and thus is irrelevant to our discussion on IP collateralization.

²⁶⁹ The term of “quasi-multital” third parties is created by Merrill and Smith (2001) “The Property/Contract Interface,” *ibid* at 835

with the secured creditor and the debtor, for instance, tort claimers and other non-adjusting creditors, potential violators of the property rights of the secured creditor, and other market participants. The original security agreement could also impinge on the rights and affect the behavior of these third parties. Nevertheless, the scope of the third group is too broad and many associated problems are not unique to security interests.²⁷⁰

This thesis therefore mainly discusses parties that are actual participants in real businesses with **direct economic interests** in the secured transaction decisions, i.e. the first and second groups of parties, including **secured creditors, debtors**, as well as **subsequent creditors and assignees**.²⁷¹

Several eminent cross-country empirical studies have shown that **creditor** rights are crucial for the functioning of the financial system.²⁷² The most serious concern of a creditor is the risk of being unable to recover the amount due. Secured creditors, mainly banks and financial institutions, accept collateral mainly because the security interests over the encumbered collateral give them two important rights that an unsecured creditor does not have. The first right is the “**repossessory right**”, which allows the secured creditors to seize and dispose of the collateral upon the debtor’s default.²⁷³ The second one is the “**priority right**”, which allows the secured creditors to have a priority in recourse before the other competing parties from the disposition of the collateral at the foreclosure sale.²⁷⁴ These two rights together help the secured creditors ensure the certainty of debt repayment. In this regard, a secured transaction legal framework should be able to allow the secured creditors to effectively employ the two rights to reduce the creditor’s financial risk.

²⁷⁰ The costs and benefits security interests as to the parties in the third group are mainly discussed in the theoretical debate on the “puzzle of security interests”, see the summary of “puzzle of security interests” in *supra* note 227.

²⁷¹ This narrowed down approach is also adopted in Williams et al. (2010) “*Secured Finance Law in China and Hong Kong*”, *supra* note 264 at 7.

²⁷² Rafael La Porta et al., “Legal Determinants of External Finance,” *The Journal of Finance* 52, no. 3 (1997): 1131–1150 (with a sample of 49 countries, showing that countries with poorer investor protections, measured by both the character of legal rules and the quality of law enforcement, have smaller and narrower capital markets, including both equity and debt markets); Ross Levine, Norman Loayza, and Thorsten Beck, “Financial Intermediation and Growth: Causality and Causes,” *Journal of Monetary Economics* 46 (2000): 31–77 (empirically showing that cross-country differences in legal creditor rights help account for differences in financial development, and suggesting that legal reforms that strengthen creditor rights, contract enforcement can boost financial development and accelerate economic growth).

²⁷³ See Merrill and Smith (2001) “The Property/Contract Interface,” *supra* note 267 at 834.

²⁷⁴ *Ibid* at 834.

A **debtor's** main concern, however, is that the secured creditor's security interests may restrict and impede it from using the encumbered collateral productively in the ordinary course of business.²⁷⁵ The restrictions imposed over the collateral by security interests are a kind of important cost that a debtor has to take into account (the cost of restrictions is only incurred as long as the debtor does *not* default). The more extensive the restrictions which the security interests can put for the debtor's use of the encumbered collateral, the more costly the debt finance is for the debtor, especially for those high-quality ones which would have a high cost because of their high probability of non-default (see detailed discussion in Section 2.4.1.1). So, the restrictions can trigger an adverse selection problem. Thus, a secured transaction legal framework should keep the restrictions at the minimum necessary level to ensure the debtor's continuing utilization of its encumbered IP in the widest possible range of situations.

In the case of third parties, the **subsequent creditors and assignees** may be affected by the existence and terms of the security agreement. In turn, any future loans made by the subsequent creditors, and any subsequent assignments of interests in the collateral, either by the creditor or the debtor, can also impair the original creditor's ability to collect the original loan back. All the parties therefore have the incentive to take into account the effects of the security interest on the value of all present and future interests in the collateral. For all the third parties, clearly there is a need for information on the secured transaction and the status of the collateral. The original secured creditor also wants to ensure its security interests can be effective against the third parties. Therefore, a secured transaction legal framework must contain an effective mechanism to publicize important information about the secured transaction (including the status of the encumbered collateral) and establish a clear priority order for completing claims from all parties.²⁷⁶

From the social welfare perspective, an efficient legal regime is always expected to maximize the social surplus from the activities. Generally, the social surplus comes from the difference between the social value and the social cost created by the debt finance. The social value comes from the value created by the secured transactions (see the detailed discussion in Section 2.3.4). The social cost is mainly the total transaction costs encountered during the whole process of the transaction, from the creation, to the perfection, to the enforcement of security interests. Generally, high

²⁷⁵ See Williams et al. (2010) "Secured Finance Law in China and Hong Kong", *supra* note 264 at 8.

²⁷⁶ See Merrill and Smith (2001) "The Property/Contract Interface," *supra* note 267 at at 843.

transaction costs in any of these aspects would reduce the expected benefits that the debtor can get from the secured transaction and eventually change the market equilibrium. Some socially welfare-enhancing investment opportunities may be forgone. There is a strong implication of market failure. Fairgrieve (1998) reveals that all these transaction costs would be ultimately borne by the debtor.²⁷⁷ High transaction costs in any of these aspects mean that only large borrowers who can bear such expense can obtain credit. So it has a more severe effect on SMEs, who actually are in greater needs of credit. Thus, for the interests of the whole society, the legal framework has to minimize the total cost of secured transactions.

3.3.2 Additional Considerations for IP Collateralization

In the case of IP collateralization, evaluating the effectiveness of the legal framework is more difficult, since IP laws also have their own objectives to pursue and more parties may be involved. The costs and benefits are complicated. How to coordinate the objectives and balance the interests of different parties is the ultimate goal of the legal framework for IP collateralization.

3.3.2.1 The objective of IP laws

Although the specific economic reasoning behind each kind of IP is not quite the same, the core idea of the IP system is to provide economic incentives to innovation. In essence, the IP regime (with the exception of trademarks) provides limited statutory exclusivity to the innovators and creators in exchange for the creation and disclosure of innovations and creative works. For providing sufficient incentives, it helps innovators and creators to exploit the legitimate exclusivity to maximize the economic benefits that can be derived from their innovations and creative works.

The laws for IP collateralization should not undermine the objective of IP law. If IP collateralization only puts the emphasis on promoting debt finance, but discourages IP exploitations and consequently reduces the economic benefits that an IP owner can draw from its innovations, then the ultimate objective of IP law in promoting innovation would be undermined. The reduced incentives to innovation constitute a form of social costs.

²⁷⁷ See Duncan Fairgrieve, "Reforming Secured Transaction Laws in Central and Eastern Europe," *European Business Law Review* 9, no. 7/8 (1998): 254–258 at 256.

3.3.2.2 Different modes of IP collateralization

A. IP licensing

IP has some different ways of exploiting other traditional assets. Nowadays, IP licensing has become a main way of IP exploitation, especially in the software industry. Based on a license agreement, an IP rights owner (as the licensor) grants the other party (as the licensee) the permission to (exclusively or non-exclusively) exploit the innovation underlying the IP protection in exchange for an agreed payment. With the license, the exploiter's exploitation would be an infringement of the patent. For different types of IP, license agreements can be in the form of copyright license agreement, technology license agreement, trademark license and franchise agreement. A license can also be in the form of a contractual license or a non-contractual license (as in the case of a statutory or a compulsory license), an exclusive or a non-exclusive license. The agreed payment can be in the form of a fixed fee or royalties, or down payment plus a running royalty.

Licensing is pro-competitive and socially beneficial when it can combine complementary factors of innovation and production. As many innovations need many generations of improvement to be commercially exploitable, very few innovators have the capability to make all the improvements alone. In the case of "basic and applied research"²⁷⁸ and "research tools"²⁷⁹, licensing helps compensate the first innovator for the foundation established for the successive innovators. It not only removes the first innovator's incentive to block but also encourages the later innovators' incentive to develop follow-up applications or complementary inventions. And few innovators have the resources in all aspects of innovation, production and market distribution. In the cases where innovators are not best situated to commercialize their innovations, licensing can increase the productive efficiency by allowing the better-situated players to adapt, exploit and distribute the innovations.²⁸⁰ In these above cases, licensing

²⁷⁸ "Basic research and applied research" refers to the case where a single innovation may lead to many different second-generation innovations. For example, the discovery of laser may have many surgical applications or military supplies. See Scotchmer (2004) "Innovation and Incentive", *supra* note 39 at 135-142.

²⁷⁹ "Research tools" refers to the case where a second-generation product requires the input of many different first-generation products. For example, the development of a new phone usually need many telecommunication patents. See Scotchmer (2004) "Innovation and Incentive", *supra* note 39 at 142-146.

²⁸⁰ See Scotchmer (2004) "Innovation and Incentive", *supra* note 39 at 162-169.

leads to an efficient use of IP, improves the welfare of consumers as well as of the IP holder. The robustness of licensing markets, therefore, plays a critical role in encouraging investment in innovative activities.²⁸¹

In a licensing relationship, both the licensor and the licensee have some interests with monetary value under the license agreement.

For an IP owner/licensor, giving a license can retain the ownership and control over IP, and meanwhile broaden the reach of IP into different and more markets and bring an additional source of revenue. In addition, IP licenses also provide IP owners/licensors a way to maintain market power via cross licensing or help to attract external finance to mitigate financial constraints.²⁸² Under normal circumstances, the licensor has many contractual rights, such as the right to compel the licensee to advertise or use the licensed IP or related products in line with terms in the license agreement and the right to terminate the license agreement upon the licensee's breach. The main monetary interest the licensor has in a license is the right to collect the agreed payment. Licensing is one of the main ways that create rewards for innovation.

For a licensee, the license grants him the authorization to manufacture, sell, import, export, distribute or market various goods or services in accordance with the terms of the license. Without the license, these exploitations may be prevented. For instance, a cell phone manufacturer may not be able to produce or sell phones without the license to use a certain patented telecommunication technology. Getting a license helps the licensee to save the R&D costs in developing the protected innovation itself or engineering-around. The permission to use or exploit IP may also help the licensee to obtain some competitive advantage over its competitors.²⁸³ The main monetary value of a license to the licensee comes from the authorization to use or exploit the underlying innovation protected by IP without being worried about being sued by the IP holder (the licensor).

²⁸¹ However, licensing can be abused as well. *See, e.g.,* Scotchmer (2004) "Innovation and Incentive", *supra* note 39 at 169-185 (providing that firms may also use collusive licensing strategies, such as, patent pools and R&D joint ventures, to maintain or exploit their market power). Antitrust scrutiny may be triggered in the case where licensing cannot be justified by sharing innovation or efficiency reasons. *See* R. Gilbert and C. Shapiro, "Antitrust Issues in the Licensing of Intellectual Property: The Nine No-No's Meet the Nineties," in *Brookings Papers on Microeconomic Activity*, ed. C. Winston (Washington, DC: Brookings Institution, 1997), 283-349.

²⁸² *See* Kulatilaka and Lin (2006) (pointing out that some firms may adopt a licensing strategy to discourage competitors' development efforts and appropriate value via licensing revenues)

²⁸³ *See* more detailed discussion in the social benefits of IP licensing in Section 3.2.2.

IP licensing, as a special way of IP exploitation introduces different modes of IP collateralization, depending on what interests are used as collateral. The exercise of the secured creditor's rights upon default of the debtor will often result in the debtor's encumbered interests being transferred and, thus, the identity of the IP owner, licensor or licensee, might change. The change affects the interests of more third parties, especially more "quasi-multital" third parties, who deal directly or indirectly with the secured creditor or debtor, but their interests are affected only *indirectly* by the security agreement.²⁸⁴

We hereby demonstrate the complexity of the different modes of IP collateralization in the following scenario. We illustrate how owners, licensors and licensees of IP can use these monetary interests as collateral for credit and how the interests of third parties might be affected.

Company *L* holds a patent over a crucial telecommunication technology. Cell phone manufacturer *X* is not able to produce or sell phones without the license from *L* to use the patented telecommunication technology. With the license, the cell phone manufacturer *X* can produce or sell phones and have an annual profit of 100 million dollars. Therefore, the patent holder *L* (as the licensor) and the phone manufacturer *X* (as the licensee) have reached a license agreement, under which the licensee *X* agrees to pay the licensor *L* a royalty of 20 million for the authorization to incorporate the patented telecommunication technology into its phone production. Similarly, some other manufacturers in the market, like *Y* and *Z*, also want to buy the patent or get a license so that they can incorporate the patented telecommunication technology into their phone production, in order to obtain some competitive advantage over the competitors.

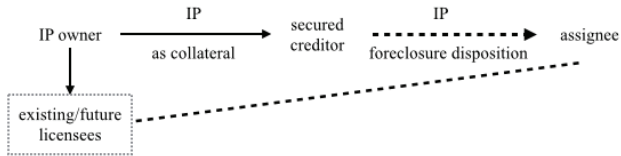
There might be three different modes of IP collateralization.

B. The use of interests of an IP owner as collateral

Company *L*, as the owner of the patent, may want to use the "patent" as collateral to borrow money from banks. Knowing that the patent is highly demanded in the market, bank *B* accepts the patent as collateral and issues the loan. Upon company *L*'s default on repaying the loan, the bank *B* wants to enforce the security interests by

²⁸⁴ See the discussion of "quasi-multital third parties" in *supra* note 269.

assigning the encumbered patent to the assignee *Z* in the foreclosure sale and to use the payment to recover the loan. The relationships can be illustrated as follows,



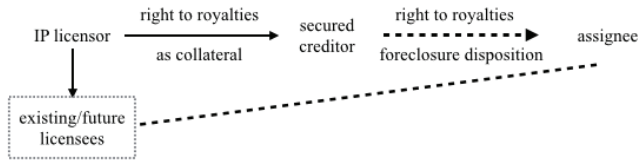
Case 1

The priority order among the security interests of the lender bank *B*, the interests of pre-existing licensee *X*, the future licensee *Y*, and the assignee *Z* is crucial in figuring out the answer to many important questions, such as, whether the existing license to phone manufacturer (as a licensee) *X* would be subject to the bank (as the secured creditor) *B*'s later security interests; if the patent owner *L*, also reaches a license agreement with another phone manufacturer *Y*, whether the after-acquired license to would be subject to the creditor *B*'s prior security interest.²⁸⁵ The answers to these questions determine whether the bank *B* can actually enforce its security interests and get recovery. They also determine whether the licensees, *X* and *Y*, still have valid licenses to exploit the patent and to whom they should perform their obligations under the licenses.

C. The use of interests of an IP licensor as collateral

Company *L*, as an IP licensor, might also want to use "its right to royalties from licensee *X*" as collateral to borrow money from banks. Knowing that the royalty payment is sufficient to pay off the loan, bank *B* accepts the licensor *L*'s right to royalties as collateral and issues the loan. Upon company *L*'s default on repaying the loan, the bank *B* wants to enforce the security interests by assigning the encumbered right to royalties in the foreclosure sale or by directly collecting the royalties. The relationships can be illustrated as follows,

²⁸⁵ See Knopf (2002) "Security Interests in Intellectual Property: An International Comparative Approach," *supra* note 260 at 34.

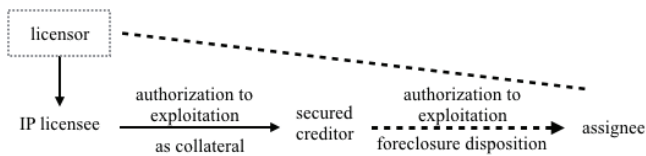


Case 2

Similarly, the priority order among the conflicting interests of the competing claimants determines if bank *B* can actually enforce its security interests and obtain recovery from the royalty payment, and to whom the licensees *X* (or some after-acquired licensees) should pay their royalties. The answers determine the lender’s incentive to provide a loan and the licensees’ cost of paying royalties.

D. The use of interests of an IP licensee as collateral

The cell phone manufacturer *X*, as the licensee, may also want to use its “interests in the license”, mainly “the authorization to exploit the patent”, as collateral. Knowing that the authorization to incorporate the patented telecommunication technology into phone production can bring *X* substantial revenue and the authorization to exploitation is also demanded in the market by other phone manufacturers, the bank *B* might want to accept the licensee’s interests in the license as collateral and issue the loan. Upon the licensee *X*’s default on repaying the loan, the bank *B* wants to enforce the security interests by assigning the “licensee’s interests in the license” in the foreclosure sale. The relationships can be illustrated as follows,



Case 3

The assignment of the license upon the default of the licensee *X* affects the interests of the licensor/patent holder *L*. The legal question whether licensees are allowed to use their interests in “the authorization to exploit the patent” as collateral determines the licensee’s ability to leverage the monetary value in the license and affects its borrowing capability. How much control the licensor has in protecting itself from the

potential detrimental effects of assigning the license to another party in the case of the licensee/debtor's default determines the IP owner/licensor's incentive to give a license and also the bank's capacity in enforcing its security interests.

E. More complicated social costs and benefits

Therefore, we see that, in all the three modes, the legal rules on the scope of IP rights (or interests) eligible for collateral²⁸⁶ and on the priority order among conflicting interests of competing claimants²⁸⁷ directly determine the lender's incentive to provide the loan, and the borrower's borrowing capability, and the licensor's incentive to give licenses (or licensee's incentive to get licenses). The availability of these types of arrangement and how they work directly determine the social value and cost of IP collateralisation.

In the special case of IP collateralization, the components of social value and costs are more complicated.

First, since more third parties are involved in IP collateralization, the calculation of social surplus should also take into account the values and costs incurred by the other parties, especially those additional third parties (such as licensors and licensees) mentioned above.²⁸⁸

Second, the social value includes not only the value from the investments funded by the debt finance, which may not be available without using IP as collateral, but also the value from the additional incentives to innovation provided by the profits from the debt finance. As IP collateralization also becomes a possible way of IP exploitation, the expected economic profits that IP owners and exploiters can derive from innovations are also increased. The higher expected economic benefits would provide innovators with more incentives to innovation.

Third, as we discussed above, IP collateralization should not undermine the objectives of IP law. If IP collateralization only puts the emphasis on promoting debt finance, but discourages IP licensing or other ways of IP exploitation and consequently reduces the

²⁸⁶ See further discussion in Section 3.4.2, 4.2.2.2, 4.3.2.2, 4.4.2.2 and 4.5.1.2.

²⁸⁷ See further discussion Section 3.5.2, 4.2.3.3, 4.3.3.3, 4.4.3.2 and 4.5.2.3.

²⁸⁸ See the discussion of "quasi-multital" in *supra note* 269. It refers to the third parties who deal directly or indirectly with the secured creditor or debtor, but their rights are affected only *indirectly* by the security agreement).

economic benefits that an IP owner can draw from its innovations, then the ultimate objective of IP law in promoting innovation would be undermined. The reduced incentives to innovation constitute a form of social costs. Thus, an efficient legal framework for IP collateralization is expected to keep all these parties' incentives in IP exploitation.

3.3.3 Functions and Functional Mechanisms

In summary, an efficient secured transaction legal framework for IP collateralization must therefore ensure the following functions:

- 1 Reducing the financial risk for secured creditors;
- 2 Maximizing the continuing exploitation of encumbered IP for debtors;
- 3 Notifying necessary information about the secured transaction and the status of the collateral for all third parties in a cost-effective way;
- 4 Promoting innovation by keeping the incentive for IP exploitation, especially for IP licensing;
- 5 Maximizing the total social surplus, by minimizing transaction cost and taking into account all the direct and indirect parties' benefits and costs.

The most relevant issue here is that, in some cases, not all these functions can be achieved at the same time. How to achieve a balance while conflicts occur is exactly what this thesis tries to explore.

In the legal framework for secured transactions, functions are implemented through concrete functional mechanisms. Sometimes a function requires the cooperation of several functional mechanisms to achieve. Knopf (2002) gives a good summary of the connection of the functional mechanisms:

“personal property security legislation enables lenders to secure loans in a variety of ways by means of security agreements that **create** security interests which attach to identifiable personal property and are **perfected** in a such a manner that **priorities** can be established and jurisdiction can be clarified for purposes of **enforcement**.”²⁸⁹

²⁸⁹ See Knopf (2002) “Security Interests in Intellectual Property: An International Comparative Approach,” *supra note* 260 at 23.

The following parts of this chapter will look into the three key functional mechanisms, creation, perfection (with publicity and priority) and enforcement,²⁹⁰ and identify some main issues where IP law and secured transaction law may cause potential conflicts when establishing a unitary legal regime for IP collateralization. This thesis is not intended to discuss all conflicts. We will just choose some important issues as examples to show how the conflicts can increase the transaction cost and legal risks. The examination will illustrate the difficulties in achieving an appropriate balance among conflicting objectives and functions. And then later we will comparatively examine how the laws of China, the US and the UNCITRAL's Supplement address the difficulties, and evaluate the effectiveness of the different solutions, mainly from the perspective of risk controlling and transaction cost reduction.

3.4 Creation

Modern secured transaction law draws a distinction between the creation and the perfection of a security right. 'Creation' is the first stage, which establishes the *in personam* relationship between debtor and secured creditor. It is defined as the process by which the secured creditor and the debtor create the security interests in the encumbered collateral and thereby confer on the secured creditor special proprietary rights in the collateral, such as enforcement of the collateral, **against the debtor**.²⁹¹

3.4.1 Transaction Structure

With the lead of the Article 9 of the Uniform Commercial Code of the United States (UCC-9), the modern secured transaction law stops making distinctions among different security devices, such as chattel mortgages and liens, but instead starts to adopt a functional approach, by treating all transactions playing the function of securing transactions under a uniform framework. The functional approach subjects all secured transactions to an identical regulatory framework and treats them alike under a common set of principles.

²⁹⁰ See Williams et al. (2010) "Secured Finance Law in China and Hong Kong", *supra* note 264 at 1-35 (describing four key functional mechanisms: creation, perfection, publicity and enforcement). We hereby also follow the approach adopted in the UCC-9 and consider publicity as an aspect of perfection. The complicated cross-border issues and the matters of private international law are beyond the scope of this thesis.

²⁹¹ This definition is summarized from the concept given in Williams et al. (2010) "Secured Finance Law in China and Hong Kong", *supra* note 264 at 11.

Applying this unitary approach to IP collateralization relieves parties of IP collateralization from the heavy burden of revaluing the advantages and disadvantages of various security devices. This approach ensures the comprehensiveness, consistency and transparency of the rules regarding IP collateralization. The transaction costs, including costs related to both the creation and enforcement of security rights are therefore reduced by this approach.

3.4.2 Scope of IP Eligible for Collateralization

The objective of modern secured transaction law is to expand the scope of assets eligible for being collateral for providing low-cost credit. The legal regime for IP collateralization is thus expected to enable innovators to make full use of their IP as collateral for credit. Unnecessary restrictions limit the debtor's borrowing capability. Unclear restrictions bring uncertainty to the transactions and leave creditors unsure whether the security interests would be effectively enforced upon the debtor's default. The legal uncertainty would exclude economically important IP from being used to support debt finance.²⁹²

3.4.2.1 Types of IP that can serve as collateral

The first issue is about what types of IP can be used as collateral. The answer to this question is much more difficult than it looks at first glance. "IP" itself is a vague and broad legal concept, which includes a bundle of different protection regimes over various types of human intellectual output.²⁹³ For a long time, although with various attempts of many scholars and international instruments, there has been no internationally accepted statutory definition of IP. Even the Trade-Related Aspects of Intellectual Property Rights (the TRIPS Agreement) in the end just chooses an enumerative approach to list the scope of IP, instead of giving a clear abstract

²⁹² See H Fleisig, M Safavian, and N de la Pena, *Reforming Collateral Laws to Increase Access to Finance* (Washington, DC: World Bank, 2006) at 23-24.

²⁹³ See Lipton (2002) "Intellectual Property in the Information Age and Secured Finance Practice", *supra* note 154 at 367 (summarizing and dividing the different forms of IP into four categories: "(1) basic forms of IP whose legal incidents are generally well established, e.g., patents, registered trademarks, copyright and possibly also registered industrial designs; (2) more unusual *sui generis* forms of IP, such as plant breeder's rights, circuit layout rights, databases, etc., in jurisdictions in which they exist as independent statutory rights; (3) forms of intellectual "quasi" property that tend to be protected for the most part by the judiciary rather than by legislation, such as trade secrets in some jurisdictions, as well as unregistered trade marks and trade names; and; (4) some newly evolving areas of IP, for example, developing law as to the appropriate IP protection for things like computer software, internet domain names, e-commerce business methods, etc.").

definition.²⁹⁴ This enumerative approach creates problems when the scope of IP is progressively expanding as a result of the developments in both science and technology. Meanwhile, there are different statutory schemes for each kind of IP in each jurisdiction and divergences in the level and scope of legal protection among jurisdictions. This fact raises further questions as to what rights can be categorized as IP, what rights are comprised in each type of IP, or what rights in which types of IP are valuable and may be used as collateral. The case-by-case analysis and assistance from specialized IP lawyers and accountants might help clarify these questions but also greatly increase the transaction costs.

In the case without clear answers to these questions, in practice, only the three fundamental forms of IP, i.e. copyright, patents and registered trademarks, are favored by the banks and other financial institutions, largely due to the fact that the relevant laws concerning them in different jurisdictions enjoy a high level of harmonization around the world. The rights comprised in the three kinds of IP and their characters are determined and regulated in most jurisdictions by laws that comply largely with international treaties, which are now generally and uniformly administered by the WIPO and by the World Trade Organization (WTO). However, lenders have been specifically advised not to take security interests over the other types of IP, with the consideration of the associated high transaction costs, legal risks and practical difficulties.²⁹⁵

Nevertheless, even for these well-standardized types of IP, there are still plenty of uncertainties as to whether they are eligible for collateralization. We can hereby take trademarks as an example. From the law and economic perspective, the trademark system is established to help the public identify the source of goods and services covered by the trademark.²⁹⁶ So, in many countries, a trademark cannot be disassociated from the related business or goodwill attached to it. However, upon the debtor's default, the foreclosure sale would impose the sale of the encumbered trademarks. If the trademarks cannot be assigned independently, the creditor would have to take the related goodwill and business altogether as collateral; otherwise the

²⁹⁴ The TRIPS Agreement lists the scope of IP in Part 2 (Standards Concerning the Availability, Scope and Use of Intellectual Property Rights), including copyright and related rights, trademarks, geographic indications, industrial designs, patents, layout-designs (Topographies) of integrated circuits, protection of undisclosed information.

²⁹⁵ See Bromfield and Runeckles (2006) "Taking Security over Intellectual Property: A Practical Overview," *supra note* 156.

²⁹⁶ See Bently and Sherman (2004) "Intellectual Property Law," *supra note* 39 at 699-702.

security interests on the trademark itself would be simply meaningless for the creditor. In other words, if a trademark cannot be assigned independently, its value of being collateral would be very limited. So, determining if an IP is capable of being used as collateral requires a comprehensive analysis of relevant rules in IP law.

The legal uncertainty as to what types of IP are eligible for collateralization imposes a heavy burden in terms of time and financial costs on the transactions. Transaction costs rise when much time and effort must be devoted to determine whether the law permits taking a security interest in a particular type of IP and what specific category of rights have been exactly included. This would seriously impede the efficiency of realizing the monetary value inherent in IP assets, especially the newly emerging ones. For this reason, an efficient legal regime for IP collateralization is firstly expected to have a clear and broad scope regarding what types of IP are eligible for collateralization.

3.4.2.2 Treatment of rights under IP license agreements

As explained in Section 3.3.2.2, licensing has been one of the main ways of IP exploitation and also the main source for providing the economic incentives for innovation. When a licensor or licensee wants to use its monetary interests under the license agreement as collateral, there is a problem of whether its interests can be the subjects of security interests.

A. Licensor's right to royalty payment

In the case a licensor (as the debtor in this setting) wants to use its “right to royalty payment” as collateral, the main legal problem is how the law should treat such a right (as Case 2 in Section 3.3.2.2). Should it be treated as a kind of IP rights, the proceeds of IP, or a separated kind of collateral such as “receivable”, i.e., a right to payment of monetary obligations? Secured transactions law and IP laws may give different treatments because of their different policy considerations.

The modern secured transaction laws, such as the *United Nations Convention on the Assignment of Receivables in International Trade*, usually give exceptional rules to eliminate some statutory and contractual restrictions on the assignability of rights in receivables, in order to facilitate the finance of receivables. The main argument is that, an obligor of receivables usually discharges its obligation by simply making the

payment. As the change of receivers is unlikely to increase any cost or risk of performance to the obligor, there is also no legitimate interest of enforcing restrictions on assignment of rights in receivables.²⁹⁷ Allowing free assignability can save the lender from the heavy burden of examining every relevant contract to determine the assignability of the receivables concerned and the cost of renegotiation.²⁹⁸

However, applying these exemptions to royalty payments arising from IP license may cause conflicts with some fundamental IP law considerations. For example, copyright laws usually limit the private autonomy to freely stipulate the compensation for a transfer of rights or prevent the assignment of equitable remuneration, in order to ensure that the rights of authors and performers to payment would not be contractually undermined by the parties with greater bargaining powers, such as large publishers and film producers.²⁹⁹ So, the law on IP collateralization should give a clear solution or explanation on how to solve the divergence on policy considerations.

B. Licensee's interests in IP license

Similarly, a licensee/debtor may also want to use its **interests in the authorization to exploitation** under an IP license, maybe the most important value source of all its assets, as collateral (as Case 3 in Section 3.3.2.2). However, it would raise the licensor's concerns. The licensor may worry about the potential detrimental effects of assigning the license to another party in the case of the licensee/debtor's default. For this reason, usually there is an anti-assignment clause in the original license agreement, which requires the licensor's consent for the assignment of the license for the purpose of security interests.

The anti-assignment or anti-attachment clause can have ambiguous effects. On the one hand, the anti-assignment clause allows the licensors to keep better control over their IP, by giving them the final power to consent to or refuse the licensee's use of an IP license as collateral. However, when the enforcement of security interests in the

²⁹⁷ See Richard A. Epstein, "Why Restrain Alienation?," *Columbia Law Review* 85, no. 5 (1985): 970–990 at 972.

²⁹⁸ Eliminating some statutory and contractual restrictions on the assignability can also protect parties holding a weaker position in negotiations of transactions from undue commitments, especially where a large debtor intends to contractually limit a small creditor's ability to use its receivables as collateral. See Brennan (2009), "International Intellectual Property Financing: An Overview," *supra note* 261 at 31.

²⁹⁹ See Reto M. Hilty and Alexander Peukert, "Equitable Remuneration in Copyright Law: The Amended German Copyright Act as a Trap for the Entertainment Industry in the U.S.," *Cardozo Arts & Entertainment Law Journal* 22, no. 1 (2004): 401–50.

licensee is totally conditional upon the IP holder-licensor's decision, which is uncertain and might be inefficient, the lenders generally would not like to accept the "licensee's rights in the license" as collateral. In this case, a licensee's capability of leveraging the economic value of his rights under a license will be highly restricted or even practically impossible.

While IP laws are in favor of enforcing the anti-assignment for keeping the licensor's control over the license, the secured transaction regime tends to restrict its enforceability for helping licensees get better access to credit. So, there is also a choice between the different preferences on the enforceability of the anti-assignment clause (see further analysis in Chapter 5).

3.4.2.3 Future IP

The modern secured transaction law has evolved to permit all property, whether presently existing ("present collateral") or to be acquired in the future ("after acquired collateral"), to serve as collateral for a loan. On the one hand, encompassing the possibility of security on "after-acquired" property permits a debtor to use the future output as collateral to get funding to satisfy the current need for working capital input.³⁰⁰ It accelerates the finance circle. On the other hand, it is also compatible with the practical needs of creating "floating security interests", a kind of non-specific security interest created over the changing assets of the borrower/debtor, which floats until the occurrence of some prescribed events which convert into it into being fixed and attached to specific assets. From the commercial and financial perspective, it is obviously impractical to request a new registration whenever there is a change in the assets, which happens very frequently in the ordinary course of business.³⁰¹ However, applying this rule to IP raises some controversies, especially about whether the scope of collateral should be expanded to the some rights in future IP, such as copyrights of future works, or the rights to the application for patents or trademarks.

The benefits of allowing the use of future IP as collateral are obvious, taking into account the fast evolution in the related industries. Many IP-intensive industries keep

³⁰⁰ See further explanation of the adverse effects of the limitation on creating security interest in after-acquired collateral or after-created debt at Chapter 3 (The Economic Consequences of Obsolete Systems for Secured Transactions) in Fleisig et al. (2006) *Reforming Collateral Laws to Increase Access to Finance*, *supra note* 292 at 29.

³⁰¹ See Christina Lui, "Navigating through the Legal Minefield of State and Federal Filing for Perfecting Security Interests in Intellectual Property," *Santa Clara Law Review* 51 (2011): 705–742.

progressing all the time. For instance, in the film industry, a film may consist of hundreds or more of discretely copyrightable components, which are subject to changes before the film is fully finished. In the software industry, works like computer programs are updated constantly even after being launched on the market. Similarly, innovators also always keep improving their technologies covered by patents in order to keep their technological superiority and to make sure that their patents are not surpassed by new technologies invented by competitors. With the improving progress, many creations or inventions can develop new derivative works or updated versions. The derivative works and revisions can turn into new independent IP assets and can greatly expand or diminish the value of original IP assets. So, from the perspective of a creditor, making sure that security interests also cover future improvements is crucial for maintaining the value of the encumbered IP. Allowing the creation of security interests in future updated works enables the creditors to create security interests in all of these different versions throughout the whole improvement process at once. It can give the creditors better protection to ensure their priority status and collateral value, and save them plenty of time and cost on keeping monitoring the debtor's activity closely, and on repeatedly creating and perfecting security interests in each new version or item.³⁰²

Intuitively, people may have practical concerns about the high financial risk. As IP is a kind of rights upon the creator's products of cognitive processes, future IP may merely be based on some "ideas" about later results of human intellect. And the grant of patents and trademarks has to pass through certain examinations, which is subject to plenty of uncertainties, from not only the innovator's R&D activities but also the competition from the market. In other words, the transactions based on future IP merely rely on some expectations concerning the innovative potential of the debtor. In the case of the debtor's default, a secured creditor may get nothing from the encumbered "future IP". However, this is a matter for financial experts to consider for collateral valuation and risk management, not a valid reason for laws to impose statutory restrictions to strictly prevent practitioners from using future IP as collateral.

³⁰² See Lorin E Brennan, "Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version)," *Hastings Communications and Entertainment Law Journal (Comm/Ent)* 23 (2001): 313–456 at 374 (noting that "Speaking from experience, for cinematographic works France requires filing the entire chain of title, including all contracts for writers, directors and composers, each of which must be translated into French by a certified translator whose translation must be notarized, authenticated and consularized").

More problems come from the practical difficulties of making the use of future IP as collateral possible. The difficulties are mainly caused by the fact that IP laws are fundamentally unfriendly to the concept of “after acquired” rights. From the perspective of IP law, the reluctance exists for two main reasons.

The first reason is from the IP law’s own consideration. For instance, in the legal regime for patents, the exclusive protection is intentionally designed with limited breadth, in order to encourage competitors to put efforts into making improvements and to restrict the patent holders’ capability of setting up barriers to entry (Section 2.1.1.2). A great improvement on the patented technology is entitled to get a new patent. Patent law is therefore reluctant to provide patent owners with rights to future patents, since the future patents may be granted to another party if the improvement turns out to be done by another party other than the patent holder in the end.

The second reason is about the practical difficulty in registration for perfection at the later stage in order to make the security interests to be effective as against third parties. IP is a kind of intangible asset. The physical possession or occupation of IP is impossible and meaningless. For this reason, many IP systems are based on registration. Every registration has to be made to ensure a defensible right in the court. An IP that is not created yet is also not eligible for registration because they do not have a legitimate “identity” to be recorded beforehand in the property-indexed IP registration system. And IP registries usually require specific description and do not permit a blanket registration, without which a creation of security interests in future IP is practically impossible (more detailed examination in the following Session 3.5.1).

So, whether to allow the use of future IP as collateral or not requires deeper exploration of its benefits and problems. If there were indeed a need to make it possible, many changes in IP law would be necessary.

3.4.3 Description of Collateral in Security Agreement

The modern secured transaction law respects the autonomy of contract and keeps the process of creating secured transactions simple, comprehensible, expeditious, and inexpensive. It therefore sets only minimum requirements on the creation of a security right. All the additional steps for the secured creditor to acquire the superior rights as to the collateral in order to get the *in rem* rights against third parties are left to the further process of “perfecting” the security interests.

Typically, the creation of a valid non-possessory security interest requires the completion of a written agreement between the debtor and the secured creditor (i.e., the security agreement). The modern secured transaction law starts to adopt a general description approach, which only requires the description of collateral in whatever way the secured party and borrower deem appropriate. The general description is for making it possible or cheaper to create “floating security interests” over inventory and accounts receivable, and to include “after-acquired collateral”.³⁰³

However, IP laws commonly require much more specific identification of the IP to be encumbered, such as the identifier in IP-registries (especially for trademarks and patents), the specific category of rights included, the territorial scope of application and the duration of security right.³⁰⁴ As explained below in Section 3.5.1, this specific description requirement comes from the “public goods” nature of IP and is consistent with the commercial practice of IP exploitation. An IP is a kind of intangible asset often comprising a bundle of rights with different values and risks. For example, a patent holder is vested with a set of exclusive rights to prevent others from commercially making, using, selling, importing, or distributing its patented invention without permission; and a copyright owner has the right to exclude others from reproducing, adapting, publically distributing, displaying or performing the copyrighted work without authorization. All these exclusive rights can be individually assigned to others as giving the authorization to a specific usage. Then these rights could be simultaneously enjoyed and exercised by an indefinite number of right holders by various contractual arrangements in different territories. So, specific description is important in identifying the exact scope of encumbered and unencumbered IP rights and the safety of transactions involving IP for all parties.³⁰⁵

However, the requirement for specific identification of each IP to be encumbered can raise the costs of creating a security interest to some prohibitive levels. First, the IP practice determines that it would be difficult to precisely identify each IP involved in the secured transaction. The fact is that most IP-based transactions involve a large number of IP. A copyrighted work is capable of being divided into segments, each

³⁰³ See Fleisig et al. (2006) *Reforming Collateral Laws to Increase Access to Finance*, *supra* note 292 at 26-29.

³⁰⁴ See Tosato (2009) “The UNCITRAL Annex on Security Rights in IP: A Work in Progress”, *infra* note 591.

³⁰⁵ See Liu Chongli (刘崇理), “The Enlightenment of the UNCITRAL Legislative Guide on Secured Transactions to the Security Interests over Intellectual Property in China (《贸易法委员会担保交易立法指南》对我国知识产权担保的启示),” *People’s Judicature (人民司法)* 7 (2010): 96 at 99-100.

capable of separate ownership. For instance, even a singular film may already contain thousands of copyrighted assets. Not only the film itself but the elements in it, e.g., songs, photos, drawings, architecture or even software are all protected as “individual” copyrights. Similarly, Gambardella et al, (2011) show that it has been a common practice for firms to “create value by raising the number of patents or inventions that they produce”, while “which particular patent or invention is most valuable is harder to predict.”³⁰⁶ From another perspective, , if a creditor wanted to control the risks brought by the uncertainty in value of patents, the best way is to be secured by a large number of patents. Against this background, it might be too costly to describe (and later register) each copyright within all those film assets or each patent in the whole patent portfolio one by one.

Second, in many secured transactions where IP is used as collateral, especially in venture loans, the loans are typically backed by a blanket lien which covers all the assets of the firm in the case of default. The requirement on specific identification would make it very troublesome for a venture loan provider to create and register its security interest in all IP of the debtor.

Third, as mentioned above in Section 3.4.2.3, a specific description of each IP would be also cumbersome for both the creation and registration of security rights in future IP, which is difficult to be specifically described beforehand. For instance, it is impossible to include the registration number of the future patent or trademark in the security agreement, if the law does so require.

Fourth, requiring specific identification can also increase the transaction risk, by making loans harder to monitor. The secured creditor would have to tackle all the exploitations, assignments or the states of each encumbered IP to ensure the validity and priority of the security interests against all competing claims.

Given these problems caused by commercial practice, the law for IP collateralization has to find a solution to satisfy the need for an appropriate identification of the encumbered IP without largely increasing the transaction cost or obstructing

³⁰⁶ See Alfonso Gambardella, Dietmar Harhoff, and Bart Verspagen, *The Determinants of the Private Value of Patented Inventions (WIPO/IP/ECON/GE/2/11/INF.1)* (Geneva: WIPO Seminar Series on “The Economics of Intellectual Property”, 2011), available at http://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_econ_ge_2_11/wipo_ip_econ_ge_2_11_determinants.pdf.

transactions.

3.4.4 Pre-default Rights and Obligations of Debtors and Secured Creditors

The creation of security interests in IP would lead to an allocation of pre-default rights and obligations as to the exploitation and preservation of collateral between the debtor and the secured creditor. While the debtor's capability of keeping a productive exploitation of the encumbered collateral in the ordinary course of business determines the cost of the secured transaction on the debtor,³⁰⁷ the responsibility for the preservation of the value of collateral determines the liquidation value that the secured creditor can get at the foreclosure sale.

For the traditional transactions secured by tangible movables, especially in the case of possession pledge, collaterals are generally transferred to and under the physical control of the secured creditors. The secured creditors are therefore obliged to properly keep and maintain the encumbered collateral during the lending period, and to return the collateral to the debtor upon the fulfillment of the principal obligations or the extinguishing of the security interests. As the value of most ordinary tangible assets is based on their physical existence and a continuous exploitation of movables may accelerate the physical deteriorations, the creditor's maintenance duties are mainly focused on restricting the exploitation of the encumbered collateral to avoid physical depreciation or any payment of relevant maintenance charges.

However, the intangible nature of IP as well as the different value sources and ways of exploitation of IP would result in a significantly different allocation of rights and obligations.

A. No transfer of physical possession

Firstly, the intangible nature of IP makes the physical possession of the encumbered IP impractical and meaningless for the secured creditor. For this reason, IP collateralization is not established on the actual transfer of the physical possession of the encumbered IP from the debtor to the secured creditor. The encumbered IP is still kept under the control of the debtor. Therefore, the responsibility of taking reasonable steps to maintain the value of encumbered IP will be imposed on the debtors.

³⁰⁷ See the discussion at Section 2.4.1.3.

B. Maintenance duties

The maintenance duties in IP collateralization are also significantly different. As the value of IP is based on the holder's statutory monopoly status and accumulated through exploitation, so the debtors' maintenance duties are mainly about safeguarding the continuous existence of legal protection and keeping effective exploitation.

As the continuous legal protection over the registered trademarks and patents is established on registration and annual renewal, the debtors are obliged to pay the annual maintenance fee in time. In jurisdictions where the "consecutive exploitation" has been imposed as a mandatory requirement for keeping the validity of a registered trademark,³⁰⁸ the debtors are also obliged to continuously implement the encumbered trademark in order to keep it from being revoked.³⁰⁹

As discussed in Section 2.1.1.2 and 2.3.2.2 B, the value of IP is determined by the IP holder's capability of exploiting its statutory monopoly status and market changes. The value may suffer serious loss with the passage of time; so in contrast with the case with ordinary tangible assets, the debtors should actively exploit the encumbered IP. Keeping exploitation is not a right entitled to the debtor, but also an obligation that the debtor has to undertake to keep the liquidation value of the encumbered IP. The restrictions on the exploitation of encumbered IP will be kept at a minimal level to reduce the debtor's cost of encumbering IP, and to ensure the creditor's repayment upon the default.

Meanwhile, as the value of an IP is susceptible to infringements and impediments caused by competitors (such as, pirating copyrighted works, imitating patented products and infringing trademarks), the debtor should be responsible for taking active action against these infringements of the encumbered IP, with the objective of maintaining the liquidation value of collaterals.

³⁰⁸ E.g., Article 19 [Requirement of Use], Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

³⁰⁹ See Bromfield and Runeckles (2006) "Taking Security over Intellectual Property: A Practical Overview," *supra note* 156. For example, in China the legal protection over registered trademarks is for 10 years and can be extended with 10 more years for each extension. But "consecutive exploitation" has been imposed as a mandatory requirement for keeping the validity of a registered trademark. Any registered trademark has not been exploited for three consecutive years can be revoked by any entities or individuals. See Article 39, 40, and 49, Trademark Law of China.

C. Safeguard mechanisms

While IP assets are so sensitive to market changes and vulnerable to infringements, any delay in adopting appropriate action to protect and preserve the value of the encumbered IP may result in a severe depreciation of the liquidation value. The depreciation can reduce the creditor's collection of repayment upon the debtor's default. As a result, the secured creditors may also need some safeguard mechanisms to intervene if the debtor fails in fulfilling their maintenance obligations or conducts misuse, in order to preserve the liquidation value of the encumbered IP.

Taking all these differences into account, the law for IP collateralization should make an appropriate allocation of the pre-default rights and obligations on the exploitation and preservation of the encumbered IP.

3.5 Perfection, Publicity and Priority

An integrated perfection and publicity system with a comprehensive set of priority rules is one of the central and defining features of an efficient legal regime for secured transactions.³¹⁰ A security interest, by definition, is simply a legal arrangement that gives the secured creditor full priority in the underlying collateral over the claims of all third parties, including inferior secured creditors, subsequent assignees of the debtor, and other unsecured creditors.³¹¹ In a world where information is not without cost, after the creation process has established an *in personam* relationship between the debtor and the secured creditor, "perfection" is set as an additional prerequisite for publicizing information and for establishing the *in rem* relationship between the secured creditor and the rest of the world with respect to the encumbered collateral. The *in rem* effect gives the security interest the effectiveness and priority against third parties and competing interests. The failure to do it will render the security ineffective against the third parties and may make the creditor "unsecured". Modern systems integrate the competing claims against the collateral into a single unified first-to-file perfection, publicity and priority system.

³¹⁰ See Fleisig et al. (2006) *Reforming Collateral Laws to Increase Access to Finance*, *supra* note 292 at 30-42.

³¹¹ Plenty of literature has worked on identifying the efficiency benefits of full priority. Barry E. Adler, "An Equity-Agency Solution to the Bankruptcy Puzzle," *The Journal of Legal Studies* 22, no. 1 (1993): 73-98; David Gray Carlson, "On the Efficiency of Secured Lending," *Virginia Law Review* 80, no. 8 (1994): 2179-2213.

3.5.1 Registration Schemes for Perfection and Publicity

The economic rationale underlying the establishment of **priority order** based on the **perfection process** is to encourage secured creditors to **publicize** information about their existing encumbrances on a given debtor's collateral.³¹² For intangible assets, perfection is usually done by registration in a designed registry. The same registry usually does publicity and offers a search service for third parties as well. The records kept by the registry not only help the parties avoid fraudulent conveyances or transfer, but also reduce the information cost for other parties (e.g. the other creditors of the debtor, prospective buyers and other third parties) to find out the existing encumbrances over the collateral. Having knowledge about the existing encumbrances over collateral and the priority order of other competing interests would allow potential subsequent creditors to accurately assess their risks, and then to adjust the lending terms accordingly.

To reduce the unnecessary transaction costs, uncertainties, and delay caused by the multiplicity of registries on perfection, publication and search, modern secured transaction laws have the following typical characteristics:

- the submission of a simple financing statement with very limited information, just including the debtor, the credit, and the underlying collateral asset, is considered to be sufficient to put third parties on notice of the existing security interest on a given debtor's collateral³¹³ (“notice-based” filing);
- assigning priority by the time of filing in the designated registry (“first-to-file priority rule”);
- the filings and searching are indexed against the debtor (“debtor-indexed”);
- a general and centralized/well-linked secured transaction registry/filing archive for all kinds of secured transaction and all assets;
- allowing a blanket registration for a whole business collateralization (“general description”);
- providing a comprehensive set of priority rules covering all secured transactions, mainly dealing with the conflicts between multiple secured or unsecured creditors;
- permitting an automatic continuation of security interests in any identifiable proceeds of the disposition of encumbered collateral.

³¹² See Steven L. Harris and Charles W. Jr. Mooney, “A Property-Based Theory of Security Interests: Taking Debtors’ Choices Seriously,” *Virginia Law Review* 80 (1994): 2021–2072 at 2053-2066 (explaining the reasons to require perfection and to establish the public notice system).

³¹³ Once the official filing is available for checking by the public at the registry, a third person is “presumed” to have received information about the security interest or is reasonably expected to know about it.

However, both questionnaires of the International Association for the Protection of Intellectual Property (AIPPI) in 2006³¹⁴ and of the WIPO in 2009³¹⁵ show that in respondent States where IP-specific registries do exist the security interests in IP are also generally required to be registered with them as well. The majority of respondent States even require the security interests in IP to become effective against third parties only after the registrations in IP-specific registries.³¹⁶

Registered IP such as patents and trademarks, usually have a deep root with registration of ownership and interests therein.³¹⁷ A specialized IP registration system usually has its own rules and plays a “right conferring” role, which is significantly different from the “notification-only” role found in the general security interests registry. For example, IP registrations usually require:

- the submission of underlying security agreements or other documents which prove the validity of the IP to be encumbered (“documentation-based” filing);
- the filings and searching are indexed against the collateral (“property-indexed”);
- a specific description of the IP to be encumbered, which makes it impossible to register security interests in a future IP (“asset-specific”);
- certain scrutiny of the documents provided to ensure the content and validity of underlying IP;
- improved versions, updates or derivatives of works may constitute new IP, instead of being treated as proceeds.

The economic rationale underlying such a specialized property or ownership-based system comes from the “public goods” nature of IP and the special way of IP exploitation. Since these rights are not tangibly perceivable or economically

³¹⁴ See Duran, “Question 190, Guidelines for National and Regional Group Reports.”

³¹⁵ According to the response to Question 4 (Can security interests in IP be recorded on a register in your country, whether an IP-specific register or other register), among the 66 respondent States, 45 accept the registration of security interests in IP in an IP-specific registry, 20 accept in other registry and 9 provide no registry. See WIPO, “WIPO Questionnaire on Security Interests in Intellectual Property.”

³¹⁶ See Brennan (2001) “Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version),” *supra note* 302 at 370-376 (summarizing the findings in the various international review reports and divides the effects of registration in IP-specific registers into three classes: (1) the registration in IP-specific registers is required to make the security assignment to be valid between the parties; (2) the registration in IP-specific registers is required to make the security assignment to be effective against third parties who take in good faith and without notice; (3) in some countries, security interests in IP have to be registered in the general public registers.)

³¹⁷ See Brennan (2001) “Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version),” *supra note* 302 at 373 and 375 (showing that almost every country requires a filing for a patent security interest). This requirement is also formalized in Article 14 (registration of security interest) in the Patent Law Treaty issued by the WIPO.

rival/exclusive in nature, the property-indexed system is created for defining the scope of rights, keeping track of the transfers of ownership of IP, and notifying any potential exploiters of IP (assignee, transferee, licensee, etc.) about the current statement of the IP. IP registries usually also ask for a specific description of the scope of the rights. And IP licensing, as the main way of IP exploitation, requires a clear record of the “chain of title” to ensure that the innovators can keep control over the use of licensees and keep track over remote sub-licensees. In essence, IP is exploited more like real property (or immovable property in the concept of civil law).³¹⁸ IP registries therefore usually ask for a clear record of change of title, licenses, and any changes of rights over IP. As a result, using the encumbered IP as the index of filing and searching matches commercial practice.

So there is a problem of dealing with the relationship between the two different registry systems. For unregistered IP, such as copyright and trade secrets, the absence of a specialized registry may avoid many possible conflicts in the coordination of rules, but may also have to deal with gaps if a registration at the general security interests registry is not allowed.³¹⁹ For registered IP like patents and trademarks, there is a problem of dealing with multiple registries, one is the notice-based general registry system and the other one is the documentation-based IP-specific registry system.

The existence of multiple registries leads to several problems for IP collateralization. First, it brings additional legal costs of navigating among different registries to find out where and how to properly give notice of the security interests. Second, it causes confusion or conflicts about the priority order of multiple registrations at different registries. It may result in dual registrations and bring uncertainty to the third-party effectiveness and the priority order of security interests (as discussed below in Section 4.3.3.1 about American law). Third, the title-based schemes of IP registers may focus on documenting the conferral of rights and the transfers of ownership of IP but cannot effectively reflect and accommodate security interest in IP, which is only an encumbrance on IP. The property-indexed IP registration system makes it impossible to have a whole business collateralization, create floating security interests, or use

³¹⁸ See Brennan (2001) “Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version),” *supra* note 302 at 317,

³¹⁹ It is noted that unregistered copyright has already been effectively employed as collateral in various jurisdictions. Many jurisdictions also provide specific registry for the voluntary registration of transactions or interests regarding copyright. See also Brennan (2001) “Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version),” *supra* note 302 at 373 (showing that almost half of the reviewed States require a filing for a copyright security interest).

future (after-acquired) assets as collateral, which are crucial benefits of the modern secured transaction legal regime and very important as to the endless progression and improvement feature of works protected by IP (see in discussion on the creation of security interests in the future IP in Section 3.4.2.3). Given these problems caused by legal disparities, how to solve these problems is one of the most serious legal barriers that the legal regime for IP collateralization has to face.

3.5.2 Priority

The essence of security interests is that the secured creditor should be vested with the “priority” to receive the preferential payments from the proceeds of disposition of the encumbered collateral in preference to competing claimants, as being paid off the secured debt. The “competing claimants” refers to all parties who also have interests in the same encumbered collateral, including another secured creditor with a security interest in the same collateral, an outright assignee, licensee, judgement creditor of the encumbered collateral, and an insolvency representative in the insolvency of the grantor/debtor. With the priority against competing claimants, the secured creditor is guaranteed to receive adequate repayment in the event of the debtor’s default (or at least have some recovery, so the overall lending risk is lower).³²⁰ The position of a secured creditor in the queue of all competing claims directly determines how much the secured creditor can recover upon the debtor’s default. The priority rule is therefore required to provide a “fair and just ordering” of “competing claims against the secured assets”.³²¹

It is worth noting that, most IP experts might be more familiar with another concept of “right of priority”, given under the Paris Convention for the Protection of Industrial Property (Paris Convention) for applicants seeking protection over their invention, utility model, mark or industrial design in several countries.³²² With the “right of priority”, on the basis of a regular first application filed in one of the Contracting States of the Paris Convention, the applicant may, within a certain period of time (12 months for patents and utility models; 6 months for industrial designs and marks), apply for protection in any of the other Contracting States. These subsequent

³²⁰ See Alan Schwartz, “Security Interests and Bankruptcy Priorities: A Review of Current Theories,” *The Journal of Legal Studies* 10, no. 1 (1981): 1–37.

³²¹ See Williams et al. (2010) “*Secured Finance Law in China and Hong Kong*”, *supra note* 264 at 13.

³²² Article 4, Paris Convention for the Protection of Industrial Property (1979).

applications will be regarded as if they had been filed on the same day as the first application and hence have priority over applications filed by others during the said period of time for the same invention, utility model, mark or industrial design. The “right of priority” given under the Paris Convention is for determining the effective date of filing and gives the applicants a 6-12 months grace period in making applications in several countries. It is totally different from the “priority” we discussed in this dissertation, which refers to the priority of the secured creditor against competing claimants in receiving payments from the proceeds of disposition of the encumbered collateral”. This is an example of what was discussed in Section 2.3.2.1 C that – a successful IP collateralization requires cooperation between experts in the field of secured financing and IP law and depends upon ‘cultural exchange’ and ‘bilingualism’.

Usually, the priority order among the conflicting security interests is easy to determine with the “first-to-file” rule. However, as stated previously in Section 3.3.2.2, the main way of IP exploitation, i.e., IP licensing, brings more third parties (especially the prior or subsequent licensor or licensee of the grantor) involved. How to balance the interests of the secured creditors and the third parties is crucial.

Prioritizing the interests of the secured creditors and giving insufficient protection to the interests of the additional third parties may undermine the market incentive for IP licensing. By contrast, giving strong protection to the third parties also undermines the creditor’s incentive to provide loans. Both ways can reduce the total social welfare created from exploiting the monetary value in its IP rights. So, efficient priority rules for IP collateralization need not only to be clear and certain, but also have a proper balance of the interests of all parties directly or indirectly involved. However, usually neither IP laws nor the general secured transaction laws have clear priority rules for dealing with the additional conflicts with the IP licensors and licensees.

Taking into account the discussion in Section 3.3.2.2, at least there should be clear rules for the priority order of competing claims in the following scenarios,

- If there is a dual-registration system, the priority between the security interests registered at the IP-specific registry and that at the general security interests registry;

- In the case where an IP owner (as the borrower/debtor) creates security interests in its **IP itself**, the priority order among the secured creditor's security interests, the IP owner/debtor's royalty income received from the pre-existing and future licensees, and the pre-existing and future licensee's interests;
- In the case where an IP licensee (as the borrower/debtor) creates security interests in the interests in the authorization to exploitation under a license agreement, the priority order among the secured creditor's security interests, the licensor's interests, and the assignee's interests.

3.6 Enforcement

Enforcement arises when the debtor defaults on the repayment of the debt or the performance of contractual obligations. Security interest is a kind of “backup mechanism” upon the debtor's default. It is the capability of extracting the salvage value from the collateral through a disposition of the encumbered collateral that helps lower the creditor's lending risk. So the rules of enforcement are mainly about providing predictable and certain remedies that a secured creditor is entitled to exercise in respect of the collateral upon the debtor's default.

The effectiveness and efficiency of the enforcement process directly determine if the backup plan works or not and, in turn, determine the creditors' ex ante incentive to provide loans at the first place. Meanwhile, enforcement remedies must be tailored to ensure the most effective and efficient enforcement while ensuring appropriate protection of the rights of the debtor and third parties.

As IP laws typically do not provide specific enforcement remedies for IP collateralization, legal conflicts do not arise for the enforcement in IP collateralization. Usually, it is the rules in the general law of secured transactions for all kinds of movables and rights that apply to IP collateralization with some adjustments. Nevertheless, the characteristics of IP may give rise to the needs for some extra protection in the enforcement for IP collateralization, at least in the following two cases.

First, as mentioned above in Section 2.3.2.2 B, the value of a specific IP is very time-sensitive and vulnerable to changes in the market. A delay in enforcement may

result in severe depreciation of the encumbered IP. The depreciation can reduce the creditor's collection of repayment and increase the debtor's remaining payment obligation. As a result, enforcing the security interests in time is important to protect the interests of both the creditor and the debtor. Remedies are needed to allow the creditor to exercise its security interests in a timely manner and some remedies that enable the debtor to take action when the creditor delays in exercising its security interests.

Second, the creditor and the assignee may have the incentive to collude in the disposition of the collateral in order to take advantage of the debtor. They may reach a low foreclosure price and leave the debtor with remaining payment obligations. Collusion can be easy especially in the case of IP collateralization, because of the lack of market price for a specific IP arising from the uniqueness of each IP. The debtor may not even be able to prove the collusion by showing the foreclosure price is unfairly below the market price. As a result, there should be some remedies for the debtor against collusion between the creditor and the assignee in the enforcement.

Third, the enforcement remedies should take into account the fact that the value of IP comes from not only assignment but also license and exploitation. In most cases, the applications by the IP holder or by the competent licensees are the main value source of IP. Sometimes debtors may just have a temporary cash shortage but this might be recoverable or even profitable, because they may still be able to get royalty income from further license or exploitation of the underlying IP. In this case, a compulsory assignment of the underlying IP upon the debtor's default may completely ruin the debtors' business. So, the enforcement remedies should provide some flexibility in allowing the debtor to negotiate with the creditor, in order to avoid forcing debtors that are in temporary cash shortage into bankruptcy. And licensees should be provided with some remedies for claiming or protecting their interests as well.

3.7 Summary of the Effectiveness Criteria

From the above discussion, with the consideration of the special characteristics of IP, the following effectiveness criteria as to the legal framework for IP collateralization are established.

When it comes to the creation of security interests, the most important issue is to see if

the legal rules for IP collateralization are flexible and clear enough to enable innovators to make full use of their IP as collateral in a simple and inexpensive way. The law is expected to

- unify rules for different kinds of IP in order to reduce legal uncertainty;
- set only minimal requirements on creation in order to reduce the transaction cost;
- give broad but clear guidance on the scope of IP eligible for collateralization in order to ensure legal certainty;
- provide the maximum autonomy to parties in order to allow them to control and reduce transaction risks via free negotiation;
- make an appropriate allocation of the pre-default rights and obligations on the exploitation and preservation of the encumbered IP.

In order to provide creditors with a simple, streamlined, comprehensible, expeditious, and inexpensive method for the perfection, publicity and priority of security interests in IP, the law is expected to:

- set clear guidance about where and how to properly give notice of the security interests; and specify, if with multiple registry schemes, the priority of registrations at different registries;
- make it possible to have a whole business collateralization, create floating security interests, or use future (after-acquired) assets as collateral, in the case of IP collateralization.
- give clear priority rules on competing interests, including also those of the additional third parties specifically for IP collateralization, such as the pre-existing and subsequent licensors and licensees.

In order to ensure an effective and efficient enforcement process to safeguard the creditor's interests on the debtor's default and make appropriate protection of the rights of the debtor and third parties, the rules for enforcement are expected to

- provide the creditor with certain, expeditious and inexpensive remedies;
- allow and also ensure that, the creditor exercises its security interests in a timely manner;
- provide remedies for the debtor against collusion between the creditor and the assignee in the enforcement

- provide some remedies for the licensees to claim or protect their interests

The conflicts pointed out in this chapter and the criteria established here establish the basis for the comparative analysis in the following Chapter 4. We will comparatively examine how the laws of China, the US and the UNCITRAL's Supplement address the problems we have identified above and evaluate the effectiveness of the different solutions, mainly from the perspective of risk controlling and transaction cost reduction.

Chapter 4 Comparative Study on the General Legal Framework for IP Collateralization

4.1 Introduction

This chapter adopts the effectiveness criteria established in Chapter 3 to make a comparative law and economics assessment of the secured transaction legal frameworks on IP collateralization in China, the US and the UNCITRAL's Supplement. The comparison aims at answering the following research questions:

- Do the secured transaction legal frameworks on IP collateralization in China, the US and the UNCITRAL function efficiently?
- What changes are needed for improving the efficiency of the current secured transaction legal framework for IP collateralization, especially for China?

There are a number of reasons for making the comparison between China, the US and the UNCITRAL's Supplement.

Chinese law is chosen for three main reasons. First, China has been one of the fastest-developing economies in the world for over two decades and recently has begun to put increasing efforts on enhancing IP protection and on stimulating R&D investments. Both the importance of the economy and the abundant needs for R&D investment justify a detailed review of its laws on IP collateralization. However, no comprehensive review of the secured transaction legal framework for IP collateralization in China has been undertaken. Second, although the legal efforts in recent years have removed some legal obstacles for IP collateralization in China, they constitute a timid patchwork that is incapable of overcoming many inveterate problems or meeting the current financial demands of both IP right-holders and fund providers. One of the main objectives of this comparative study is to help identify the problems and to explore certain guidance for future improvements in the Chinese rules regarding IP collateralization. Third, despite the greater influence of common law systems in recent years, China's legal system still largely follows the continental civilian model. Some problems identified in the Chinese law on IP collateralization may also affect other civil law jurisdictions.

US law is chosen for two main reasons. First, while Article 9 of the Uniform Commercial Code of the United States (UCC-9) heavily influences the modern secured transaction system all over the world. American IP laws are also well known for their high level of IP protection. So the conflicts between secured transaction law and IP law occurring in the US legal regime are more obvious and representative. Second, US law is a typical representative of the common law system. It can be used as an opposite counterpart to compare with the civil law model represented by Chinese law. The discussion and examination of the US rules therefore are mainly for making comparisons and formulating proposals for Chinese rules.

The *UNCITRAL Legislative Guide on Secured Transactions: Supplement on Security Rights in Intellectual Property* (the Supplement) is the first main international document addressing the legal issues on IP collateralization. It reflects some of the recent achievements in the secured transaction law sector and provides plenty of basic principles for modernizing laws for IP collateralization. It is also for the first time that the international community has collectively undertaken efforts on this issue. Having a closer examination of the efforts made by the UNCITRAL can help us have an enhanced understanding of the difficulty in, and underlying principles of, coordinating the secured transaction laws and IP laws. However, the possible effects of the Supplement on IP collateralization in a national context are uncertain and have never been examined. In this case, critically comparing the *Supplement* with the current rules in China and the US can help us to draw a clearer picture of the effects of the recommendations in the *Supplement* in a national context. We can also learn from this comparison to see if the *Supplement* can give direct and clear guidance for the improvement of Chinese rules on IP collateralization.

The chapter is divided into 6 sections. Following the analytic framework and effectiveness criteria established in Chapter 3, the next three sections (Section 4.2, 4.3 and 4.4) show how the conflicts between IP laws and secured transactions are targeted, respectively, in China, the US, and the UNICITRAL's Supplement. Then Section 4.5, by employing the general efficiency criteria established in Chapter 3, provides a comparative examination on the efficiency of the rules. This examination may provide China with certain guidance for future improvements on the rules regarding IP collateralization. It is unrealistic for (and also not the purpose of) this dissertation to discuss all specific legal issues in IP collateralization. The comparative analysis aims to present the main structural legal obstacles and the conceptual framework design.

Some brief general suggestions for the reform of the legal framework for IP collateralization in China are proposed in Section 4.6.

4.2 China

4.2.1 Background: Historical Development of IP Collateralization in China

The historical law and economic scholar Mackaay (2000) argues that the economic evaluation of a specific legal issue or rule cannot be done without looking into the setting of the whole legal framework and then its historical development.³²³ Looking into the historical development can help us better understand how current rules and institutions evolved and facilitate our further analysis into specific rules.³²⁴

In general, the development of Chinese laws and policies on IP collateralization can be divided into three main phases.

4.2.1.1 The First Phase: 1995-2006

The first phase starts from the first legislative acceptance of IP collateralization in China. Only in 1995³²⁵ was IP collateralization for the first time has been explicitly accepted in Chinese law under the *Security Law (Dan Bao Fa)*.³²⁶ IP was featured as a kind of “property rights” and the security interests had to be employed in the way of a “pledge”. So, IP collateralization was governed under the section for the “pledge of rights”.³²⁷ This legislative model has a strong civil law tradition. A similar approach is

³²³ See Mackaay (2000), “History of Law and Economics,” *supra* note 16, at 83-86.

³²⁴ See Ugo A. Mattei, Luisa Antonioli, and Andrea Rossato, “Comparative Law and Economics Law,” *supra* note 28 at 505.

³²⁵ As early as 1986, Art. 89 of the *Chinese General Principles of the Civil Law* has determined that security interests in China could be created in the ways of *personal security* or *real security*. See Article 89, *General Principles of the Civil Law of PRC (中华人民共和国民法通则)*, promulgated on April 12, 1986 and came into force on January 1, 1987, amended on August 27, 2009 (L.). Nevertheless, there was no specific reference to IP collateralization at that time.

³²⁶ *Security Law of PRC (中华人民共和国担保法)*, adopted by NPC on June 30, 1995 and came into force on October 1, 1995 (L.).

³²⁷ Section II Pledge of Rights, Chapter IV Pledge, Security law. This legislative model has a strong civil law tradition.

adopted in other typical civil law countries such as Germany and Japan as well.³²⁸

The *Security Law* includes three provisions, which specifically address IP collateralization on the scope of rights eligible for pledge, the creation of pledge in IP and the effectiveness of the pledge.³²⁹ However, only the three basic types of IP, namely, **trademark, patent and copyright** were explicitly mentioned.³³⁰ The registration of the written security agreement with the “corresponding competent authority” was set as a pre-condition for making the security agreement itself effective between the parties and also for making the security interests in IP become effective against third parties.³³¹ Based on the underlying rationale of civil law that security interests are a kind of real rights (*wu quan*) imposed on the ownership of the collateral, security interests in IP should therefore be registered with the same title-registries of IP for keeping the integrity of the title records. Under the decentralized administrative system of IP in China,³³² the China Trademark Office (CTMO),³³³ the former Patent

³²⁸ Germany follows the traditions of Roman law and Germanic law; the provisions concerning the pledge of rights are incorporated in the *German Civil Code* (*Bürgerliches Gesetzbuch*). The *German Civil Code* generally accepts that all property rights which are independently assignable and vested with monetary value, including IP, shall be able to be subject to the “pledge of rights” (Section 1273-1296). Specific issues regarding the creation of security interests in IP and the method for achieving third-party effectiveness of the security interests in IP are governed under rules of relevant IP laws. Bearing traits of strong influences from German law, the *Japanese Civil Code* follows a similar legislative model as well. It accepts that IP features as intangible property rights and therefore applies the rules for a “pledge of rights” to IP collateralization (Article 362-368). However, the provisions in the *Japanese Civil Code* focus more on the pledge of created claims and none specifically refer to IP. In this case, specific provisions concerning IP collateralization are mainly scattered in IP laws, such as the *Japanese Patent Act* (Article 95 and 96), the *Japanese Trademark Act* (Article 34), the *Japanese Copyright Act* (Article 66), and the *Japanese Design Act* (Article 35).

³²⁹ **Art. 75 [The Rights Eligible for Pledge]** The following rights can be pledged: [...] (3) property rights in exclusive rights to use trademarks, patent rights and copyrights that are assignable according to laws.

Art. 79 [The Creation of Pledge Rights in IP] In the case where property rights in exclusive rights to use trademarks, patent rights and copyrights that are assignable according to laws are pledged, the pledgor and pledgee shall enter into a written pledge contract and register the pledge contract with the corresponding competent authority. The written pledge contract shall enter into effect as from the date of registration.

Art. 80 [The Effectiveness of Pledge Rights in IP] After a right described in Art. 79 is pledged, the pledgor cannot further assign or license the encumbered IP, except for with consent from the pledgee. The subsequent proceeds gained by the pledgor, including assignment fee, license fee, shall be used to pay off the principal obligation in advance, or be held in escrow with a third party appointed by the pledgee.

³³⁰ Article 75 (3), *Security Law*, *ibid*.

³³¹ Article 79, *Security Law*, *ibid*.

³³² See Daniel J. Gervais, “The TRIPS Agreement and the Changing Landscape of International Intellectual Property,” in *Intellectual Property and TRIPS Compliance in China: Chinese and European Perspectives*, ed. Paul Torremans, Hailing Shan, and Johan Erauw (Cheltenham: Edward Elgar, 2007), 65–84.

³³³ See China Trademark Office (CTMO, 中国商标局) is under the direct supervision of the State Administration for Industry and Commerce (SAIC, 国家工商总局) and is responsible for the registration and administration of trademarks. See further information of CTMO at: <http://sbj.saic.gov.cn/english/organization/introduction.asp>.

Office,³³⁴ and the National Copyright Administration (NCAC)³³⁵ were designated as the “corresponding competent authorities” to implement legislative rules for IP collateralization and to administer registration-related affairs for each specific category of IP. Aside from the three specific provisions for IP, other issues regarding IP collateralization such as the scope of secured obligations, the requirements on the pledge contract, the pre-default rights and obligations of parties, the priority rules and the enforcement of pledge were governed by the provisions applicable *mutatis mutandis* to the “pledge of tangible movables”.³³⁶

Within the next two years, for further explanation of the registration requirements and schemes for IP collateralization, the three “corresponding competent authorities” individually promulgated three departmental regulations (*bumen guizhang*).³³⁷

In sum, at this phase, Chinese rules regarding IP collateralization were incorporated in the *Security Law of 1995*, in its judicial interpretation, as well as the three implementing departmental regulations.³³⁸ The three departmental regulations were

³³⁴ By then, the Patent Office (专利局) was the responsible administrative department for the registration and administration of patents. As a consequence of the reshuffle of the State Council in 1998, the Patent Office later became a part of the State Intellectual Property Office (SIPO, 中国知识产权局). SIPO acts directly under the control of the State Council at the vice ministry level and is in overall charge of relevant IP works and specific administration of patents.

³³⁵ The National Copyright Administration (NCAC, 国家版权局) falls within the supervision of the State Administration for Press and Publication (国家出版总局) and is the responsible body for organizing and coordinating the protection of copyrights. See further information of NCAC at: <http://www.ncac.gov.cn/cms/html/205/1800/List-1.html>.

³³⁶ Art. 81, *Security Law* (prescribing “Aside from provisions in this section (Pledge of rights), pledge of rights is also governed by the provisions in Section I (Pledge of movables) of this Chapter.”)

³³⁷ Within the hierarchy of law in China, the rules promulgated by the ministries and commissions under the State Council are “departmental regulations (*bumen guizhang*)”. See Daniel C. K. Chow, *The Legal System of the People's Republic of China in a Nutshell* (St. Paul MN: West Group Publishing, 2009) at 118. The three departmental regulations are: for **copyrights**, the *Measures for the Registration of Copyrights Pledge Contracts* (著作权质押合同登记办法), promulgated by the No.1 Order of NCAC on September 23, 1996 and came into force on September 23, 1996 (D.R.) **Repealed**, see *infra* note 410; for **patents**, *Interim Measures for the Registration of Patent Rights Pledge Contracts* (专利权质押合同登记管理暂行办法), promulgated by the No.8 Order of China Patent Office on September 19, 1996 and came into force on October 1, 1996 (D.R.) **Repealed**, see *infra* note 409; for **trademarks**, *Registration Procedures for the Registration of Pledge of Exclusive Rights to Use Trademarks*, (商标专用权质押登记程序), promulgated by the No.127 Order of SAIC of 1997 on May 6, 1997 and came into force on May 6, 1997. (D.R.) **Repealed**, see *infra* note 408.

³³⁸ *Judicial Interpretation of SPC on Some Issues Regarding the Application of Security Law* (最高人民法院关于适用《中华人民共和国担保法》若干问题的解释) adopted on September 29, 2000 and came into force on December 13, 2000 (J.I.).

the most important legal resources that directly govern the practice of IP collateralization in China at that time.³³⁹

Despite the legislative acceptance and specific implementation rules, during the period from 1995 to 2006, very few IP-based loans were successfully concluded in practice. Taking patent collateralization as an example, by the end of 2006, among the more than 1.73 million patents granted domestically,³⁴⁰ only 323 patent pledge contracts were registered with the State Intellectual Property Office (SIPO).³⁴¹ Among these 323 transactions, insurance companies were the main source for enterprises to obtain funds but most of their loans were quite small.³⁴² By contrast, banks offered relatively larger loans but meanwhile generally required other tangible assets as additional collateral when contracting IP collateralizations.³⁴³ In the majority of these transactions, patents constituted merely a part (up to 40%) of the whole collateral package.³⁴⁴ In other words, IP exerted merely the role as a “credit enhancer” or a “tool of risk diversion” in these transactions. The caution of the financial institutions reflected in these transactions might help in avoiding credit bubbles, but at a disproportionate expense of wasting the great wealth inherent in IP.

In sum, at the first phase, it was extremely difficult for SMEs to get loans by IP collateralization.³⁴⁵

4.2.1.2 The Second Phase: 2007-2009

Faced with the relative reluctance of financial institutions in accepting IP collateralization, many legal changes and policy documents were made by the Central Government to improve the efficiency and attractiveness of IP collateralization from

³³⁹ The three regulated were considered as having positive impacts on the exercise of administrative functions and on the protection of legitimate rights and interests of parties in IP collateralization *Exposure Draft of the Measures for the Registration of a Pledge of Patent Rights*, available at: http://big5.sipo.gov.cn/www/sipo2008/tfs/dtxx/jndt/201005/t20100519_519092.html.

³⁴⁰ Data reference to SIPO, *China Intellectual Property Yearbook 2006 (中国知识产权年鉴 2006)* (Beijing: Knowledge Press (知识出版社), 2007) at 499.

³⁴¹ Data reference to Lu Zhiying(卢志英), “Analysis of the State of Patent Pledge Financing (专利质押融资现状分析),” *Invention & Patent (中国发明与专利)* 6 (2007): 45 at 46.

³⁴² *Ibid.*

³⁴³ *Ibid.*

³⁴⁴ *Ibid* and see also Bu Yuanshi ed., *Chinese Business Law* (Munich: C.H. Beck, 2010) at 348.

³⁴⁵ See Xu Dong (徐栋), “A Study on the Development of Intellectual Property Pledge Loan Home and Abroad (中外知识产权质押贷款发展状况研究),” *Electronic Intellectual Property (电子知识产权)* 8 (2009): 51 at 52.

the end of 2006. During this period from 2006 to 2009, the practice of IP collateralization was experiencing a rapid growth with the stimulus provided by several guidelines and economic policies of both central and local governments.

During this period, the main legal changes were brought about by the enactment of the *Property Law (Wu Quan Fa)*; or translated as “*Real Rights Law*” in some other literature) in March 2007.³⁴⁶ The *Property Law* was developed with technical assistance and detailed recommendations on modernizing the secured transactions law from the International Finance Corporation (IFC) and the World Bank.³⁴⁷ It was considered as “perhaps the single most significant development in the Chinese civil law since the founding of the PRC”.³⁴⁸

For security interests in moveable assets, the *Property Law* has made remarkable improvements, at least in the following matters:³⁴⁹ first, it expanded the scope of movable collateral to movable property of all kinds, tangible and intangible, present and future, by eliminating the enumeration of each specific type of movable assets eligible for collateralization; second, it simplified the formality requirements on the creation of security interests and improved the publicity of registration, by allowing a notice-based registration, eliminating the need to register the security agreement and creating a public online-accessible electronic registry of security interests; third, it encouraged the creation of multiple security interests upon the same collateral and built a more transparent priority scheme, by incorporating more sophisticated priority rules; fourth, it allowed lenders to have contractual arrangements on default events.

³⁴⁶ *Property Law of PRC (中华人民共和国物权法)*, promulgated on March 16, 2007 and came into force on October 1, 2007 (L.).

³⁴⁷ See Research Bureau of the People's Bank of China, (中国人民银行研究局), Foreign Investment, Advisory Services of the World Bank Group (世界银行集团外国投资咨询服务局), and China Project Development Facility of the International Finance Corporation (国际金融公司中国项目开发中心), *Secured Transactions Reform and Credit Market Development in China (中国动产担保物权与信贷市场发展)* (Beijing: China CITIC Press (中信出版社), 2006).

³⁴⁸ See Wang Liming (王利明), “Property Law Is the Cornerstone of the Rule of Law in China (《物权法》是奠定法治大厦的基石),” *Democracy and Legal System (民主与法制)* 5 (2007): 1 at 1.

³⁴⁹ See Investment Advisory Services of the World Bank Group (2010), *Secured Transactions Systems and Collateral Registries*, *supra* note 266 at 104; Song Xiaoming (宋晓明) (the presiding judge of Court 2 of SPC), “Several Important Issues Regarding the Implementation of the Real Security Rights Section of the Property Law (物权法担保物权编实施中的几个重要问题)”, speech at the International Symposium on Real Security Rights in Property Law (物权法担保物权国际研讨会), April 29, 2008 (Judicial Interpretation).

For matters regarding IP collateralization, the *Property Law*, however, did not make much structural reform. IP collateralization was still governed under the section for the “pledge of rights”.³⁵⁰ The *Property Law* included two provisions specifically referring to IP collateralization.³⁵¹ The two rules further clarified some ambiguities existing in the *Security Law* in two main ways: firstly, it extended the subjects of pledge from the three basic types of IP to all kinds of IP (but it limited the “trademark” that can be pledged to the “registered trademark” only);³⁵² secondly, it clarified that a registration is the prerequisite for creating a “pledge right in IP” (against third parties), not for “putting the written pledge contract into effect” (against the debtor).³⁵³ Other than these minor changes, the *Property Law*, just the same as the *Security Law*, dealt with the absence of detailed provisions by allowing the analogical application of provisions regarding the “pledge of movables” with necessary changes.³⁵⁴ For this reason, the aforementioned substantial improvements as to the pledge of tangible movables also provided clearer priority rules, greater party autonomy on pre-default obligations and rights setting to contracting parties, as well as more enforcement remedies for IP collateralization.

However, the problem is that, before 2009, in the absence of corresponding amendments in the three departmental regulations regarding the registration of IP collateralization, the substantive changes in the *Property Law* remained on the books but were barely implemented in the practice of IP collateralization.

Although the legal development was left far behind, the Chinese governments at various levels initiated plenty of active measures to facilitate and promote the development of IP collateralization. From the beginning of 2006, the two most important national guiding policy documents, the *Outline of National Medium- and Long-Term Development Plan on Science and Technology (2006-2020)*³⁵⁵ and the

³⁵⁰ Section II [Pledge of Rights], Chapter XVII [Pledge], Part Four [Real Security Rights], *Property Law*.

³⁵¹ Article 223(5) and Article 227, *Property Law*.

³⁵² See further discussion in Section 4.2.2.2 A.

³⁵³ See further discussion in Section 4.2.2.1.

³⁵⁴ Article 229, *Property Law* (stipulating that “beside the rules under this section, the pledge of rights is also governed under the rules in Section I for the pledge of movables”).

³⁵⁵ Paragraph 5, Section 8, *Outline of National Medium- and Long-Term Development Plan on Science and Technology (2006-2020)* (国家中长期科技发展规划纲要: 2006-2020), promulgated by State Council on February 9, 2006, available at: http://www.gov.cn/jrzq/2006-02/09/content_183787.htm (hereafter “Development Plan 2006-2020”) (setting as one of its primary policies to incentivize the policy banks and commercial institutions to provide preferential credit aids for establishing and improving a sound credit system and necessary supporting financial schemes for IP financing, by utilizing government funds).

*Outline of the National Intellectual Property Strategy*³⁵⁶ have identified promoting the commercial and industrial exploitation of IP as the central Government's concern in the IP sector, with the objective of solving the difficulties of high-tech SMEs in financing. Later, the China Banking Regulatory Commission (CBRC), as the competent administrative department for leading the promotion of IP collateralization in practice,³⁵⁷ also emphasized IP collateralization as a significant way of resolving the current financing problems for SMEs in some important policy documents.³⁵⁸

While these guiding economic stimulus policies have helped IP collateralization gain some public notice, they were still too general and therefore could not be directly applied in practice. To push forward the implementation, in September 2006, the CBRC and the Central Bank of China (CBC) took the lead to convene the National Intellectual Property Pledge Finance Seminar in Xiangtan (Hunan province). More than 180 specialists from both financing and IP sectors, including scholars and professionals from the World Bank, the International Finance Corporation, branches of the People's Bank of China (PBC), the SIPO and its provincial branches, some other commercial banks, guarantee institutions and valuation institutions, were presented at this seminar and actively discussed solutions to expand financing channels for IP collateralization.³⁵⁹ This seminar was labeled as the starting point of the prosperity of

³⁵⁶ Clause 12, *Outline of the National Intellectual Property Strategy* (《知识产权战略纲要》), promulgated by the State Council on June 5, 2008, available at: http://www.gov.cn/english/2008-06/21/content_1023471.htm (hereafter "IP Strategy") (stipulating that the Central Government would actively deploy financial and economic policies to strongly encourage and support the participation of various market entities in the development of financial exploitation of IP and to lead enterprises to use IP collateralization to realize the market value of their IP).

³⁵⁷ According to the unified deployment of the Chinese central government, the China Banking Regulatory Commission (CBRC) is the competent administrative department to draft and implement more detailed directory documents for further implementing the general principles regarding promoting financial innovations in the guiding policy documents. The CBRC is therefore the competent administrative department for promoting IP collateralization.

³⁵⁸ Article 10, *Guiding Opinions of China Banking Regulatory Commission for Commercial Banks to Improve and Strengthen Financial Services to High-Tech Enterprises* (《中国银行业监督管理委员会关于商业银行改善和加强对高新技术企业金融服务的指导意见》, CBRC No. 94 [2006] (explicitly encouraging commercial banks to explore and develop various forms of financial service in order to grant preferential credits to high-tech enterprises, especially by experimenting with the pledge of IP on the high-tech enterprises that own independent IP and have passed the evaluation of state authority); Article 14, *Guiding Opinions on the Banks' Granting of Credits to Small Enterprises* (《中国银行业监督管理委员会关于印发《银行开展小企业授信工作指导意见》的通知》, CBRC No. 53 [2007] (reemphasizing that IP assets should be included in the scope of eligible assets for collateralization in order to relax the loan criteria for small-size enterprises).

³⁵⁹ See SIPO, "Holding of National Intellectual Property Pledge Finance Seminar (全国知识产权质押融资工作研讨会召开)," *SIPO Homepage*, September 28, 2006, available at http://www.sipo.gov.cn/sipo2008/yw/2006/200804/t20080401_352186.html.

IP collateralization in China. Subsequent to the seminar, IP collateralization has suddenly gained strong momentum from the market. In September of the same year, the Industrial and Commercial Bank of China (ICBC) issued its first patent pledged loan in Shanghai.³⁶⁰

The opportunities attracted plenty of specialized market entities such as valuation institutions, insurance companies, law firms and guarantee institutions to participate in IP collateralization. Some of them tried to work together to build some sustainable long-term cooperation business modes. For example, in October 2006, the Beijing Branch of the Bank of Communications, the Jingwei Law Office of Beijing, the Liancheng Assets Appraisal Co., Ltd and the Beijing Zihexin Insurance Ltd. formally signed a four-party agreement to build a united service platform named *Zhanyetong* to carry out a routine finance service concerning IP collateralization.³⁶¹ The cooperation among various specialized market entities allowed each of them bring in its specialty and reduce or share the overall risk altogether. The cooperation helped in easing the financial institutions' skepticism about IP collateralization. The four-party cooperation received good market responses. By the end of August 2008, the Bank of Communications had offered 37 enterprises 44 IP-based loans amounting to RMB 402.75 million, and all of these loans were paid off in due course.³⁶²

In the wake of these efforts, IP collateralization witnessed its growing appearance among local financial institutions in China. Taking the pledge of patents as an example, in the year 2007, the number of registrations of patent-pledged contracts rose up to 324, which was more than the total amount in the previous decade.³⁶³

³⁶⁰ See Huang Ting (黄婷), "The First Pledge of Patent in Shanghai (上海首现专利质押贷款)," available at, <http://finance.sina.com.cn/stock/t/20060919/0514933642.shtml>.

³⁶¹ Only SMEs with total assets of no more than RMB 40 million or annual sales revenue less than RMB 30 million, or SMEs with credit exposures less than RMB 10 million are qualified to apply for loans from this four-party platform. See more information at the website of Bank of Communications Promotion: <http://www.bankcomm.com/jh/cn/newRecommend/zyt.html>; see also Yang Jinxin (杨井鑫), "Patent Pledge Loans Resolve Enterprises out of Finance Dilemma (专利质押贷款破解企业融资难题)," *China Securities Journal* (中国证券报), August 9, 2009, <http://www.bankcomm.com/jh/cn/newRecommend/zyt.html>.

³⁶² See Yangzi (刘阳子) Liu, "Governmental Interest Subsidies Facilitate Enterprises in Zhongguancun Go through Financial by Using Intellectual Property (政府贴息助中关村企业以知识产权渡难关)," *China Intellectual Property News* (中国知识产权报), January 1, 2009, page 3.

³⁶³ Data reference to Lu (2007) at 45-47.

4.2.1.3 The Third Phase: 2009 to the Present

As a matter of fact, the most important result of the Xiangtan Seminar in September 2006 is that the necessity of using government funds to facilitate IP collateralization has been noticed. A centralized policy pilot scheme was consequently launched for further implementing the general economic stimulus policies and for accumulating experiences of different government funding models. For now three groups with 16 pilot regions in total have been chosen for experimenting with different policies, with different main objectives and emphasis.

In December 2008, the first group of six pilot regions was selected for achieving nine main objectives (such as, using mechanisms like interest subsidies and intermediary services to reduce the cost of IP collateralization for SMEs, establishing professional financing service platforms, and promoting cooperation between valuation institutions and banks) within the 2-year duration of the experiment.³⁶⁴ In each pilot region, the local municipal SIPO was chosen as the competent organization for directing and monitoring the policy experimentation. The central government, especially the CBRC and the SIPO, would provide certain preferential credits or professional support for these local policy experiments but would not impose or even propose any specific suggestions. After taking their local conditions into consideration, local governments were encouraged to freely try various innovative models for cooperation to utilize government funds, accompanied by preferential policies, to spur IP collateralization. During the pilot period, basically all local governments of the pilot regions have promulgated local regulations to provide more specific rules for their local experiments. A work mechanism named “government policy guidance, enterprises participation, market operation” was established. These pilot efforts have achieved fruitful results.³⁶⁵

³⁶⁴ The six pilot regions are: the Haidian District of Beijing, Changchun, Nanchang, Xiangtan, the Nanhan District of Foshan and the Ningxia Hui Autonomous Region. See SIPO, “China Nailed Down the First Group of Pilot Organizations for Probing IP Pledge Financing (我国确定首批知识产权质押融资试点单位),” *SIPO Homepage*, December 12, 2008, available at http://www.sipo.gov.cn/sipo2008/zlgl/scgl/zcpj/zyrzd/200910/t20091028_478992.html.

³⁶⁵ For example, in Xiangtan, during the short 2-year period of experiment from the start of the pilot project in December 2008 to the end of December of 2010, the whole city had offered *pure IP-based loans* with the amount of more than RMB 58.25 million to ten SMEs; and *loans with IP as additional collateral* with the amount of RMB 204.5 million. See SIPO, “Xiangtan of Hunan Province Has Passed Through the Examination of SIPO on Pilot Works in IP Pledge Financing (湖南湘潭通过全国知识产权质押融资试点工作验收),” *SIPO Homepage*, February 28, 2011, available at

In September 2009, when the first pilot group was still at the trial, another six cities were chosen for the second pilot group.³⁶⁶ While the central government did not change its position of giving local government full competences on experimenting new policies, it re-emphasized that the pilot regions should be based on the development level of local SMEs and the actual needs for IP collateralization, find more innovative workable mechanisms and explore financial models, gradually establish scientific and reasonable risk-sharing mechanisms, take efforts to solve the financial difficulties for SMEs, and promote the effective integration of technological innovations and financial innovations.³⁶⁷ The SIPO promised to not only provide pilot regions with great support regarding policy guidance, strategic research, staff training and problem solving; but also organize conferences for information and experience sharing.³⁶⁸ The main change in the second stage experimentation is the geographic spread. Compared to those regions in the first group, the six regions chosen in the second group were relatively better developed and with more obvious regional advantages in both high-tech and finance development. All the six new pilot regions have gathered a large number of innovative high-tech SMEs, formed well-founded IP protection systems, and established sophisticated finance and market mechanisms. The SMEs in these regions also have greater enthusiasm for IP collateralization.

Later, in July 2010, the third group of pilot regions was selected. This time only four

http://www.sipo.gov.cn/sipo2008/dtxx/gn/2011/201102/t20110228_582253.html. This prosperity was not limited to Xiangtan but actually dispersed nationwide. Within the national scope, to the end of September 2010, 24 commercial banks and 16 guarantee agencies had already registered a total of around 2000 patent-based loans with SIPO, involving an amount of up to RMB 25 billion. See SIPO, "China Has Achieved a Remarkable Result in IP Pledge Financing with the Amount of 25 Billion (专利权质押融资工作成效显著 全国融资近 250 亿元)," *SIPO Homepage*, September 30, 2010, available at: http://www.sipo.gov.cn/sipo2008/yw/2010/201009/t20100926_539318.html. Among these transactions, RMB 7.46 billion were concluded within 2009 alone, see Planning and Development Department of SIPO (国家知识产权局规划发展司), "Patent Statistics Bulletin (专利统计简报) No.12 of 2010 (88)," May 20, 2010, available at <http://www.sipo.gov.cn/sipo2008/ghfzs/zltjtb/201005/P020100524341390757138.pdf>.

³⁶⁶ The six regions included in the second pilot group are: Chengdu, Guangzhou, Dongguan, Yichang, Wuxi and Wenzhou. See SIPO, "SIPO Launched A New Round of IP Pledge Financing Pilots (国家知识产权局启动新一轮知识产权质押融资试点)," *SIPO Homepage*, September 18, 2009, available at: http://www.sipo.gov.cn/sipo2008/yw/2009/200909/t20090916_475619.html.

³⁶⁷ *Ibid.*

³⁶⁸ *Ibid.* Three years after the initiation of the official policy experiment pilot project, in June 2011, the SIPO convened a special seminar for sharing the experience collected in the trials among its branches at the local level, representatives of financial institutions with IP collateralization business and academic scholars. See SIPO, "The Seminar on Intellectual Property Investment and Financing Service Is Held in Beijing (知识产权投融资服务专题研修班在京举办)," *SIPO Homepage*, May 18, 2011, available at: http://www.sipo.gov.cn/ztzl/ndcs/zgzlz/5thpatentweek/pw005zyrz/201111/t20111107_628778.html.

regions were chosen.³⁶⁹ After having taken into account the experience from previous policy trials, “strengthening the cooperation among various regulatory departments in promoting IP collateralization” was emphasized as the key issue in the instruction document for the third stage of the pilot scheme.³⁷⁰ Accordingly, in August 2010, six administrative departments of the State Council, including the Ministry of Finance, the Ministry of Industry and Information Technology (MIIT), the CBRC, the SIPO, the SAIC and the NCAC, jointly released a departmental regulation, i.e., the *Notice on Strengthening the Intellectual Property Pledge Finance and Evaluation Management to Support the Development of Small-and-Medium-sized Enterprises*.³⁷¹ In this notice, the central government required all relevant departments at various levels to collectively improve the supporting policies and management mechanisms to enhance the management of IP valuation and to accelerate the establishment of a concerted mechanism for IP collateralization, with the objective of guiding and facilitating financial institutions to explore business opportunities in relevant fields. With the general guidance from the central government, plenty of methods, such as third-party loan guarantees, government subsidies and specialized lending institutions, have formed part of the experiment in pilot regions for helping local financial institutions to offset the risk of employing IP collateralization.³⁷²

After having taken into account the problems found and the experience accumulated in these pilot schemes, three years after the promulgation of the *Property Law* of 2007 the three competent departments finally released updated departmental regulations to

³⁶⁹ The four regions included in the third pilot group are: Pudong New District of Shanghai, Tianjin, Zhenjiang and Wuhan. See SIPO, “The List of Third Group of Pilot Has Been Determined (知识产权质押融资试点第三批名单确定),” *SIPO Homepage*, July 7, 2010, available at: http://www.sipo.gov.cn/sipo2008/yw/2010/201007/t20100713_525179.html.

³⁷⁰ *Ibid.*

³⁷¹ *Notice on Strengthening the Intellectual Property Pledge Finance and Evaluation Management to Support the Development of Small-and-Medium-sized Enterprises (关于加强知识产权质押融资与评估管理支持中小企业发展的通知)*, Ministry of Finance No.1999 [2010], by Ministry of Finance, MIIT, CBRC, SIPO, SAIC and NCAC, on 20 August, 2010.

³⁷² In a loan guarantee scheme, the banks’ risks in IP collateralization are underwritten by the third-parties. While some third-party guarantees are directly funded by the government, some are given by specialized guarantee institutions which are supported by government funds. In some loan subsidies scheme, subsidies are given to specialized banks or financial institutions directly, or are given in the way of default compensation. See more detailed discussion in Lin Min(林敏), “Comparative Analysis on the Modes Utilized by Chinese Government Funds in Promoting the IP Collateralization (政府资金推进知识产权质押融资的模式比较探析),” *Cadernos de Ciência Jurídica* 14 (2010): 193; Li Xiyi (李希义) and Jiang Xiu (蒋琇), “The Mode to Develop Intellectual Property as Security for Loans by Government (政府支持下的知识产权质押贷款模式及其特征分析),” *Science Technology and Law (科技与法律)* 5 (2009): 8.

keep consistent with the legal changes and the evolved practice.³⁷³ The three departmental regulations largely simplified the registration process, by greatly reducing the respective requirements for the security agreement, as well as the scope and the time of registry scrutiny.³⁷⁴

In the wake of this wave of amendments in departmental implementing regulations, fifteen years after IP collateralization had been incorporated into the general secured transaction laws, some changes were finally introduced to IP laws at the beginning of 2010. Both the two recently revised legal documents, the revised *Copyright Law*³⁷⁵ and the *Detailed Rules for the Implementation of the Patent Law*³⁷⁶ added specific provisions for IP collateralization, stipulating “where the copyright (or patent) is pledged, the pledgor and the pledgee shall handle the registration of pledge at the copyright (or patent) department of the State Council.”³⁷⁷ These changes in IP law show that IP collateralization has been explicitly acknowledged as a routine way of IP exploitation in China.

In 2013, the CBRC, with assistance from the SIPO, released a departmental regulation specifically for providing more clear guidance and regulation over the commercial banks in their operation of IP collateralization, i.e., *Guiding Opinions for Commercial Banks on Operating IP collateralization*.³⁷⁸ In 2015, the SIPO issued the *Opinions on Further Promoting the Financial Services to Intellectual Property*³⁷⁹ for giving more specific policy guidance over IP collateralization, mainly on improving the IP

³⁷³ The new departmental regulations are: *Regulation on the Procedures for the Registration of Pledge Rights in Exclusive Rights to Use Registered Trademarks* (注册商标专用权质押登记程序规定), *infra* note 408; *Measures for the Registration of Pledge of Patent Rights* (专利权质押登记办法), *infra* note 409; *Measures for the Registration of Pledge Rights of Copyright* (著作权质押登记办法), *infra* note 410.

³⁷⁴ See detailed discussion in Section 4.2.2-4.2.4.

³⁷⁵ *Copyright Law of the PRC* (中华人民共和国著作权法), originally adopted on September 7, 1990 and amended twice, respectively, on October 27, 2001 and February 26, 2010 (L.).

³⁷⁶ *Regulation for the Implementation of the Patent Law of the PRC* (中华人民共和国专利法实施条例), originally adopted on December 21, 1992, and amended twice, respectively, on December 28, 2002 and January 9, 2010 (A.R.).

³⁷⁷ Article 26, *Copyright Law of 2010*; Article 14, *Regulation for the Implementation of the Copyright Law of 2010*.

³⁷⁸ *Guiding Opinions for Commercial Banks on Operating IP collateralization* (关于商业银行知识产权质押贷款业务的指导意见), CBRC No.6 [2013]. This document is directly addressed to all the SIPO, Administration for Industry and Commerce (AIC), Copyright Administration at the provincial level, all policy banks, state-owned commercial banks, joint-equity commercial banks, financial assets management companies, postal saving banks, all rural credit cooperatives at the provincial level, and all trust companies, financial companies of enterprise group, financial leasing companies directly regulated under the CBRC.

³⁷⁹ *Opinions on Further Promoting the Financial Services to Intellectual Property* (关于进一步推动知识产权金融服务工作的意见), SIPO No. 21 [2015].

valuation mechanisms, risk-management in IP collateralization and the disposition of IP. Just recently, in August 2016, the SIPO initiated a new demonstration scheme and a new pilot scheme on patent collateralization and patent insurance in 72 selected regions spread over the whole country.³⁸⁰ All these developments mentioned above show that the Chinese Government is making great efforts to encourage both financial institutions and IP owners to exploit actively the financial value inherent in IP.

4.2.1.4 The status quo

A. Enhanced IP protection

For a long time and only until recently, China has been accused as the pirate who was only preaching IP, copying and manufacturing counterfeit products. However, this situation has improved a lot recently. In recent years, China tries to achieve economy transformation by discouraging labor-intensive industries and by promoting capital or technology-intensive industries. Now China has become a leader in innovation and no longer a follower.³⁸¹ In the Global Innovation Index (GII) prepared by Cornell University, the INSEAD and the WIPO, China became a “top 25” innovative economy for the first time in 2015, mainly for the fact that “the country has a particularly high number of R&D-intensive firms among the top global corporate R&D spenders”.³⁸² It is also the first middle-income country having achieved this.

With their stronger performance in the international market, Chinese firms have started to take patent management as a crucial part of their business strategy. They started to take advantage of the international IP protection system to protect their interests. Just taking patents as an example, China has experienced the highest growth rate among

³⁸⁰ The list of “patent collateralization demonstration regions” includes 11 regions such as Guangzhou, Chengdu and Wuxi; the list of “patent insurance demonstration regions” includes 9 regions such as Nanjing, Jinan, Shenzhen; the list of “patent collateralization pilot regions” includes 40 regions such as Qingdao, Shenyang, Changchun; the list of “patent insurance pilot regions” includes 12 regions such as Yantai, Anyang, Foshan. See more information at SIPO, “The Pilot And Demonstration Scheme on Patent Collateralization And Patent Insurance Has Been Initiated (专利权质押融资和专利保险试点示范工作启动),” *SIPO Homepage*, August 26, 2016, available at http://www.sipo.gov.cn/zscqgz/2016/201608/t20160826_1288248.html.

³⁸¹ “China Emerges as World Patent Leader,” *Thomson Reuters*, 2014, available at <http://thomsonreuters.com/en/articles/2014/china-emerges-as-world-patent-leader.html>.

³⁸² See The Global Innovation Index 2016, by Cornell University, the INSEAD and the WIPO, available at: http://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2016.pdf.

the top 10 PCT³⁸³ filing countries since 2010.³⁸⁴ In 2015, China was the fourth largest PCT filer, with 31,031 filled applications.³⁸⁵ Among middle-income countries, the applications were far ahead of its immediate followers, i.e., India with 1,423, Turkey with 1,016 and Brazil with 547.³⁸⁶

Meanwhile, at the domestic level, as IP applications keep increasing with the steady economic growth,³⁸⁷ the enforcement of IP protection in China has been greatly enhanced as well. In 2013, 55,000 IP cases were concluded and more than 59,000 arrests were made; a total of 173 billion RMB worth of goods were seized by authorities.³⁸⁸ For now, all main Chinese websites for streaming or downloading music or movies are with proper authorization from the original copyright holders. To further the improvements, the State Administration of Press, Publication, Radio, Film and Television (SAPPRFT) has recently released a statement aiming to improve standard operations in track registration, copyright authentication and paid use of music products before 2020.

With the increasing awareness of using IP to defend technology and innovation against both domestic and foreign competitors, there has been a corresponding increase in patent litigations. Accordingly, three specialized IP courts were introduced in Beijing, Shanghai and Guangzhou in 2014 to fulfill the increasing demand for IP-related litigations. As of 20 August 2015, within just one year, the three IP courts have already accepted 10,795 IP cases and concluded 4,160 IP cases in total.³⁸⁹ With such positive results, some IP courts might be established in other regions in 2017. These improvements in the enforcement of IP protection provide investors with greater confidence on doing business in China. The 2016 China Business Environment Member

³⁸³ When pursuing patent rights outside their home jurisdictions, patent applicants can choose between two filing routes. One is the Paris route, which has existed since 1883 and enables an applicant who has filed an application in one office of a Paris Convention signatory to file subsequent applications referring to the same priority date directly in the offices of other signatories, subject to certain conditions. The other one is the PCT route, which has been created by the Patent Cooperation Treaty since 1978 and allows applicants to seek patent protection simultaneously in a large number of offices by filing a single “international” PCT application”.

³⁸⁴ WIPO, *Patent Cooperation Treaty Yearly Review 2016 - The International Patent System*, 2016, http://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2016.pdf at 27.

³⁸⁵ *Ibid.*, at 26.

³⁸⁶ *Ibid.*, at 27.

³⁸⁷ See the China’s Statistical Country Profiles on IP applications and economic growth at the homepage of the WIPO at http://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=CN.

³⁸⁸ The data is from the web summary of “The Truth About Intellectual Property Protection in China,” available at <http://internshipschina.com/truth-intellectual-property-protection-china/>.

³⁸⁹ The data is from the homepage of China Court, available at <http://www.chinacourt.org/article/detail/2015/09/id/1703517.shtml>.

Survey by the US-China Business Council (USCBC) shows that, among the most concerned matters for the USCBC members doing business in China, IP enforcement has slipped overall from 2nd place in 2014, to 4th place in 2015, and then to 8th place in 2016.³⁹⁰

With the economic change and the need for stronger IP protection, China started the fourth comprehensive revision to the Patent Law. In April 2015, the SIPO posted the amendments to the Patent Law for public comment.³⁹¹ The amendments are intended to make it easier for patent owners to prosecute infringement cases and to take the IP protection beyond the current international standards and to a higher level.³⁹² In addition, more emphasis will be put on patent commercialization. The amendments are considered to reflect a mindset that believes “a patent's value lies in its commercialization and utilization, rather than protection,” and “commercialization is key for our country to move from a large patent producer to a strong innovation country.”³⁹³

The enhanced IP protection in China allows IP owners to obtain more economic profits from IP. In other words, in the case of being used as collateral, IP is worth more to both the debtor and the creditor. Consequently, the collateralizing value of IP is also increased.

B. Remarkable growth of IP collateralization

With the support from all aforementioned policies, legal changes and governmental funds, the development of IP collateralization in China keeps a good momentum of growth. The data from the SIPO shows that, from 2008, when the first group of six pilot regions was selected for trialing out new stimulus policies, to 2012, the number of registered transactions secured by patents and the total number of patents used as

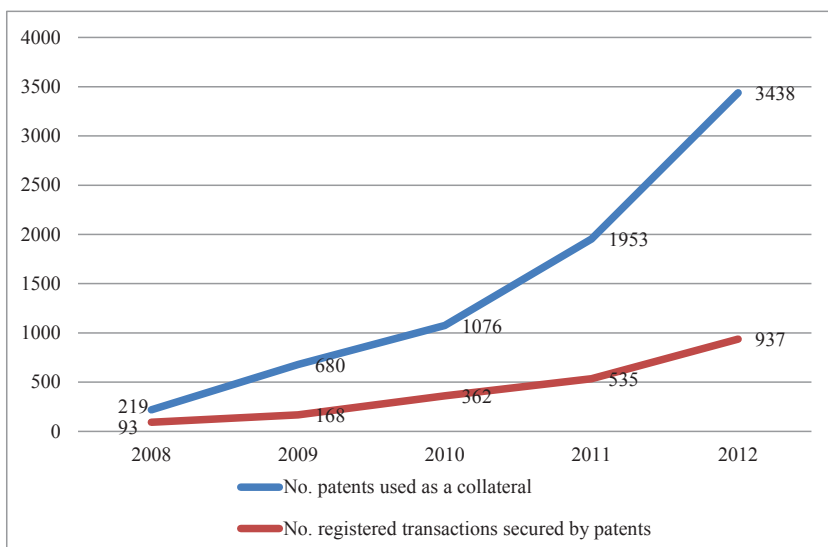
³⁹⁰ See the USCBC 2016 China Business Environment Member Survey, available at <https://www.uschina.org/reports/uscbsc-2016-member-company-survey>.

³⁹¹ See the Draft of Amendments to Patent Law for Public Comment at the homepage of the SIPO, http://www.sipo.gov.cn/tz/gz/201504/t20150401_1095939.html.

³⁹² See the drafters' explanations on the purpose of the comprehensive revision to the Patent Law in SIPO, “[Legislation Q&A] The Fourth Comprehensive Revision of the Patent Law (【立法问答】专利法第四次全面修改),” *Homepage of SIPO*, 2015, http://www.sipo.gov.cn/tztz/ywzt/zlfjqssxzdsxg/xylzlfxg/201504/t20150424_1107544.html.

³⁹³ See Wang Xin, “New Draft Patent Law Released,” *China Daily*, April 22, 2015, available at http://www.chinadaily.com.cn/cndy/2015-04/22/content_20502602.htm.

collateral has kept a high level of growth for 5 continuous years.³⁹⁴



Graph 4.1 Number of patents used as collateral versus transactions secured by patents

From 2008 to 2012, the average annual growth rate of the total number of registered transactions secured by patents is 77.63%, while for the total number of patents being used as collateral it is 98.71% and for the total transaction value it is 78.8%. In total, 2073 transactions backed by 7326 patents with a total value of RMB 38.57 billion (approximately US\$5.6 billion) have been successfully concluded.³⁹⁵ The growth trend continued in the following years with an even more remarkably increasing rate. In 2013 alone, the total amount of loans secured by patents reached RMB 25.4 billion (approximately US\$3.7 billion), while for 2014 it was RMB 48.9 billion

³⁹⁴ The data is collected and analyzed by the SIPO, available at http://www.sipo.gov.cn/ztzl/ywzt/zlzydjyxkba/xxcl/201401/t20140125_901043.html.

³⁹⁵ The data is from the report on the homepage of SIPO, see SIPO, “In 2012 the Total Amount of Funds Backed by Patent Collateralization Has Reached RMB 10 Billion For the First Time (2012 年全国知识产权质押融资金额首破百亿),” *SIPO Homepage*, January 22, 2013, available at http://www.sipo.gov.cn/zscqgz/2012/201310/t20131023_841144.html. For more specific data for 2009, see the Planning and Development Department of SIPO (国家知识产权局规划发展司), “Patent Statistics Bulletin (专利统计简报) No.12 of 2010 (88),” May 20, 2010, available at <http://www.sipo.gov.cn/sipo2008/ghfzs/zltjbb/201005/P020100524341390757138.pdf>; for specific data for 2010, see Planning and Development Department of SIPO (国家知识产权局规划发展司), “Patent Statistics Bulletin (专利统计简报) No.9 of 2011 (108)” (2011), <http://www.sipo.gov.cn/tjxx/zltjbb/201509/P020150911515200284498.pdf>. After 2010, the SIPO stops issuing specific report on pledge of patents.

(approximately US\$7.1 billion) and for 2015 it was RMB 56 billion (approximately US\$8.1 billion).³⁹⁶ The SIPO and the State Council set aspirational but also feasible goals that, by 2020, IP collateralization should become more routine and in a larger scale, the annual amount of loans secured by patents should reach RMB 100 billion (approximately US\$14.5 billion) and for all loans secured by IP should reach RMB 180 billion (approximately US\$26 billion).³⁹⁷

In 2015 alone, a total loan amount of RMB 56 billion (approximately US\$8.1 billion) secured by patents have been given to more than 2000 firms.³⁹⁸ The SIPO ran a sample survey over 20 funded firms at the end of the year. The survey shows that in 2015 the 20 firms together had achieved additional sales of RMB 3.77 billion (approximately US\$540 million), and additional profit of RMB 320 million (approximately US\$46.2 million).³⁹⁹ The additional sales and profit indicate the tremendous economic value created by IP collateralization.

C. Geographically unbalanced utilization of IP collateralization

The SIPO reveals the top 10 provinces in the total amount of loans secured by patents and the top 10 provinces in the number of projects funded by using patents as collateral for the year of 2015.⁴⁰⁰ When we locate all the provinces in the maps below, we can see a significant geographic imbalance. While most IP collateralizations happen along the eastern coast, much fewer cases happen in Central or Western China.

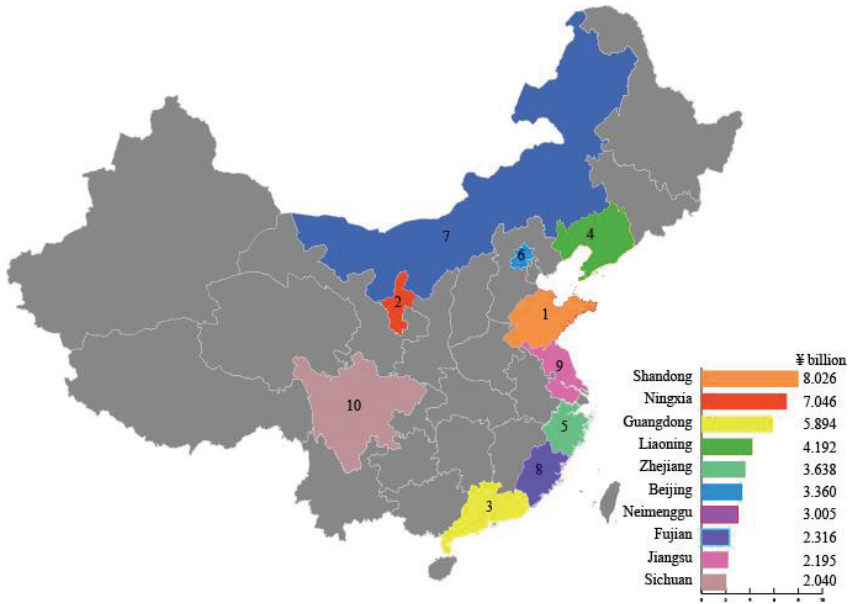
³⁹⁶ The data about 2013 and 2014 is collected from news report, available at: <http://www.hfiplaw.cn/?p=2652> (2015-03-09); the data about 2015 is collected from news report, available at: <http://www.nipso.cn/onews.asp?id=30163> (2016-01-19).

³⁹⁷ The SIPO sets goals in the *Opinions on Further Promoting the Financial Services to Intellectual Property* that, *supra note* 379 that the annual amount of loans secured by patents shall reach RMB 100 billion and IP collateralization shall become more routine and scale-up. The State Council sets goals in the *Action Plan on Further Implementation of National Intellectual Property Strategy (2014-2020)*, State Council No.64 [2014], that the annual amount of loans secured by IP shall reach RMB 68.75 billion in 2013, RMB 75 billion in 2015 and RMB 180 billion in 2020.

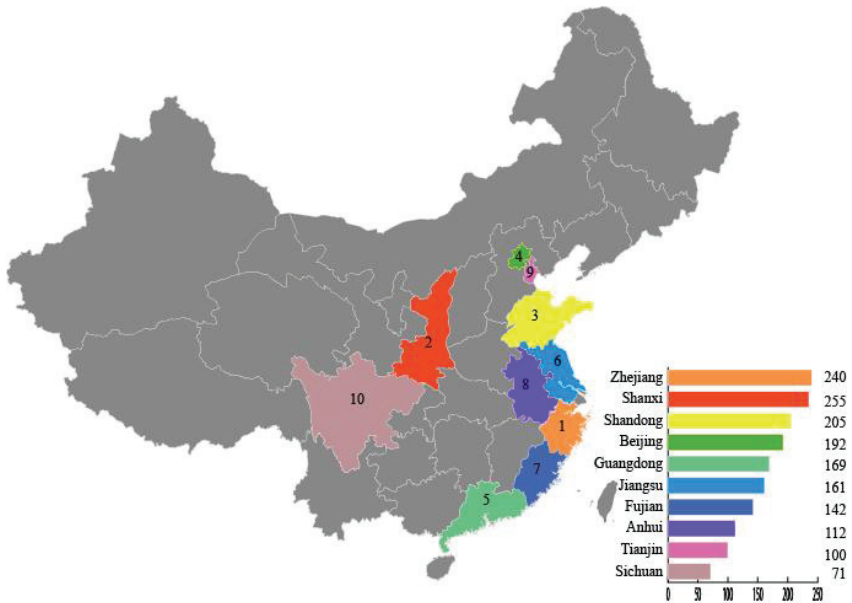
³⁹⁸ The data is collected at the website of the SIPO, *see* SIPO, “The Total Amount of Loans Secured by Patents in 2015 Exceeded 56 Billion Yuan (2015 年专利权质押融资金额突破 560 亿元),” 2016-01-28, available at http://www.sipo.gov.cn/zscqgz/2016/201601/t20160128_1234421.html.

³⁹⁹ *Ibid.*

⁴⁰⁰ *See* the data in SIPO (2016), “The Total Amount of Loans Secured by Patents in 2015 Exceeded 56 Billion Yuan (2015 年专利权质押融资金额突破 560 亿元),” *supra note* 398.



Graph 4.2 Top 10 provinces in the total amount of loans secured by patents in 2015



Graph 4.3 Top 10 provinces in the number of projects funded with loans secured by patents in 2015

D. Under-utilization of IP collateralization

Notwithstanding the spectacular growth in recent years, the practice of IP collateralization in China is still below expectation. Even with the supporting policies from the government, the banks still put risk-control the first and focus on the repayment capacity of IP mainly.⁴⁰¹ Almost all the banks that accept IP collateralization for SMEs keep their line of credit (LOC, i.e., the maximum loan balance that the lender permits the borrower to access or maintain) at a very low level. For example, in a bank's internal Practice Guidance for IP collateralization, it explicates that the maximum LOC for innovation patents is 30% of the valuation, while 15% for utility mode patents, 30% for copyrights, 30% for "famous trademarks recognized by the SAIC" and 20% for other registered trademarks; and the pledge term shall be no more than 1 year in the usual case.⁴⁰² The low LOC greatly increase the cost of IP collateralization for borrowers.⁴⁰³

A survey was done by the SIPO in 2015 on the factors impeding individuals from profiting from technological creations. While 46.5% of the respondent firms reply "it takes too long from getting patents from the technologic outputs to actually producing the patented products can be sold in the market", 45.3% of the respondent firms reply that the "lack of effective funding channels to support the financial needs for the follow-up production" is still the main factor "obstructing enterprises from making profits from technological innovations".⁴⁰⁴ The data in 2012 shows that, only 3438 out of the total 3508561 patents in force, a percentage of less than 0.1%, have been used as collateral.⁴⁰⁵ Such a low percentage shows a clear under-utilization of IP collateralization and implies a serious waste of economic value in IP.

⁴⁰¹ See Zhou Yi, "We Promote Market-Driven IP Pledge Financing Mode"—An Interview with Liu Zhengang, Director of the Beijing IP Office," *China Intellectual Property Magazine*, May 5, 2010, available at <http://www.chinaipmagazine.com/en/journal-show.asp?id=568> (explaining that, in most cases, the IP holders are reluctant to use their IP for loans due to concerns about costs of IP collateralization, and financial institutions are not willing to accept IP as collateral because of concerns about risks related to IP collateralization).

⁴⁰² Note: for confidentiality reasons, the author is prohibited from directly revealing the inner information source.

⁴⁰³ Reading together with the Section 2.4.1.1.

⁴⁰⁴ SIPO, 国家知识产权局规划发展司, 国家知识产权局知识产权发展研究中心, *Survey Report on Chinese Patent Data of 2015 (2015 年中国专利调查数据报告)*, 2016, <http://www.sipo.gov.cn/tjxx/yjcg/201607/P020160701584633098492.pdf> at 16.

⁴⁰⁵ The total number of valid patents in 2012 is from the SIPO's annual patent report of 2012, available at <http://www.sipo.gov.cn/tjxx/jianbao/year2012/c/c1.html>.

E. Summary of the national policies and legal documents on IP collateralization

Many other factors might be accounted as the causes for the limited success in the practical operation of IP collateralization as well, such as, the immaturity of the markets for IP transactions, the absence of effective and reliable IP valuation criteria, the lack of experts in related sectors and the weakness in laws and regulations regarding related issues.⁴⁰⁶ Among these possible obstacles, we take the last one, i.e., the problems in law, as the subject of our further examination below.

All the currently effective legal documents and national policies on IP collateralization in China can be summarized as follows,

⁴⁰⁶ See Li Siqu (黎四奇), “On the Barriers of Pawning Finance of Intellectual Property Right and the Corresponding Solutions (知识产权质押融资的障碍及其克服),” *Retical Exploration (理论探索)* 4 (2008): 139; Yanchao (杨延超) Yang, *No Title* (Beijing: Law Press China (法律出版社), 2008) at 120-122.

Year	Name of document	Status	Applicable rules
1995	Security Law ⁴⁰⁷	Law	Article 75, 79 and 80, and the Section for “pledge of movables”
2007	Property Law	Law	Article 223(5), Article 227, and the Section for “pledge of movables”
2010	Copyright Law (2010 revision)	Law	Article 26
2010	Detailed Rules for the Implementation of the Patent Law (2010 revision)	Departmental Regulation, by the SIPO	Article 14
2009	Regulation on the Procedures for the Registration of Pledge Rights in Exclusive Rights to Use Registered Trademarks ⁴⁰⁸	Departmental Regulation, by the SAIC	Entire regulation
2010	Measures for the Registration of Pledge of Patent Rights ⁴⁰⁹	Departmental Regulation, by the SIPO	Entire regulation
2011	Measures for the Registration of Pledge Rights of Copyrights ⁴¹⁰	Departmental Regulation, by the NCAC	Entire regulation
2006	Outline of National Medium- and Long-Term Development Plan on Science and Technology (2006-2020)	National guiding policy, by the State Council	Paragraph 5 of Section 8
2008	Outline of the National Intellectual Property Strategy	National guiding policy, by the State Council	Clause 12
2006	Guiding Opinions of the China Banking Regulatory Commission for Commercial Banks to Improve and Strengthen Financial Services to High-Tech Enterprises	Implementation policy, by the CBRC	Article 10
2007	Guiding Opinions on the Banks’ Granting of Credits to Small Enterprises	Implementation policy, by the CBRC	Article 14
2010	Notice on Strengthening the Intellectual Property Pledge Finance and Evaluation Management to Support the Development of Small-and Medium-sized Enterprises	Implementation policy, by the Ministry of Finance, the MIIT, the CBRC, the SIPO, the SAIC and the NCAC	Entire regulation
2013	Guiding Opinions for Commercial Banks on Operating IP collateralization	Implementation policy, by the CBRC	Entire regulation
2015	Opinions on Further Promoting the Financial Services to Intellectual Property	Implementation policy, by the SIPO	Entire regulation

⁴⁰⁷ Note: as the *Property Law* of 2007 did not wholly replace or abolish the *Security Law* of 1995, both of them are in force now and the provisions in the *Property Law* prevail in the case of conflicts, see Article 178, *Property Law*.

⁴⁰⁸ *Regulation on the Procedures for the Registration of Pledge Rights in Exclusive Rights to Use Registered Trademarks* (注册商标专用权质押登记程序规定), promulgated by the No.182 SAIC Order of 2009 on January 1, 2009 and came into force on December 1, 2009 (D.R.).

⁴⁰⁹ *Measures for the Registration of Pledge of Patent Rights* (专利权质押登记办法), promulgated by the No. 56 of SIPO Order on August 26, 2010 and came into force on October 1, 2010 (D.R.).

⁴¹⁰ *Measures for the Registration of Pledge Rights of Copyright* (著作权质押登记办法), promulgated by the No. 8 of NCAC Order of 2010 on November 25, 2010 and came into force on January 1, 2011 (D.R.).

It can be seen from the summary that, at the legislative level, China has not yet set up an independent and unified system of rules for IP collateralization. Currently, the rules regarding IP collateralization in China are scattered among various laws, mainly the *Property Law* of 2007, and the three implementing departmental administrative regulations governing the registration of pledge in patents, trademarks and copyrights. The CBRC's *Guiding Opinions for Commercial Banks on Operating IP collateralization* (hereafter "CBRC's Guiding Opinion") is a policy guidance document, not a mandatory legislative document. However, in Chinese practice, it directly guides and regulates the operation of banks and does determine the practical operation as well. Therefore, we will also refer to it when it is relevant in our following analysis.

4.2.2 Creation

4.2.2.1 Transaction structure

Currently, Chinese law allows various security devices, including guarantee (*bao zheng*), charge (*Di ya*), pledge (*zhi ya*), lien (*liu zhi*), mortgage (*rang yu dan bao*), deposit (*ding jin*) and retention of title (*suo you quan bao liu*). Among these security devices, "pledge" is expressly stipulated as the only security device that can be used to create security interests in IP.⁴¹¹ In comparison with the previous *Security Law of 1995*, subjecting all secured transactions in movables to the same security device is also one of the most important improvements in the *Property Law of 2007*. The collateral can be provided by the debtor or a third party, so the pledgor can be different from the debtor. In the following discussion, we mainly discuss the situation where the pledgor is also the debtor.

The current Chinese rules indeed make a distinction between the creation and the perfection of security interests in IP. With a careful comparison of the text of the *Security Law* of 1995 with that of the *Property Law* of 2007, we can find that the

⁴¹¹ In Chinese law, "pledge" is essentially a possession-based security device for tangible movables. The pledgor/debtor transfers the possession of his movables to the pledgee/creditor as a security for debt. If the pledgor/debtor defaults, the pledgee/creditor is entitled to enjoy priority in having his claims satisfied with the proceeds of auction or sale of the pledged collateral. See Art. 208 of the *Property Law*; formerly Art. 63 of the *Security Law*. In the current *Chinese Property Law*, all kinds of movable assets, tangible and intangible, present and future, are governed under a unitary security device the "pledge" and the same rules apply, except for limited exceptions. Art. 223 (5) of the *Property Law* expressly stipulated that "pledge" is the only security device for creating security interests in IP.

subject to registration in the designated public registry has changed from the “pledge contract” to the “pledge right”.

Year	Legal document	Content
1995	Security Law	Art. 79 [...]: The written pledge contract shall enter into effect as from the date of registration.
2007	Property Law	Art. 227 (1): A pledge right [in IP] shall be created upon the registration with the competent authority.

As the *Property Law* changes the expression from “a pledge contract enters into effect” to “a pledge right is created”, it has clarified that the registration is only a pre-requisite for creating the pledge right, which has the *in rem* effect against all the third parties (the third-party effectiveness - perfection purpose), not a statutory requirement for making the pledge contracts effective between the parties anymore.⁴¹² This change of the subject to registration is also reflected at the names of the administrative departmental regulations.⁴¹³

Therefore, in the current law, a formal written pledge contract is sufficient to establish the *in personam* relationship and make the security interest effective between the parties (creation purpose).

4.2.2.2 Scope of IP eligible for collateralization

A. General requirements: property rights in legally assignable IP

For the scope of IP eligible for being collateral, Art. 223 (5) of the *Property Law*

⁴¹² At the first glance, someone may think, under the *Property Law*, registration is still imposed as a prerequisite for the creation of security rights (effective between parties). However, such an initial impression is caused by the divergence in terminologies. In accordance with the traditional “real rights” (*wu quan*) theory in Chinese law, a pledge right is a real right with *in rem* effect against all third parties and permits the secured creditor to be paid out in preference to competing claimants (this is the same as making the security interest effective against third parties). A pledge contract itself establishes a contractual *in personam* relationship between the parties only (this is the same as making the security interest effective between the parties).

⁴¹³ For copyright, the *Measures for the Registration of Copyrights Pledge Contracts* of 1996 is changed into the *Measures for the Registration of Pledge Rights of Copyright* of 2011; for patents, the *Interim Measures for the Registration of Patent Rights Pledge Contracts* of 1996 is changed into *Measures for the Registration of Pledge of Patent Rights* of 2010.

removes the ambiguity in Art. 75 (3) of the *Security Law*,⁴¹⁴ by stipulating as follows,

Art. 223 [The Scope of Rights Eligible for Pledge]

The following rights of which an obligor or a third party has the right to disposition can be pledged:

[...]

(5) Property rights in the exclusive rights to use registered trademarks,⁴¹⁵ patent rights and copyrights and other intellectual property that are assignable according to laws.

Except for restricting “trademarks” to “registered trademarks”, the *Property Law* actually sets only minimal requirements on the eligibility of collateral, namely, property rights in (all kinds of) IP that are legally assignable.⁴¹⁶ It seems that this flexible approach can cover IP to the maximum extent and avoid conflicting with IP laws. Whether a specific property right in an IP can be encumbered as collateral or not will be determined by a combined reading with relevant IP laws to check if such a right is independently assignable.

However, in practice, the lack of coordination among rules makes the determination of the scope of IP eligible for collateralization in China much more complicated. We hereby use the following three examples to demonstrate the complexity: whether the

⁴¹⁴ With regard to the scope of IP eligible for collateralization, Art. 75 (3) of the *Security Law* only mentioned the three basic types of IP, i.e., trademark, patent and copyright. For a long time scholars were unable to reach a consensus on whether other unmentioned types of IP could be encumbered as collateral in the legal regime of China. Some scholars argued that other types of IP may be permitted to be encumbered by reference to “other rights that may be pledged” under Art. 75(4) of the *Security Law*. The great majority of scholars and practitioners, however, tended to favor the opposite position. It is well exemplified by the fact that these un-mentioned types of IP had rarely been encumbered as collateral in secured transactions in practice. See Lv Yu'e (吕玉娥) “Investigation on Legal Issues of Trademark Collateral (探讨商标权质押之相关法律问题),” in *Intellectual Property Rights Strategy and Practice - Third Series (知识产权战略与实务-第3辑)*, ed. Yu Zehui (于泽辉) (Beijing: Law Press-China 中国法律出版社, 2008), at 70.

⁴¹⁵ In Chinese law, a trademark holder is vested with “exclusive right to use a trademark” (*Shang biao zhuan yong quan*). This exclusive right enables the holder to mark the sign “registered trademark” on its goods and related commercial activities, and to exclude others from using a mark that is likely to cause consumer confusions (Article 9 (2), Trademark Law of 2001; and Article 3, Implementing Regulation of Trademark Law). The “exclusive right to use a trademark” is considered as being narrower in scope than the terms of “trademark right” or “exclusive right” used in international treaties or laws in other jurisdictions. See Zheng Chengsi (郑成思), *Intellectual Property Law: Several Research Focuses at the Beginning of the New Century (知识产权法: 新世纪初的若干研究重点)* (Beijing: Law Press (法律出版社), 2004) at 19.

⁴¹⁶ Some scholars argue that there are three preconditions for IP being used as collateral: (1) being property rights; (2) being legally assignable and (3) can be registered with the competent authority. See, e.g., Wang Chun (王春), “Several Issues on Pledge on Trademark Rights (商标权质押若干问题),” *China Trademark (中华商标)* 2 (2006): 55 at 55. This argument actually confuses the preconditions of creation of the security rights with its practical possibility. The lack of corresponding registry is a problem for the practical implementation but not a legislative precondition for the creation of security interests.

moral rights in copyrights are eligible for collateralization, the treatment of rights under IP license agreements; and the use of future IP as collateral.

a. Moral rights in copyrights

First, as the IP laws are very different from the traditional property law, some legal experts who are specialized in IP law but not so familiar with property law, or the other way around, may not be able to be sure about the assignability of a specific IP right.

We hereby use the discussion on whether the moral rights in copyrights are eligible for collateralization to demonstrate the complexity. Some leading experts in IP law argue that “moral rights are not *chai chan quan* and thus cannot be used as collateral.”⁴¹⁷ And a scholar in secured transaction laws agrees with this argument.⁴¹⁸ Their argument is based on the following two provisions.

Legal document	Content
Copyright Law	Art. 10: An original creator is entitled with both moral rights (<i>ren shen quan</i>) and economic rights (<i>chai chan quan</i>).
Property Law	Art. 223 (5): Property rights (<i>chai chan quan</i>) in [...] copyrights [...] may be pledged.

The argument is actually caused by the confusion of two legal concepts, namely, “moral rights” with “personal rights”. Despite both terms being closely associated with the protected person’s reputation and thus overlapping to some extent in scope, they are terms of different sub-fields of law and hence not identical.

“Moral rights” (from the French *droit moral*) is a term used in the IP laws, as opposed to the term of “economic rights” (*Chai chan quan* in Chinese). Standing in the tradition inherited from the French dualistic model, the Chinese *Copyright Law* distinguishes moral rights (including the rights to publication, authorship, alteration and integrity) from economic rights (including the rights to reproduction, distribution, lease, exhibition, performance, projection, broadcasting, information network

⁴¹⁷ See Wu Handong(吴汉东) et al., *Study on the Legal Regimes of Copyright in Several Western Countries (西方诸国著作权制度研究)* (Beijing: China University of Political Science and Law, 1998) at 218;

⁴¹⁸ See Fei Anling (费安玲) Fei, *Comparative Security Law: Take Security Laws in Germany, France, Switzerland, Italy and China as Study Objects (比较担保法-以德国、法国、瑞士、意大利、英国和中国担保法为研究对象)* (Beijing: China University of Political Science and Law, 2004) at 408.

dissemination, production, adaptation, translation, compilation and other related rights).⁴¹⁹ The moral rights are given to an author for keeping the author’s relationship with its work and enabling the author to protect his personal and reputational value upon the work.⁴²⁰ While moral rights in most cases are inalienable, some moral rights, like the right to publication (in works like computer software, diagrams of project design, drawings of product design and maps) can be waived or be assigned by the author in exchange for monetary payment in certain cases.⁴²¹ Those assignable moral rights can be used as collateral.

By contrast, “personal rights” is a term used in the general property law, as opposed to the term of “property rights” (*chai chan quan* in Chinese). It refers to rights that a person has over its own body or reputation, which are absolutely inalienable from the protected person.⁴²² Of course, a personal right cannot be used as collateral.

Their relationships and difference can be shown as follows:

IP law	Moral rights (some are assignable)	Economic rights (<i>chai chan quan</i>)
Property law	Personal rights (non-assignable)	Property rights (<i>chai chan quan</i>)

However, as both the term “economic rights” in IP law and the term “property rights” in the general property law are expressed as “*chai chan quan*” in Chinese, legal experts specialized in one legal field only may not be able to appreciate the distinction.

⁴¹⁹ The economic rights in a copyrighted work are explicitly assignable (by license or assignment) in part or as a whole. See Article 10, Copyright Law of 2010.

⁴²⁰ Article 6 bis, *Berne Convention for the Protection of Literary and Artistic Works*; Article 5, *World Performers and Phonograms Treaty (WPPT)*.

⁴²¹ The current *Chinese Copyright Law* just prescribes that the economic rights of a copyright are permitted to be authorized or be wholly or partly assigned by the copyright holder to others, without specifying whether these moral rights are assignable or not. It is generally agreed that moral rights in most works are inalienable. The limitation on the assignability of moral rights mainly aims at protecting the authors’ reputations and avoiding the disruption of social orders. However, as to works like computer software and graphic works (such as diagrams of project design, drawings of product design, maps and sketches as well as works of their model), the focus of copyright protection is on their commercial utility. For these works, the assignment of moral rights would not adversely affect the public interest and therefore are allowed in China in certain cases, See Article 8, Regulation on the Protection of Computer Software; Article 16(2), Copyright Law of 2010. Some scholars also argue that the right to publication in all kinds of works are assignable and therefore can be used as collateral. See Che Hui (车辉) and Li Min (李敏), *On New Issues in the Legal Regime of Secured Transactions (担保法律制度新问题研究)* (Beijing: Law Press China (法律出版社), 2005) at 184.

⁴²² See Sam Ricketson and Jane Ginsburg, *International Copyright and Neighbouring Rights: The Berne Convention and Beyond (Volumn 1)*, 2nd Editio (Oxford University Press, 2006) at para 10.01.

When they mistakenly equate “economic rights” in IP law with the “property rights” in property law, they may equate their counterparts, namely, the moral rights and personal rights. The misconception can lead to a jump to the flawed conclusion that “moral rights are not property rights and thus cannot be used as collateral”.

This misconception shows that a combined reading of IP law and secured transaction law (or the general property law) is much more complicated than it looks and can give rise to lots of legal uncertainty.

b. Trademarks

Second, sometimes IP laws impose additional requirements for the assignment. In China, registered trademarks can be dissociated from the related business or goodwill attached to it and therefore can be used as collateral. However, any assignment of registered trademark must be approved by the Trademark Office.⁴²³ When assigning a registered trademark, the assignor (also the registered owner of the trademark) shall also assign the similar trademarks that he owns on the identical category of commodity, or the identical or similar trademarks on the similar category of commodity, in order to avoid of causing confusions to the public; otherwise, the Trademark Office can refuse to approve the assignment.⁴²⁴ The departmental regulation for the registration of pledge in trademark and CBRC’s Guiding Opinion also stipulate that, when providing loans backed by trademarks, the banks shall require the pledgor to pledge the identical or similar trademarks in identical or similar products or services as well.⁴²⁵

B. Treatment of rights under IP license agreements

The *Chinese Property Law* does not make any distinction between different types of IP, types of debtors, as well as forms of interest. It seems that all rights of IP holders or rights under the IP licenses can be used as collateral. Nevertheless, the conflicts among rules from different documents easily destroy such a harmonious picture.

a. Licensor’s right to royalty payment

In Chinese law, after an IP has been pledged, the pledgor/debtor, who is also the IP

⁴²³ Article 42, Trademark Law (2013).

⁴²⁴ Article 42, Trademark Law (2013).

⁴²⁵ Article 3, Trademark Pledge Regulation of 2009; Article 23, *Guiding Opinions for Commercial Banks on Operating IP collateralization*, *supra* note 378.

holder, cannot assign or license the pledged IP, unless with express consent from the pledgee/secured creditor.⁴²⁶ In the case with the pledgee/secured creditor's consent, the royalties arising from assigning or licensing the pledged IP (post-royalties) are treated as proceeds and therefore are automatically covered by the pledge and should be used to fulfill the principal obligation in advance or be held in escrow with a competent authority.⁴²⁷ The post-royalties cannot be used as independent collateral.

By contrast, in the case where an IP holder/licensor wants to use its right to royalty payment (pre-royalties) as collateral, the pre-royalties shall be considered as account receivables,⁴²⁸ a category of rights different from IP.⁴²⁹ In this case, the rules for the pledge of account receivables instead of those for the pledge of IP should apply. The security interests in pre-royalties should be registered with a separated specific registry for account receivables, not an IP-specific registry. The right to collect receivables is perfected by registration with the Credit Reference Center (a national information system established by the People's Bank).⁴³⁰ It is allowed to create multiple pledges on receivables with the priority order established by the time of registration.⁴³¹

b. Licensee's interests in license

In the *Guiding Opinions for Commercial Banks on Operating IP collateralization*, the CBRC specifically instructs the commercial banks that "in the case where licensees create a pledge, the consent from the original IP holder or the licensor is required."⁴³² This instruction implies that the CBRC, as the state administrative department of the banks, does allow banks to accept licensee's use of interests in license as collateral. However, all of the three departmental registration regulations require that the pledgor

⁴²⁶ Article 227 (2), Property Law.

⁴²⁷ Article 80, Security Law; Article 227 (2), Property Law. See Wang (2006) at 56.

⁴²⁸ The right to collect receivables is newly added in the Property Law as intangible property which can be pledged. See Article 223 (6) and 228, Property Law; Article 4(1), *Measures for the Registration of Pledge of Receivables* (应收账款质押登记办法), promulgated by PBC No. 4 Order [2007] on September 30, 2007 and came into force on October 1, 2007 (D.R.).

⁴²⁹ Article 223 of the Property Law (Scope of Rights Eligible for Pledge), IP is governed under 223 (5) and receivables are governed under 223(6). See also Bu (2010) at 349.

⁴³⁰ Article 2, Measures for the Registration of Pledge of Receivables. The registry for the registration of pledge of receivables is the *Credit Reference Center of the People's Bank of China* (中国人民银行征信中心).

⁴³¹ Article 5, Measures for the Registration of Pledge of Receivables.

⁴³² Article 8, *Guiding Opinions for Commercial Banks on Operating IP collateralization*, *supra* note 378.

in registration should be the “recorded title-holder” of the IP to be pledged.⁴³³ As a licensee cannot be the “recorded title-holder” of an IP in the Chinese law, this registration requirement makes it impossible for a licensee to have a security interests with third-party effectiveness in its interests in the authorization to exploitation, even with express consent from the licensor.⁴³⁴

This prohibition might come from the dogmatic distinctions between the rights in legal theory. In Chinese IP laws, “rights in IP” refers only to rights enjoyed by IP owners, excluding the licensee’s interests in the authorization to exploit IP owned by another party.⁴³⁵ In this case, a licensee’s interests in the authorization to exploit someone else’s IP is deemed as a kind of **contractual claim** created by the license agreement between the licensor and the licensee. Similarly, other contractual rights enjoyed by parties under license agreements are **not** considered as rights in IP either. Meanwhile, in current Chinese law whether a contractual claim can be used as collateral for credit or not is still unclear.⁴³⁶

In summary, although the licensee’s use of an IP license as collateral is allowed under the *Real Rights Law* and by the CBRC, it cannot be done in practice because of the registration rules. In this end, it is practically impossible for IP right holders rather than the IP owners to use their rights in IP to get finance.

C. Future IP

Similarly, the current *Chinese Property Law* accepts the use of future assets as collateral.⁴³⁷ The CBRC also encourages commercial banks to do so. In the *Guiding*

⁴³³ Article 8, *Regulation on the Procedures for the Registration of Pledge Rights in Exclusive Rights to Use Registered Trademarks* of 2009; Article 12 (1), *Measures for the Registration of Pledge of Patent Rights* of 2010; Article 12, *Measures for the Registration of Pledge of Copyright* of 2011.

⁴³⁴ In theory, if the creditor does not want to register its security interest for the third-party effectiveness, there is a legal obstacle to just create security interest in a licensee’s right to exploitation, which is effective between the parties only. But this creation is meaningless for the purpose of security interests.

⁴³⁵ See Zhong Qing (钟青), *On Pledge of Rights (权利质权研究)* (Beijing: Law Press China (北京:法律出版社), 2004) at 259.

⁴³⁶ Some Chinese scholars argue that a general contractual claim can be used as collateral, see e.g. Che and Li (2005), *On New Issues in the Legal Regime of Secured Transactions (担保法律制度新问题研究)*, *supra* note 421 at 193-204.

⁴³⁷ However, some scholars do still think the pledge cannot be created over future or after-acquired property, see, for example, Hu Kaizhong (胡开忠), *Studies on Pledge over Rights (权利质权制度研究)* (Beijing: Chinese University of Politics and Law Press (中国政法大学出版社), 2004) at 152 (arguing that the pledge cannot be created over future or after-acquired property because the nature and extent of future property has not been determined). This thesis does not agree with this opinion. Despite the fact that there is no clear

Opinions for Commercial Banks on Operating IP collateralization, it stipulates that “in the pledge of patents, the commercial banks can require the pledgor to promise to pledge the future improved patents as well; [...] in the pledge of copyrights, the commercial banks can require the pledgor to pledge the existing or future copyrights in the revisions or derivative works as well”.⁴³⁸ However, the departmental registration regulations put a different level of restrictions for different kinds of IP which obstruct the practical applications.

For copyrights, as neither the *Copyright Law* nor the departmental registration regulation has imposed any impediment, the pledge of copyright in future works has been exercised in practice. For example, in May 2008, the Bank of Beijing offered the Beijing Time Co. Ltd a RMB 10 million loan for the production and distribution of the movie “Painted Skin”, with taking the future copyrights of the movie “Painted Skin” (*Hua Pi*) as collateral.⁴³⁹ Some other transactions backed by future copyrights were paid off in due time as well.⁴⁴⁰

However, for patents and trademarks, despite there being no explicit prohibition in *Patent Law* or *Trademark Law*, the departmental registration regulations impose requirements on a specific reference with the registration number of each patent or trademark to be pledged.⁴⁴¹ Such requirements make it impossible to have a security interest with third-party effectiveness in future patents or trademarks (see detailed discussion in Section 4.2.2.3). Therefore, even a bank, by following the guidance from the CBRC, requires the pledgor to make a promise of pledging the future patents over

provision in the *Security Law* or the *Property Law* regarding security interests in future assets, the explicit permissions for two kinds of secured transactions involving future assets or rights, namely, the floating charge in movable property (Article 181 Floating Charge) and the pledge of receivables (Article 223 Subject to Pledge of Rights) can be considered as a kind of implied acceptance of use of future assets for credits. See also Joshua T. Klein, “Recent Legal Changes That Affect Secured Financing in the People’s Republic of China,” *American Bankruptcy Institute Journal* 27, no. 10 (2008): 38 at 39.

⁴³⁸ Article 23, *Guiding Opinions for Commercial Banks on Operating IP collateralization*, *supra* note 378.

⁴³⁹ “The Cultural Creation Loans of Beijing Bank Have No Bad Debts, Painted Skin Paid Back 100 Million on Time (北京银行文化创意贷款没有坏账 《画皮》顺利还贷 1000 万元),” *Beijing Commerce* (北京商报), October 16, 2011, available at <http://www.cmc.gov.cn/cms/a/xinwenzhongxin/chanyexinwen/2011/1016/3685.html>.

⁴⁴⁰ For example, in 2007, one of the largest private entertainment groups in China, the Huayi Brothers Media Corporation, used the future copyrights in TV shows as collateral to get loans from Beijing Bank (Chaoyang Branch) for the money to produce 10-14 shows. All transactions paid off in due time. See Weiwei(赵伟伟) Zhao, “The Cultural Banks Should Solve the Dilemma for Copyright Pledge (文化银行需解版权质押之困),” *Beijing Daily* (北京日报), May 14, 2014, http://bjrb.bjd.com.cn/html/2014-05/14/content_178825.htm.

⁴⁴¹ Article 3 and 5(4), Trademark Pledge Regulation of 2009; Article 9 (4), Patent Pledge Regulation of 2010.

improved innovations, such a promise is effective only between the parties and cannot be used against any third parties. To protect its own interests, the bank has to make another new pledge registration immediately after the improved innovations are granted with patents. In the case where the bank fails to do so, if the pledgor breaches its promise and pledges the new patents for another loan, the bank cannot claim its interests in the new patents directly against the new secured creditor. In practice, there are only cases about the creation of pledge rights in future copyrights.⁴⁴²

For the right to a patent application, although *Patent Law* expressly acknowledges its assignability,⁴⁴³ the departmental registration regulation explicitly excludes it from being used for pledge. Both the 1997 and the 2010 regulations on the registration of pledge in patents uniformly stipulate that “for a patent application that has not been granted with a patent right, the SIPO shall **disapprove** the registration of pledge”.⁴⁴⁴ An explanatory document promulgated by SIPO, entitled *How to Make the Registration of Patent Pledge Contracts*, explains that “[e]ven though the right to a patent application is the precondition for acquiring a patent and assignable under the current law, the obvious lack of certainty in law makes it unable to be a property right with legal validity.”⁴⁴⁵ Some scholar explained that the “obvious lack of certainty in law” here refers to the high risks associated with the disapproval of the application.⁴⁴⁶

As a result, in the end, only future copyrights can and have been used as collateral in China.

⁴⁴² See the cases in *supra* note 439 and 440.

⁴⁴³ According to Article 13 of the Chinese Patent Law of 2008, during the period of application - after the publication of patent application and before the grant of a patent - the applicant is already entitled to give license and require the entity or individual who wants to exploit the invention to pay an appropriate fee. The right to apply for a patent is of intrinsically economic value and explicitly allows to be assigned to others by virtue of law (Article 10, Patent Law of 2008). As a result, according to the Property Law, the right to patent application is supposed to be eligible for collateralization.

⁴⁴⁴ Article 12 (3), *Measures for the Registration of Pledge of Patent Rights* of 2010.

⁴⁴⁵ Article 3, Forth Section, *How to Make the Registration of Patent Pledge Contracts (如何办理专利权质押合同登记)*, promulgated by the Patent Market Bureau of Patent Work Management Department at National Patent Office of SIPO, May 9, 2006, available at: http://www.sipo.gov.cn/sipo2008/xtgls/bszn/200901/t20090106_437152.html (stipulating that “[T]he subjects to a pledge (of patent) shall be assignable property rights deriving from granted patents. [...] Even though the right to a patent application is the precondition of acquiring a patent and assignable under the current law, the obvious lack of certainty in law makes it cannot be a property right with legal validity. The right to application therefore cannot be utilized as collateral to secure debts”).

⁴⁴⁶ See Che and Li (2005), *On New Issues in the Legal Regime of Secured Transactions (担保法律制度新问题研究)*, *supra* note 421 at 181.

4.2.2.3 Specific description of encumbered IP in security agreements

The *Property Law* has just imposed minimum requirements on the formality and content of the security agreement. In respect of the formality, the pledge contract is only required to be in writing, as either a pledge clause in the principal contract or an independent pledge contract.⁴⁴⁷ In respect of the content, there is no mandatory requirement on the clauses. Parties of a security agreement are free to decide what to be included in the pledge contract. The law only provides some non-mandatory rules to **suggest** that parties should specify information about the encumbered collateral for reducing legal uncertainty.⁴⁴⁸

As these non-mandatory rules remind parties about important matters, they allow parties to negotiate terms on their needs and leave room for a general description of the IP to be encumbered, which makes the creation of “an all-asset security right” or “floating pledge”, or the creation of security interests over after-acquired assets feasible.⁴⁴⁹ Accordingly, the three departmental regulations have also reduced the statutory requirements on clauses in pledge contracts.⁴⁵⁰

However, while the departmental regulation for copyrights retains these flexible clauses in the *Property Law* as non-mandatory,⁴⁵¹ the departmental regulations for

⁴⁴⁷ Article 210 (1), *Property Law*. This is a general rule for the pledge of movables, which is also apply to the pledge of rights, including IP. Article 229, *Property Law*.

⁴⁴⁸ Art. 210 of the *Property Law* provides:

“A pledge contract **generally** includes the following clauses:

- (1) the type and amount of the obligation to be secured;
- (2) the time limit for the debtor to fulfill obligation;
- (3) the name, quantity, quality, condition of the pledged assets;
- (4) the scope secured by the pledge;”

⁴⁴⁹ See Klein (2008) “Recent Legal Changes That Affect Secured Financing in the People’s Republic of China,” *supra* note 437 at 39. Note, regarding the secured scope of a pledge, the allowance for a general description of the obligation to be secured also makes it possible to secure future obligations up to a maximum amount, see Article 203-206, 229 and 222, *Property Law*. Unless otherwise stipulated in the pledge contract, a pledge covers the principal claim and its contractual or statutory interests, agreed default fines, damage claims, collateral-maintenance fees, and pledge-enforcement costs, see Article 21, *Security Law*; Article 173, *Property Law*. Regarding the default fine, see Article 114-116 *Contract Law*.

⁴⁵⁰ Some previously compulsory clauses are no longer mandatory any more but subjects to the autonomy of parties concerned, such as, reasons and purposes of the pledge, the evaluation report provided by the trademarks evaluation organization appointed by the SAIC, see Article 5, *Trademark Pledge Regulation of 1997*; the method of payment, the agreement on keeping the validity of the encumbered patent during the pledge duration and the liabilities of the grantor where a patent dispute is raised, see Article 7, *Patent Pledge Regulation of 1996*.

⁴⁵¹ The regulation for copyright retains these clauses in the *Property Law* as non-mandatory. Article 7 (4) of the *Copyright Pledge Regulation of 2011* only provides that “A copyright pledge contract generally contains:

trademarks⁴⁵² and patents transform them into mandatory rules asking for a specific description. For example, the regulation for patents requires the pledge contract to include: “the total quantity of the patents to be pledged; a specific description of each underlying patent, including at least: the name, the registration number, the date of application, the date of authorization proclamation.”⁴⁵³ Failure to comply with any of these requirements makes the registration of the pledge impossible.

The mandatory rules on specific description of IP to be pledged prevent parties from creating an all-asset pledge through merely describing the collateral as “all IP of the debtor” in the security agreement, or creating pledge rights in “future patents or trademarks”. That is also why in practice there are only cases about the creation of pledge rights in future copyrights.⁴⁵⁴

4.2.2.4 Pre-default rights and obligations of debtors and secured creditors

While the *Property Law* leaves most issues regarding the allocation of pre-default rights and obligations to the parties to decide freely in their security agreement, it also provides several mandatory rules and defaulted non-mandatory rules.

A. Mandatory rules

The mandatory rules mainly aim at helping secured creditor to protect their legitimate interests.

a. Maintenance obligation and monetary right

The *Property Law* generally grants pledgees/secured creditors the rights to monitor the

[...] (4) The content and protection term of the pledged copyright.” So, a general description of copyrights to be pledged is still allowed. That is why the creation of security interests in future copyrights is feasible in practice, see *supra* note 439 and 440.

⁴⁵² The regulation for trademarks expressly requires that the pledge contract should explicitly state the registration number of each trademark to be pledged. Article 5(4) of the Trademark Pledge Regulation of 2009 just recommends that a pledge contract generally includes a detailed list with reference to the registration number, type and protection term of each encumbered trademark. This recommendation is not mandatory. However, Article 3 requires the parties to specify the register-number of each trademark to be pledged in the Application Form for Pledge Registration. And Article 4 (5) even requires the parties to provide a photocopy of the Registration Certificate for each trademark to be pledged.

⁴⁵³ Article 9 (4), Patent Pledge Regulation of 2010. These matters are also specifically required by the Practical Notes on the Registration of Pledge of Patent Rights (专利权质押登记手续办理实务须知), issued by the SIPO, available at http://www.sipo.gov.cn/ztzl/ywzt/ztzydjyxkba/bszn/201507/t20150728_1151491.html.

⁴⁵⁴ See the cases in *supra* note 439 and 440.

value maintenance of collaterals and to protect its own legitimate interests. Accordingly, when the encumbered IP is likely to suffer severe depreciation which can adversely affect the pledgee/secured creditor's interests, the pledgee/secured creditor is entitled to take many actions, including demanding a deposit of the pledged IP, making an earlier discharge of the obligation with return of the property, asking for additional collaterals to cover the potential depreciation of the pledged IP, or, with the refusal of the pledgor/debtor, taking legal action to realize and secure the current value of the pledged IP by way of auction or private sale.⁴⁵⁵ In order to ensure that the secured creditors in patent-based transactions know the current statement of the pledged patents and can take active actions against depreciation in a timely manner, the specific departmental regulations even impose some obligations on the public authorities. The SIPO is required to instantly inform the pledgees in two cases: if the patentee or debtor fails to pay the annual fee for a pledged patent in time; or the pledged patent is annulled or terminated during the term of pledge.⁴⁵⁶

b. No re-pledge

However, some contractual freedoms given by the *Property Law* have been turned into mandatory prohibition in the registry practice.

For example, the *Property Law* does not prohibit a pledgee from re-pledging the pledged collateral and leaves the matter for parties to decide in their pledge contracts. Article 217 of *Property Law* provides that, "if the pledgee re-pledges the collateral during the pledge term without the consent from the pledgor, such a re-pledge is invalid and the pledgee shall be liable for any loss, destruction or damage to the collateral arising from the sub-pledge." Therefore, in the case with consent from the pledgor, a re-pledge by the pledgee should be feasible.⁴⁵⁷

However, all the three registration regulations require that the pledgor in registration should be the "recorded title-holder" of the pledged IP.⁴⁵⁸ As a pledgee is not considered as the "recorded title-holder" of the pledged IP in Chinese law, this registration requirement makes it impossible for the pledgee/secured creditor to be the

⁴⁵⁵ Article 215, 216 and 219, *Property Law*.

⁴⁵⁶ Article 19 and 20, *Patent Pledge Regulation of 2010*.

⁴⁵⁷ Article 217, *Property Law*.

⁴⁵⁸ Article 12(1), *Patent Pledge Regulation of 2010*; Article 8(1), *Trademark Pledge Regulation of 2009*; Article 12(1), *Copyright Pledge Regulation of 2011*.

“pledgor of the re-pledge”, even with express consent from the debtor (who is the “pledgor of the first pledge” and also the recorded title-holder of the pledged IP). In the end, the creation of re-pledge is actually prohibited for all kinds of IP.

c. No multiple pledges

Similarly, while there is no explicit prohibition on the creation of multiple pledges on the same IP in the *Property Law*,⁴⁵⁹ it is strictly prohibited in the registry practice for patent-based transactions. The regulation for the registration of pledge of patents of 2010 expressly stipulates that one of the pre-condition for the approval of registration is that there is no pre-existing and on-going pledge upon the patent to be pledged.⁴⁶⁰ It is not clear whether the creation of multiple pledges in trademarks or copyrights is allowed or not, because there is no such a prohibition in the registry regulations for pledge in trademarks and copyrights, nor any cases.

B. Non-mandatory Rules

Chinese law also incorporated some non-mandatory rules to facilitate the conclusion of transactions by increasing the efficiency and reducing transaction costs without interfering with the parties’ autonomy. These non-mandatory rules are set as default rules, which would apply when the security agreements are silent with regard to the relevant issues. They can be otherwise apportioned between the debtor and the secured creditor in the pledge contract.

Some non-mandatory rules mainly aim at helping parties to reduce the policing cost. For example, the *Property Law* stipulates that a pledgor/debtor retains the right to exploit the pledged IP by himself but is not allowed to further assign or license the encumbered IP to others without the consent from the pledgee/secured creditor.⁴⁶¹ In this way, the pledgee/creditor would always be informed if changes occurred to the pledged IP. However, this also means that the pledgor/debtor’s decision of making further assignment or license would be always conditional upon the creditor’s consent.

In addition, the regulation for patents provides one more non-mandatory rule, which

⁴⁵⁹ While the Property Law explicitly allows the creation of multiple mortgages (*diya*) on the same immovable (Article 199, Property Law), there is no such explicit allowance for the creation of multiple pledges on the same movables or intangible property. But there is no prohibition either.

⁴⁶⁰ Article 12 (11), Patent Pledge Regulation of 2010. See the text in *infra note 473*.

⁴⁶¹ Article 227 (2), Property Law.

states that, without the consent of the secured creditor, the pledged patent may not be revoked or limited before the secured claims have been satisfied.⁴⁶² This approach, on the one hand, allows the pledgee/secured creditor to police the current statement of the pledged patent through limiting the pledgor/debtor's right to waive its patent. On the other hand, it avoids the danger of wasting expenses for the maintenance of worthless IP, by permitting to waive worthless IP with the consent of the pledgee/secured creditor.

Furthermore, considering the possibility that some changes may happen to the validity and right-holder of the encumbered, the regulation for patents reminds parties to negotiate over issues about the "the payment of the annual fee of the encumbered patent during the pledge term; the assignments and the licenses for the exploitation of the patent right during the pledge term; the measures to be taken when the patent right is declared invalid or the ownership of the patent right changes; the delivery of correlative technical materials when the right of pledge is realized" and to explicitly write them into the pledge contract if necessary.^{463 464}

⁴⁶² Article 15 of the Patent Regulation of 2010 provides: "During the pledge term of a patent, the SIPO shall disapprove the waiver of the patent right if the pledgor fails to provide evidentiary materials on the pledgee's consent to his waiver of the right." There is no such a non-mandatory rule like this for trademarks or copyrights.

⁴⁶³ See Article 10, Patent Regulation of 2010.

⁴⁶⁴ In practice, the banks are required by the CBRC's *Guiding Opinions for Commercial Banks on Operating IP collateralization (supra note 378)* to include all these terms in the pledge contracts:

Article 20 Commercial banks should sign a written pledge contract with the pledgor, clearly stating the name, content, protection term, ownership status (and relevant proof) of the IP to be pledged; the scope of pledge, the arrangement about pledge registration, the obligations of the pledgor, the enforcement mechanisms; as well the matters occurring during the pledge term, such as transfer and licensing of the pledged IP, as well as how to handle the revocation and invalidation of the pledged IP.

Article 21 The pledge contract should specify the pledgor's obligations on maintaining **the integrity of pledged IP rights**, including matters like providing the documents like the certificates of the pledged IP and ensuring that the information provided is genuine, accurate, complete and valid; shall require the pledgor to earnestly safeguard the validity of the pledged IP and prohibit the pledgor from waiving the pledged IP without consent from the pledgee's consent; shall require the pledgor to actively protect the pledged IP from the infringements from other parties, and to use the required compensation from infringements to pay back the secured debts first.

Article 22 The pledge contract shall also specify the pledgor's obligations on maintaining **the validity of the pledge rights of the pledgee**, including matters like no assignment or license of the pledged to other parties without the pledgee's consent; the payment from assignment or license of the pledged IP shall be used to pay back the secured debt first; instantly informing the pledgee and taking actions when events that can have a substantially impact on the validity and economic value of the pledged IP occur; timely and sufficiently exploit the pledged patent when there is a possibility of being compulsorily licensed; shall stipulate that the license fee should be used to pay back the secured debts in advance or be held in escrow when the pledged patent is compulsorily licensed."

4.2.3 Perfection, Publicity and Priority

For an IP, the *Property Law* stipulates that the pledge right, as a kind of “real rights” (*wu quan*) with third-party effectiveness, becomes effective with a proper registration in the corresponding IP-specific registry.⁴⁶⁵ The approval of a registration is conditional upon a substantive scrutiny of comprehensive documents.

4.2.3.1 IP-specific registry system

Based on the civil law underlying rationale that the creation and enforcement of a security interest would affect the exercise and disposition of the ownership of the encumbered collateral, security interests are usually registered in the same title-registry as the collateral for keeping the integrity of the title records. Although the fragmentation in the registry system of China has been the subject of complaint for a long time,⁴⁶⁶ the *Property Law* did not consolidate these registries into a single unitary system. For now, there are more than fifteen movable collateral registries in China but without a general security registry.

Similarly, there are multiple registries for IP. The security interests in each type of IP have to be perfected by registration at its corresponding title-based registry, respectively, the SIPO for patents, the CTMO for trademarks, and the NCAC for copyrights.⁴⁶⁷ As the *Property Law* remains vague, detailed rules for the registration of security rights are given under the departmental regulations promulgated by the three registries.

This specialized approach may make it easier for the specialized competent authority to administer registry affairs or to give specific rules better suited to satisfy the specific requirements of each type of IP. However, it also gives many problems.

First, the multiple registries give rise to high legal uncertainty and transaction costs. If one pledgor wants to use different kinds of IP as collateral, it has to make multiple registrations at different registries. Accordingly, other parties have to search at all

⁴⁶⁵ Art. 227 (1), *Property Law*.

⁴⁶⁶ Over the past thirty years since the beginning of the 1980s, China has developed multiple decentralized collateral registry systems specialized for specific types of assets, such as real estates, ships, airplanes, machinery, equipment, inventory and receivables. See Investment Advisory Services of the World Bank Group (2010), *Secured Transactions Systems and Collateral Registries*, *supra* note 266 at 105

⁴⁶⁷ See Gervais (2007) “The TRIPS Agreement and the Changing Landscape of International Intellectual Property,” *supra* note 332.

registries to find out all encumbrances in the pledgor's assets. As discussed above in Section 4.2.2.2 B, when an IP licensor wants to use its right to royalty payment (pre-royalties) as collateral, the registration has to be done with a different registry for "account receivables" subject to different regulations.

Second, the lack of a general registry or general rules, makes it is impossible to using some IP as collateral in practice. Although Article 223 (5) of the Property Law clearly stipulates that "property rights in [...] other intellectual property" can be pledged as well, other kinds of IP are rarely used as collateral in practice. For other types of IP with specialized title registry, such as new plant varieties, the difficulty is the absence of specific regulations guiding the registration of security interests thereof. For unregistered IP such as trade secrets, the problem is that there is nowhere to register the security interests. No cases have been found for the use of IP other than the three basic types as collateral in Chinese practice.

4.2.3.2 A document-based registration with substantive scrutiny

While the *Property Law* made major progress on simplifying the registry system, by allowing a notice registration and by eliminating the requirement of registering the security agreement,⁴⁶⁸ these departmental regulations for registering security interests in IP have not fully followed this legislative improvement.

First, although the three departmental regulations have greatly simplified the registration process, they still require the submission of numerous documents, including at least the following,

- the registration application form,
- pledge contract (must indicate the names and addresses of all direct parties; the type and amount of the obligation to be secured; the time limit for the debtor to fulfill obligation, a specific description of each underlying IP, the scope secured by the pledge),
- identity documents of the pledgor and the pledgee, and authorization letter (if applicable),
- valuation report (if applicable),
- and even the principal debt contract itself should be submitted for registration as

⁴⁶⁸ See Investment Advisory Services of the World Bank Group (2010), *Secured Transactions Systems and Collateral Registries*, *supra* note 266 at 104.

well.⁴⁶⁹

- the regulation for the pledge of copyrights even requires a submission of all the pre-existing license contracts.⁴⁷⁰
- the regulation for the pledge of trademarks even requires a submission of photocopy of the registration certificate of each trademark to be pledged.⁴⁷¹

Second, only the registrations passing a comprehensive scrutiny of all the submitted documents can be approved.⁴⁷² We hereby take the pledge of patents as an example to demonstrate the broad scope of scrutiny of the registry.

Article 12, Measures for the Registration of Pledge of Patent Rights (October 1, 2010)

[...] If any of the following cases is found with the scrutiny, the SIPO shall make the decision of “disapproving registration” and issue the “Notice Letter for Disapproving the Registration of Pledge of Patents”.

- (1) the pledgor is inconsistent with the “recorded title-holder” of the patent at the registry;
- (2) the patent has been terminated or has been declared to be void;
- (3) the patent application has not been granted with a patent yet;
- (4) the patent is delinquent on the annual fee payment;
- (5) the patent has been initiated with an invalidation proceeding;
- (6) the procedure for the pledge of patent is suspended, because there is an ownership dispute over the patent, or the People’s Court has ruled protective measures against the patent.
- (7) the maturity of the debt is beyond the validity period of the patent;
- (8) the pledge contract agrees that the ownership of the patent would be transferred to the pledgee if the debt is not discharged at its maturity;
- (9) the pledge contract does not comply with Article 9 of these Measures;
- (10) the pledge of a joint patent has not obtained the consent of all joint owners.
- (11) the patent has been applied for pledge registration and is still during the term of pledge;
- (12) any other situations that may cause disapproval of registration.

We can see from the long list that the scrutiny not only concerns the form of the underlying documentations but also their substance, which covers a broad range of

⁴⁶⁹ Article 4, Trademark Pledge Regulation of 2009; Article 7, Patent Pledge Regulation of 2010; Article 6, Copyright Pledge Regulation of 2011. Although in the case regarding patents, the principal contract is not a compulsory document anymore, some information regarding the principal contract, such as name of principal contract, the creditor and the debtor, as well as the duration of principal obligation and the cause of pledge, are still required to be filled in the “application form for registration of the pledge right”. The application form for the registration shall be uniformly printed and provided by the SIPO, The application form available at: <http://www.sipo.gov.cn/sipo2008/bgxz/zlqzybg/201010/P020101011588076254354.doc>.

⁴⁷⁰ Article 6(6), Copyright Pledge Regulation of 2010.

⁴⁷¹ Article 4 (5), Trademark Pledge Regulation of 2009 (requiring the parties to provide the photocopy of the Registration Certificate of each of each trademark to be pledged).

⁴⁷² Article 6 and 8, Trademark Pledge Regulation of 2009; Article 12, Patent Pledge regulation of 2010; Article 9 and 12, Copyright Pledge Regulation of 2011.

issues, including the validity of the underlying IP, the clauses of the security agreement, the pledgor's rights to the underlying IP, and the pre-existing pledges.⁴⁷³

Thirdly, as a consequence of the substantive scrutiny over so many factors, the registrations proceed very slowly. Although the departmental regulations set clear deadlines requiring that the scrutiny to be finished within 5 days for trademarks,⁴⁷⁴ 7 days for patents,⁴⁷⁵ and 10 days for copyrights,⁴⁷⁶ there are substantive delays between the application for registration and the actual registration. The delay can cause serious problems to the priority order. For patents or copyrights, a pledge becomes effective as of the **approval** of application for registration.⁴⁷⁷ Then even a diligent creditor that makes registration exactly on may still find out that its pledge cannot be effective against some subsequent creditors or assignees because its earlier registration application may be approved later than a subsequent registration application. The problem is slightly different in the case with trademarks, for which a pledge becomes effective upon the approval of registration but is retrospective to the day of application.⁴⁷⁸ Then a creditor cannot be completely sure about its priority order even after a completely diligent and accurate search at the CTMO, because some pledges or assignments may have happened before its search but have not yet been approved by the time of the search.

4.2.3.3 Priority rules

Upon the registration of the pledge in IP at the designated IP-specific registry, the secured creditor is granted the priority in receiving the repayment from the disposition of the pledged IP upon the debtor's default, against all subsequent third parties. The sole criterion for determining the priority order is the time of registration; the knowledge of competing claimants is irrelevant. The *Property Law* allows a secured creditor to waive or subordinate his priority claim in the case without being against the legitimate interest of other third parties.⁴⁷⁹ There is hardly any discussion in literature

⁴⁷³ Article 8, Trademark Pledge Regulation of 2009; Article 12, Patent Pledge regulation of 2010; Article 12, Copyright Pledge Regulation of 2011.

⁴⁷⁴ Article 6, Trademark Pledge Regulation of 2009.

⁴⁷⁵ Article 11, Trademark Pledge Regulation of 2009.

⁴⁷⁶ Article 9, Copyright Pledge Regulation of 2011.

⁴⁷⁷ Article 12, Patent Pledge Regulation of 2010; Article 9, Copyright Pledge Regulation of 2011.

⁴⁷⁸ Article 6 (1), Trademark Pledge Regulation of 2009.

⁴⁷⁹ Article 218, Property Law (providing: "A pledgee may waive the right of pledge. In case an obligor establishes the right of pledge with its own properties, and the pledgee waives the right of pledge, other security providers will be exempted from the security liability within the scope for which the pledgee has lost

regarding the priority rules among security interests in China, maybe because of the strict prohibitions on many matters.

A. Conflicting security interests

As discussed above in Section 4.2.2.4.A, the Chinese rules have expressly prohibited the pledgees/secured creditors from the creation of re-pledge in all kinds of IP. And the creation of multiple pledges in the same encumbered patent is also prohibited (not clear for trademarks and copyrights). With these prohibitions, there is basically no need to discuss the priority order among multiple security interests on the same encumbered patent; this is a situation which does not arise in the current IP collateralization practice at all. Even if it was presumed that the creation of multiple pledges on the same trademark or copyright was allowed, the registration time would be the only criterion for determining the priority order among these multiple pledges.

B. Pre-existing license vs. security interests

Under the current Chinese law, only an IP owner can create security interests in its own IP. When an IP owner can create security interests in its own IP as collateral, the pre-existing license in the pledged IP, given before the creation of the pledge, is not affected by the pledge.⁴⁸⁰

As a licensee cannot use its right to exploitation as collateral, there is no need to discuss the potential conflicts between the interests of the licensor and that of the secured creditor.

C. Security interests vs. subsequent assignees/licenses

In Chinese law, there is no need to discuss the continuation of pledge in IP after an assignment, license, or other disposition. Once a pledge right has been created on an IP, any further assignment or license of the pledged IP is only possible with the consent of the pledgee/secured creditor. The proceeds which the pledgor/debtor obtains from the

the right to seek preferred payments, unless any of other security providers promises to provide the security all the same.”)

⁴⁸⁰ There is no provision in the Property Law which specifically addresses this issue for IP collateralization. However, the rules for the mortgage (diya) of immovable stipulate that the lease relationship established before the mortgage contract is not affected by the mortgage; the lease relationship established after the mortgage contract is subject to the mortgage. See Article 190, Property Law. By analogy, it seems that pre-existing license relationships will not be affected by the later pledge either.

consented assignment or license should be used to pay off the pledgee's claims in advance or be deposited or be held in escrow with a competent third party assigned by the secured creditor.⁴⁸¹ Since the further assignment or license has got the consent from the pledgee/secured creditor and the proceeds have been paid off the pledgee/secured creditor, the subsequent assignee or licensee has the encumbered IP **free from** pre-existing security interests. As a result, the priority order between the secured creditor and subsequent assignees or licensees is irrelevant in China.

There is no "ordinary course of business" exception in Chinese law for IP collateralization.

4.2.4 Enforcement

Currently, the three departmental regulations deal mainly with the registration for perfection but remain silent on the issue of enforcement remedies. Without specific reference to IP collateralization, the general procedural norms under the *Property Law* regarding the enforcement of pledge in all kinds of tangible assets apply mutatis mutandis to the enforcement of security interests in IP.

Where the debtor performs his obligation or pays the secured debt at or prior to maturity, the pledgee/creditor should deregister the pledge.⁴⁸² Upon the debtor's default at the due date or the occurrence of a contractually stipulated circumstance (realization events), the enforcement of a pledge in an IP will be triggered. When the contractually stipulated realization events occur, the enforcement can be exercised prior to the due date. The pledgee/creditor is entitled with the priority in being repaid with the proceeds from the enforcement.⁴⁸³

With the application of general procedural norms for tangible movables, the security interests in IP can only be enforced by one of the three available remedies:⁴⁸⁴

- (a) to acquire the pledged IP at market price and then offset the purchase price against the secured claim (conversion), or
- (b) to seek payments through judicial proceedings by requesting the court to auction the pledged IP (judicial sale), or

⁴⁸¹ Article 227 (2), Property Law; Article 80, Security Law; Article 16 (2), Patent Pledge Regulation of 2010.

⁴⁸² Article 219, Property Law.

⁴⁸³ Article 208, Property Law; Article 63, Security Law.

⁴⁸⁴ Article 219, Property Law.

- (c) to seek payments received from a private sale or auction of the pledged IP (extrajudicial sale).

The pledgee can only be paid back from the proceeds of the above three remedies. Chinese law does not allow a “strict foreclosure”, where the debtor’s right to redeem the secured property is extinguished by the court order and the creditor is left as the absolute owner of the property. The parties are not allowed to agree on letting the pledgee/creditor have direct retention of the ownership of the collateral for the satisfaction of the secured obligation. Any stipulation in the contract indicating that ownership of the pledged patent would be transferred to the pledgee upon the debtor’s default is void.⁴⁸⁵ The IP-specific registry for perfecting the pledge even scrutinizes the pledge contract. If there is any strict foreclosure clause or similar stipulation in the pledge contract, the registry will disapprove the registration of the pledge.⁴⁸⁶

The three remedies are available in parallel. The proceeds obtained from any of the three enforcement remedies should be used to pay off the principal obligation or debt; any proceeds exceeding the secured debt should be paid back to the pledgor; where the proceeds are insufficient to cover the whole secured debt, the deficit remains payable by the debtor.⁴⁸⁷ The creditor is entitled to sue the debtor for any deficiency.

Market prices should be used as reference in conversion or private sale of the pledged IP.⁴⁸⁸ Chinese law does not set any specific procedure providing the debtors with market price protection against the collusion between the creditor and the assignee in conversion or private sale.⁴⁸⁹ Nevertheless, if the creditor and the debtor cannot reach an agreement on the disposition value of the pledged IP, the creditor should have recourse to the court for a judicial auction. Although the judicial auction procedure is generally perceived as slow and expensive, directly applying for a court order for judicial auction is still faster than a lawsuit which is a full civil action involving a prolonged and complex procedure.⁴⁹⁰ It is therefore believed that the lack of market price protection should not cause significant problems in practice.⁴⁹¹

⁴⁸⁵ Article 211, Property Law.

⁴⁸⁶ Article 12(8), Regulation for the Pledge of Patents of 2010.

⁴⁸⁷ Article 221, Property Law.

⁴⁸⁸ Article 219, Property Law.

⁴⁸⁹ See Williams et al. (2010) “Secured Finance Law in China and Hong Kong”, *supra* note 264, at 369.

⁴⁹⁰ *Ibid.*, at 390.

⁴⁹¹ *Ibid.*, at 369.

The *Property Law* includes a new provision to provide the debtors with an extra protection when the creditor does not enforce its rights of pledge in a timely manner when the debt fails due. The pledgor can request the pledgee to enforce the pledge at its maturity; if the pledgee does not enforce the pledge in a timely manner, the pledgor can have recourse to court for a judicial sale or auction of the pledged IP. And the pledgee should compensate for the depreciation of the pledged IP arising from the pledgee's delay in enforcing the pledge.⁴⁹² This extra protection is crucial for protecting the debtor against the loss caused by the pledgee's delay in enforcing the pledge, especially when the value of IP is very time-sensitive to market changes.

4.3 US

4.3.1 General Introduction and Preemption of Federal Law

The legal issues involving IP collateralization in the US are even more complicated, because the US statutory schemes for IP and secured transaction laws are also at two different levels in its federalism system:

- a title system for the IP under the IP laws which is exercised at the federal level,⁴⁹³ mainly including the Copyright Act (17 U.S.C.), the Patent Act (35 U.S.C.), and the Lanham Act (15 U.S.C.)⁴⁹⁴; and
- an encumbrance system for secured transactions in “personal property”⁴⁹⁵ under Article 9 of Uniform Commercial Codes (UCC-9), which is individually

⁴⁹² Article 220, Property Law.

⁴⁹³ The U.S. Constitution specifically empowers the federal government (i.e., U.S. Congress) with the exclusive authority in respect of patents and copyrights, for promoting the progress of science and useful arts, under its Copyright and Patent Clause. See U.S. Constitution, Art. 1, Sec. 8 Cl.8 empowers the U.S. Congress: “To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.” This clause is usually referred to as the “Copyright and Patent Clause”, which constitutes the legitimate basis for the Copyright Act and the Patent Act. Though without specific references, the U.S. Constitution, Art. 1, Sec. 8 Cl.3 also provides federal jurisdiction to protect the **inter-state** use of trademarks under its Commerce Clause, while leaving the in-state use of trademarks to individual state jurisdiction. So, IP laws are mainly at the federal level, including the Copyright Act, the Patent Act, and The Lanham Act.

⁴⁹⁴ It is noteworthy that trademark protection in the US is a state common law right, which is only “enhanced” and “protected” by federal registration. The federal law does not create separate exclusive property in the trademark in the same sense that it does for patents and copyrights. See William J. Murphy, “Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property,” *IDEA* 41, no. 3&4 (2002): 297–604 at 310-311.

⁴⁹⁵ In the common law concepts of the US law, “personal property” contrasts with real property (land and interests created over it, such as leases and easements).

implemented at the state level. IP likes patent, trademark, and copyright are all qualified under the catchall category of collateral - “general intangibles” under the UCC-9.⁴⁹⁶

The literature about IP collateralization in the US therefore mainly criticizes about how the interface between federal and state legislation, and how it brings more legal uncertainty and increases the difficulty of concluding transactions.⁴⁹⁷ This two-level system creates lots of functional problems such as which of the two systems would apply, especially where conflicts and deficiency exist. The UCC-9 has included a general rule of “preemption of federal law” as a solution for the case where an inconsistency or gap between UCC-9 rules and federal law exists.⁴⁹⁸ The rule restricts the application scope of the UCC-9 to the extent without preemption from the federal law.

The fact is that even though the federal laws do partly govern the security interests in all three types of IP, the substantive federal IP laws are “primarily concerned with defining the nature and scope of the owner’s or exclusive rights in the intellectual property and with setting out the limits on and procedures for enforcing those rights. [...] Each makes some provision for recording, priority and derivative interests (including security interests), but none deals directly with the creation or priority of security interest”.⁴⁹⁹ So, **no** complete federal preemption exists in this area. It is still the UCC-9 that provides the main rules for the creation, perfection, priority and enforcement of security interests in IP, unless preempted by federal laws. However, most of the UCC-9 rules just generally apply to all personal property, without explicitly addressing IP. There are still some gaps which cannot be filled. In the end,

⁴⁹⁶ See further discussion below at Section 4.3.2.2 A.

⁴⁹⁷ For example, see Lorin E Brennan, “Financing Intellectual Property Under Federal Law: A National Imperative (Electronic Version),” *Hastings Communications and Entertainment Law Journal (Comm/Ent)* no. 23 (2002): 195–312 (discusses how effective financing of copyrights, patents and trademarks under federal law should operate in harmony with the state secured transaction laws); Murphy (2002), “Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property”, *supra note 494* (focuses on the problems in the registration for perfection, and gives very specific proposals to the USPTO on creating a centralized or integrated registry for security interests in IP and offers a technological solution for the implementation of that registry); Xuan-Thao Nguyen, “Commercial Law Collides with Cyberspace: The Trouble with Perfection - Insecurity Interests in the New Corporate Asset,” *Washington and Lee Law Review* 59, no. 1 (2002): 37–82 (discussing the problems of perfecting security interests in domain names).

⁴⁹⁸ UCC § 9-109(c)(1) (109 [SCOPE] (c) [Extent to which article does not apply] “This article does not apply to the extent that: (1) a statute, regulation, or treaty of the United States preempts this article”).

⁴⁹⁹ Murphy (2002), “Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property”, *supra note 494* at 327-328.

the lack of clarity in the federal laws and the inconsistent case law regarding the “preemption of federal law” give rise to a lot of controversy and legal uncertainties, especially about the filing requirements for perfection.

As explained in Section 4.1, the US law is chosen as a comparative counterpart because of the conflicts between secured transaction law and IP law occurring in the US legal regime are more intensive. Although it seems that this dual-level system problem does not exist for China at all, it in essence reflects amplified conflicts between secured transaction law and IP law. The main purpose of this thesis is for generating proposal for Chinese rules, so the discussion on the US rules will be more descriptive rather than a critical analysis. The discussion does go too deeply into specific legal issues or case studies.

4.3.2 Creation

The UCC-9 makes a distinction between the creation of security rights, when the security interest is “attached” to the collateral and becomes enforceable against the debtor,⁵⁰⁰ and the third-party effectiveness of security rights, when the security interest is “perfected” and becomes enforceable against the debtor.

4.3.2.1 Transaction structure

US law clearly distinguishes the “grant of security interests” from an “assignment”. While an “assignment” is the transfer of **all** of the IP owner’s title, rights and interests to the IP; the “grant of security interests” under UCC-9 is a **lesser** transfer as the borrower still keeps its title and retains certain rights and interests in the encumbered collateral.⁵⁰¹

In the past, many debtors were required to “absolutely” assign the encumbered patents to the creditors firstly, in order to try to fit within the language of section 261 of the Patent Act and to make a recordation in the U.S. Patent and Trademark Office (USPTO). Then the debtors could get a license back from the creditors (which have become the registered owners) in order to keep exploiting the encumbered patents. This approach makes it difficult for the debtor to show its ownership for bringing

⁵⁰⁰ UCC § 9-203.

⁵⁰¹ For patents, see *In re Transp. Design & Tech., Inc.*, 48 B.R. 635 (S.D. Cal. 1985); for trademarks, see *Li'l Red Barn, Inc. v. Red Barn Sys., Inc.*, 322 F. Supp. 98 (N.D. Ind. 1970).

infringement actions, and also imposes on the creditor too many burdens regarding maintaining and protecting the encumbered IP.⁵⁰² The problem of this transaction structure is more severe in the case of trademarks. Under the Lanham Act, an effective assignment of a trademark requires an assignment of its accompanying goodwill, including all aspects of the business to which the trademark pertains, such as trade secrets, supplier and customer lists, copyrights, and patents.⁵⁰³ An absolute title assignment for the purpose of security interest only, without being accompanied by a transfer of the related goodwill of the assignor (i.e., the debtor)'s business, may risk invalidating the trademark and totally destroy its value.⁵⁰⁴ As a result, in recent years, this "assignment" structure has become much less common in practice.⁵⁰⁵

In order to keep the security interests effective, maintain the integrity and validity of the encumbered IP, and to avoid imposing maintenance burdens on the creditor, the best strategy is to structure the security instrument as a UCC-9 "security interest", which is the contingent right to an asset (tangible or intangible) created by a security agreement to secure payment or performance of an obligation.⁵⁰⁶ Upon the borrower's default, the security interest allows the creditor to take or transfer ownership of the encumbered IP. It is important to avoid the use of assignment language in the security agreement.⁵⁰⁷

The UCC-9's unitary "security interest" approach leads the modernization of secured transaction law all over the world, by leaving aside the pre-existing doctrine and practice about various security devices and uniformly treating all the transactions playing the function of securing transactions under the same rules.⁵⁰⁸

⁵⁰² See Jeff Makovicka and Chris Bikus, "Security Interests in IP - Part 1: Tangible Problems in an Intangible World," *Nebraska Banker* March (2012): 20–23 at 21.

⁵⁰³ 15 U.S.C § 1060.

⁵⁰⁴ Any assignment of a trademark without its accompanying goodwill is a "naked assignment" or an "assignment in gross", which can lead to an invalidity of the trademark. See *Clorox Co. v. Chemical Bank*, 40 U.S.P.Q2d 1098 (TTAB 1996) (in which a debtor's registered trademark was invalidated because the intent-to-use application from which it issued was assigned outright to a bank under the terms of a collateralized loan agreement).

⁵⁰⁵ Makovicka & Bikus (2012). "Security Interests in IP - Part 1: Tangible Problems in an Intangible World," *supra* note 502 at 21.

⁵⁰⁶ Murphy (2002), "Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property", *supra* note 494 at 313.

⁵⁰⁷ Makovicka & Bikus (2012). "Security Interests in IP - Part 1: Tangible Problems in an Intangible World," *supra* note 502 at 21.

⁵⁰⁸ UCC § 9-109(a) (1) (stipulating UCC-9 applies to "a transaction, regardless of its form, that creates a security interest in personal property or fixtures by contract") & cmt. 2. (stipulating "When a security interest

4.3.2.2 Scope of IP eligible for collateralization

A. General requirements

UCC-9 adopts a broad term to describe the transactions covered. IP are qualified as “general intangibles”, a catch-all category of collateral which include all residual forms of personal property that are not otherwise included in the other defined types of collateral.⁵⁰⁹ The Official Comment uses the term “intellectual property” as an example of a “general intangible”, by just referring to “various categories of intellectual property”.⁵¹⁰ It does not explicitly recite any specific form of IP. It is believed that this way is intentionally “designed to accommodate both existing and future forms of IP.”⁵¹¹

B. The treatment of rights under IP license agreements

a. Licensor’s right to royalty payment

All derivative rights to payment under the terms of an assignment or license of IP (such as the right of a licensor to receive royalties payable under a IP license) are categorized as “accounts”⁵¹², not “general intangible”⁵¹³ nor “payment

is created, this Article applies regardless of the form of the transaction or the name the parties have given to it.”) See Harry C. Sigman, “Twenty Questions about Filing under Revised Article 9: The Rules of the Game under New Part 5,” *Chicago-Kent Law Review* 74, no. 3 (1999): 861–892 at 861 (stating that the Revised UCC-9 is intended to “place virtually all filings in a single, statewide office, facilitate electronic filing, foster nationwide utilization of well-designed user-friendly uniform paper forms, and make new document filing more efficient, transparent, and uniform.”) Note: Sigman was a member of the Drafting Committee to revise Article 9.

⁵⁰⁹ UCC § 9-102(a)(42) gives a definition of “general intangible”, which means any personal property, including things in action, other than accounts, chattel paper, commercial tort claims, deposit accounts, documents, goods, instruments, investment property, letter-of-credit rights, letters of credit, money, and oil, gas, or other minerals before extraction. The term includes payment intangibles and software.”

⁵¹⁰ While the UCC-9 does not specifically recite patents, trademarks, and copyrights, the Official Comment uses the term “intellectual property” as an example of a “general intangible”. See Official Comment 5d to UCC § 9-102 (“General intangible is the residual category of personal property, including things in action, that is not included in the other defined types of collateral. Examples are various categories of intellectual property and the right to payment of a loan of funds that is not evidenced by chattel paper or an instrument. As used in the definition of general intangible, things in action include rights that arise under a license of intellectual property, including the right to exploit the intellectual property without liability for infringement.”).

⁵¹¹ See Murphy (2002), “Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property”, *supra note* 494 at 316.

⁵¹² UCC § 9-102(a)(2) (2010).

⁵¹³ UCC § 9-102(a)(42) (2010) (providing any right to payment that is an “account” is excluded from the definition of a “general intangible”).

intangible”⁵¹⁴.⁵¹⁵ Accounts are classified as a separate form of collateral capable of separate ownership. They are also regulated under UCC-9 but may be subject to some special rules on specific occasions.

b. Licensee’s interests in license

Under the UCC-9, a licensee’s interests “that arise under a license of intellectual property, including the right to exploit the intellectual property without liability for infringement” are also explicitly included in the definition of “general intangible”.⁵¹⁶ The licensee’s interests under an IP license can be used as collateral and should be subject to the same rules as the various categories of IP (see more discussion in Chapter 5).

C. Infringement claims

Infringement claims can be categorized as “commercial tort claims” and be original collateral under the UCC-9.⁵¹⁷ However, they have to be subject to many special rules. For example, while a general description with reasonable identification is sufficient for the creation of security interests in most personal property, a specific description is required for the creation of security interests in a commercial tort claim, in which case a description only by type is insufficient to enable identification.⁵¹⁸ Similarly, while a security agreement may create a security interest in after-acquired collateral, a

⁵¹⁴ UCC § 9-102(a)(61) (2010) (providing “payment intangible” is a subcategory of “general intangible”). As “accounts” are excluded from the delimitation of a “general intangible”, they cannot be “payment intangible” either.

⁵¹⁵ See Murphy (2002), “Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property”, *supra note* 494 at 317-319; Jeff Makovicka, “Security Interests in IP - Part 2: Collateralizing & Creating Security Interests in IP,” *Nebraska Banker* May/June (2012): 20–23 at 20.

⁵¹⁶ See Official Comment 5d to UCC § 9-102 (providing - As used in the definition of “general intangible”, “things in action” includes rights that arise under a license of intellectual property, including the right to exploit the intellectual property without liability for infringement.”).

⁵¹⁷ UCC § 9-102(a)(13) defines “commercial tort claims” as all business-related tort claims that do not involve personal injury or death. As the UCC-9 generally does not apply to an assignment of “tort claims”, UCC § 9-109(d)(12) gives an exception to “commercial tort claims”. However, UCC § 9-102(a)(2) emphasizes that commercial tort claims are not categorized as “accounts”. See also Murphy (2002), “Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property”, *supra note* 494 at 319-320.

⁵¹⁸ UCC § 9-108(a) (the general rule is that a general description is sufficient for reasonable identification), UCC § 9-108(b)(3) (a description only by type is generally sufficient); UCC § 9-108(e)(1) (“a description only by type is an insufficient description for a commercial tort claim”). See also UCC § 9-108 cmt. 2.

security interest cannot be attached to a commercial tort claim under an after-acquired property clause.⁵¹⁹

D. Future IP

The UCC-9 allows the creation of security interests in the after-acquired assets, in which case the attachment occurs when the debtor acquires the rights in the after-acquired collateral.⁵²⁰ So, there is no problem of creating security interests in future IP. For example, in the case of patents, creditors could also obtain a grant of a security interest in all inventions, issued patents, and patent applications which the debtor owns, in whatever rights the debtor may have had or may in the future have against third persons that use or infringe the rights it owns, and in whatever transferable rights the debtor may have to use corresponding rights owned by others. A simple description like “including all now existing and hereafter acquired or created IP, as well as everything associated with the IP” is sufficient to cover the future IP.

However, as discussed below in Section 4.3.3 about perfection, security interests in many types of IP, especially patents, registered copyrights, federal trademarks, also need registration with the federal USPTO or Copyright Office, in order to be effective against subsequent creditors and assignees. The registration can only be done to registered IP and must be with specific reference to the encumbered IP. In this case, a registration of security interests in future IP for perfection would be difficult and even impossible in practice.

In order to ensure that its security interest continues to be perfected in such after-acquired IP, the creditor may have to monitor the debtor’s activity closely and continuously make separate new federal registrations for new items of IP. In practice, the creditor may find some protection by requiring in the security agreement periodic (for example, monthly or quarterly) reporting and registration of after-acquired IP interests.⁵²¹ For example, in the case of unregistered copyright, the creditor can include in the security agreement a requirement that the debtor has to inform the

⁵¹⁹ UCC § 9-204(a) (creation of security interests in after-acquired collateral), UCC § 9-204(b)(2) (a security interest does not attach under a term constituting an after-acquired property clause to a commercial tort claim). *See also* Murphy (2002), “Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property”, *supra note* 494 at 319-320.

⁵²⁰ UCC § 9-204(a) (creation of security interests in after-acquired collateral),

⁵²¹ Makovicka (2012) “Security Interests in IP - Part 2: Collateralizing & Creating Security Interests in IP,” *supra note* 515 at 23.

lender as soon as an unregistered copyright becomes registered (see detailed discussion below at the section of perfection).⁵²²

4.3.2.3 General description of encumbered IP in security agreements

With a strong tradition of following the principle of party autonomy, just for the purpose of making the security interest effective between parties, there is minimal requirement in US law on the format or content of the security agreement creating security interests in IP. The security agreement is only required to be able to “reasonably identify what is described”.⁵²³ A description by category, by type (with exceptions⁵²⁴), by quantity, in the way of computational or allocational formula or procedure; or by any other method as long as the identity of the collateral is objectively determinable, is considered as being sufficient for “reasonable identification”.⁵²⁵ So, if the parties aim at claiming all general intangibles (including all IP assets), a collateral description as simple as “all general intangibles” is sufficient.⁵²⁶ This approach can greatly reduce transactional costs by simplifying the process. It has been criticized that the use of the term “general intangibles” will put IP holder/debtors at a disadvantage, because they may not fully realize the precise scope of the IP to be encumbered and later realize that the coverage is much broader than they thought.⁵²⁷ While the UCC-9 sets minimal requirements on general description only, the parties are always free to (and actually should) make more specific-listing description to ensure the legal certainty of the transaction.

Although the legal rules are extremely simple, the practice is much more complicated. Trademarks may be taken as an example. Upon default, the secured lender may sell the collateral only if it “(a) owns the trademark, and (b) transfers the goodwill associated

⁵²² *Ibid.*

⁵²³ UCC § 9-108(a).

⁵²⁴ *E.g.*, for commercial tort claims, a description only by type is insufficient to enable identification, *see* UCC § 9-108(e)(1).

⁵²⁵ UCC § 9-108(b).

⁵²⁶ However, an even more general description of collateral as “all the debtor’s assets” or “all the debtor’s personal property” or using words of similar import does not reasonably identify the collateral. *See* UCC § 9-108(c). However, at the later stage for the further purpose of perfecting the created security interests against third parties, a financing statement covering all assets or all personal property is sufficient in the indication of collateral for filing. *See* UCC § 9-504 (2).

⁵²⁷ Xuan-Thao Nguyen, “Collateralizing Intellectual Property,” *Georgia Law Review* 42, no. 1 (2007): 1–45 at 42 (specifying that “the broad definition has the negative side-effect of not giving the debtor, the creditor, and others sufficient notice of the reach of the security interest in these types of intellectual property assets.”).

with the trademark along with the trademark itself.”⁵²⁸ For this reason, it is advised to avoid the use of assignment language in the security agreement,⁵²⁹ and to include two important provisions in any security agreement covering trademarks, “First, the agreement should include an irrevocable power of attorney allowing the lender to execute an assignment on behalf of the borrower upon default. Second, if the collateral description mentions trademarks in general or a specific trademark, the description should include “all goodwill associated therewith” or “all general intangibles”.⁵³⁰

4.3.2.4 Pre-default rights and obligations of debtors and secured creditors

As there is no legal rule specifically for IP collateralization, all the allocation of pre-default rights and obligations between the debtors and the secured creditors are left to the autonomy of the parties. No mandatory rules or non-mandatory recommendations have been given in the laws.

4.3.3 Perfection, Publicity and Priority

For the further purpose of perfecting the security interests created against third parties, like subsequent creditors and assignees, a financing statement must be duly filed.⁵³¹ The main issue here is there are two registration schemes available concurrently at two different levels. The IP laws for the three main types of IP provide a federal-level title recordation-filing scheme for ownership and assignment. Meanwhile, the UCC-9 also provides a state-level filing scheme for registering general security interests, which may apply as well. The main issue here is whether the federal-level filing preempts the state-level UCC-9 filing or not.⁵³² The answer determines at which level the

⁵²⁸ See Makovicka (2012) “Security Interests in IP - Part 2: Collateralizing & Creating Security Interests in IP,” *supra note* 515 at 22.

⁵²⁹ See Makovicka & Bikus (2012). “Security Interests in IP - Part 1: Tangible Problems in an Intangible World,” *supra note* 502 at 21.

⁵³⁰ *Ibid* (specifying “Goodwill is classified as a kind of “general intangible” under the UCC-9, if the collateral description includes “all general intangibles”, a specific reference to the goodwill associated with the trademark(s) is not necessary.”)

⁵³¹ UCC § 9-310(a).

⁵³² UCC § 9-311(a)(1) [Perfection of Security Interests in Property Subject to Certain Statutes, Regulations, and Treaties] (a) [Security interest subject to other law.] “Except as otherwise provided in subsection (d), the filing of a financing statement is not necessary or effective to perfect a security interest in property subject to: (1) a statute, regulation, or treaty of the United States whose requirements for a security interest’s obtaining priority over the rights of a lien creditor with respect to the property preempt Section 9-310(a).” For example, in US law, it has long been accepted that “the recording of patents in the United States Patent and Trademark Office is a “constructive notice” to the world of their existence.” *In re Cybernetic Service, Inc.*, 252 F.3d 1039, 44 U.C.C Rep. Serv. 2d 639 (9th Cir. 2001) (The US Court has confirmed that “Congress

registration for perfection should be done. The lack of clarity about the interface between the two registration regimes and the lack of uniformity and consistency in the relevant federal IP laws make the rules for perfection of security interests vary for different types of IP, and bring lots of legal uncertainties regarding the priority order among parties with conflicting interests.

4.3.3.1 Dual-registration system

A. Patent

For security interests in patents, there are two registration schemes available. The federal Patent Act requires a federal recordation in the United States Patent and Trademark Office (USPTO) to make an “assignment, grant, or conveyance of a patent or application for patent” valid, as against a bona fide “subsequent purchaser or mortgagee”.⁵³³ Case law has established that the grant of security interests in a patent is a **lesser** transfer than an “assignment” governed under the Patent Act, so there is no federal preemption.⁵³⁴ A state-level UCC filing should be necessary for perfecting security interests in patents against the subsequent creditors; and a filing only with the USPTO would be fatal for a creditor.⁵³⁵

However, the UCC filing omits the bona fide purchaser. As a subsequent purchaser has no obligation to search the UCC filing to find out the existing security interests in the patents to be purchased, a UCC registration alone does not constitute a constructive notice. If a search in the USPTO reveals no existence of previously created security interests in the patents to be purchased, the subsequent purchaser can claim for being bona fide and hence having an ownership with a priority over the

intended for parties to record their ownership interests in a patent so as to provide constructive notice to subsequent holders of an ownership interest.”).

⁵³³ 35 U.S.C. § 261 (governing ownership and assignment of patents and provides a federal-filing scheme for protecting patent rights – “An interest that constitutes an assignment, grant or conveyance shall be void as against any subsequent purchaser or mortgagee for a valuable consideration, without notice, unless it is recorded in the Patent and Trademark Office within three months from its date or prior to the date of such subsequent purchase or mortgage”).

⁵³⁴ Courts have reasoned that the grant of security interests in a patent is a lesser transfer than an “assignment”, and therefore does not fall within the “assignment, grant, or conveyance” under 35 U.S.C. § 261. As the Patent Act has not directly referred to the registration of a security interest/mortgage, it does **not** preempt the UCC-9 regarding the perfection of security interests in patents. The UCC-9, therefore, would apply in this regard. See *In re Cybernetic Services, Inc.*, 252 F.3d 1039 (9th Cir. 2001).

⁵³⁵ See *In re Tower Tech, Inc.*, 67 Fed. Appx. 521 (10th Cir. 2003) (a filing only with the USPTO cannot make the security interests in patents valid as against subsequent creditors).

security interests.⁵³⁶ Therefore, in order to keep the priority over the bona fide subsequent purchasers of the encumbered patents, a prudent creditor is also advised to have a federal-level registration with the USPTO, which is for disclosing the existence of his security interests in the encumbered collateral.⁵³⁷

In summary, for ensuring the maximum protection for the creditor, the current customary practice is to have a **dual registration** of the security interests at both the state-level UCC, for perfecting the security interests as against **subsequent creditors**, and the federal-level USPTO, for protecting against **subsequent purchasers** of the encumbered patents.

B. Trademarks

In US law, there are three classes of trademarks: (a) common law unregistered trademarks, (b) stateily registered trademarks for the use of trademark within the state only, and (c) federally registered trademarks for inter-state use. For the first two types of trademarks, which arise under state law, perfection is accomplished by a state-level UCC filing as well. With respect to a federally registered trademark, legal rules and case law are almost the same as those for patents.

For the federally registered trademarks, the case law has also established that the Lanham Act does not preempt the UCC-9 either, because security interests in trademarks are **not** considered as assignments.⁵³⁸ A state-level UCC filing is therefore

⁵³⁶ Rhone-Poulence Agro, S.A. v. DeKalb Genetics Corp., 284 F.3d 1323 (Fed. Cir. 2002) (the creditor cannot use a UCC registration to claim that the subsequent purchaser has actual knowledge about the pre-existing security interests; a bona fide subsequent purchaser with a duly recorded assignment at the USPTO would defeat a secured creditor that has not filed in the USPTO). So, a UCC filing alone cannot protect creditors against subsequent purchasers of the encumbered patents.

⁵³⁷ The creditor can record **the whole security agreement** or, alternatively, **an abbreviated agreement**, which restates the grant of the security interests, identifies the patent in compliance with USPTO recording requirements, and cross-references the security agreement. See *Moldo v. Matsco* (In re Cybernetic Servs., Inc.), 252 F. 3d 1039 (9th Cir. 2001). With this federal USPTO filing, purchasers of patents are likely to acquire actual notice of the short form patent security agreement through a USPTO search even if the filing still does not constitute constructive notice. Makovicka & Bikus (2012). "Security Interests in IP - Part 1: Tangible Problems in an Intangible World," *supra note* 502 at 21.

⁵³⁸ In the US, the federally registered trademarks are governed under the Lanham Act (15 U.S.C). Section 1060 of the Lanham Act stipulates that assignments must be registered federally in order to preserve "distinctiveness", and provides a federal filing scheme for registering assignments of federally registered trademarks. Similar to the Patent Act, the clause does not specifically refer to security interests. See 15 U.S.C. § 1060. The relevant case law has also established that security interests in trademarks are **not** considered as assignments. See *Roman Cleanser Co. v. National Acceptance Co.*, 43 B.R. 940 (E.D. Mich. 1984) (ruling that a security interest in a trademark is not equivalent to an assignment; the federal assignment recordal

necessary for perfecting security interests against subsequent creditors. In the same way as with patents, without a USPTO registration, a bona fide subsequent purchaser of the encumbered trademark may defeat the creditor's priority.⁵³⁹ So, similar to the case of patents, for perfecting security interests in federally registered trademarks, a **dual-registration** with both the state-level UCC and the federal-level USPTO is advised to a prudent creditor.

C. Copyrights

The case law involving perfecting security interests in copyright has been the most controversial. Although the current US Copyright law has precluded the requirement of registration as a condition for the subsistence of copyright after the US finally changed law to be a state member of the Berne Convention in 1989,⁵⁴⁰ compared to many other jurisdictions, the US keeps a deeply rooted tradition of registering copyrights. As copyrights may be federally registered or unregistered, the rules for perfecting security interests are also different.

For registered copyrights, the federal Copyright Act has clearly preempted the state UCC-9. In contrast with the cases of patents and federally registered trademarks discussed above, the Copyright Act, by its terms, has already specifically referred to governing security interests (mortgage) in registered copyrights.⁵⁴¹ The leading cases have also confirmed that a federal filing with the Copyright Office is the exclusive method of perfecting security interests in registered copyrights, as against both

provisions did not trigger the UCC preemption); *In re Chattanooga Choo-Choo Co.*, 98 B.R. 792 (E.D. Tenn. 1989) (a service mark is a UCC general intangible requiring the filing of a financing statement); *In re Trimarchi v. Together Dev. Corp.*, 255 B.R. 606 (D. Mass. 2000) (the creditor's security interest was unperfected and voidable in bankruptcy because the secured creditor filed the financing statement with the USPTO rather than with the secretary of state.)

⁵³⁹ See 15 U.S.C. § 1060 (an assignment of federally registered trademarks should be **void** against any subsequent purchaser for valuable consideration without notice, unless the prescribed information reporting the assignment is recorded in the USPTO).

⁵⁴⁰ According to the Berne Convention, copyright rights arise automatically upon creation and cannot be dependent upon formalities such as registration. In the current US copyright law, copyrights exist automatically upon creation of the work whether or not registered with the Copyright Office.

⁵⁴¹ Section 205 of the Copyright Act provides a federal filing scheme for the registration of ownership and for the recordation of "any transfer of copyright ownership". See 17 U.S.C. § 205. Meanwhile, its Section 101 defines "transfer of copyright ownership" as "an assignment, mortgage, exclusive license, or any other conveyance, alienation, or hypothecation of a copyright or of any of the exclusive rights comprised in a copyright". See 17 U.S.C. § 101. There is a federal-level filing scheme provided for the perfection of security interests in registered copyrights.

subsequent creditors and subsequent purchasers.⁵⁴² A UCC-9 filing is neither necessary nor adequate to perfect a security interest in a registered copyright.

For unregistered copyrights, the rules are not so straightforward. As the federal Copyright Office's filing scheme is only available for registered copyrights, the issue relevant here is if a UCC-9 filing would be sufficient for perfecting a security interest in an unregistered copyright. With the absence of clear rules in both the Copyright Act and the UCC-9, case law is also unsettled. While some cases have held that all copyrights **must be** registered with the Copyright Office in order to perfect a security interest in them,⁵⁴³ some cases have held that a state-level filing with the UCC **might be** adequate for perfecting a security interest in an unregistered copyright.⁵⁴⁴ Without consistent case law, in order to reduce the legal uncertainty, a prudent commercial creditor is highly advised to take the first approach – always registering with the Copyright Office.⁵⁴⁵

However, the federal Copyright Office's filing scheme is not possible for unregistered copyrights. For this reason, a creditor should always register the copyright to be encumbered firstly, and then perfect the registered copyright with the Copyright Office. The problem is that, in some cases, it may not be practicable to register the copyright first. For example, in the software industry, software is likely to be revised frequently. Keeping registering copyrights for all the versions of software is just impractical. In such a case, a lender may choose to file the unregistered copyright as general intangible under the UCC-9 firstly and then keep monitoring whether the unregistered copyright becomes registered afterwards. The monitoring can be done by means of including appropriate covenants and warranties in the copyright security agreement,

⁵⁴² *In re World Auxiliary Power Co.*, 303 F.3d 1120 (9th Cir. 2002) (the Copyright Act's use of the word "mortgage" as one definition of a "transfer" includes security interests under the UCC-9). Courts reject the proposition that federally registered copyrights are properly perfected under the UCC. *In re Peregrine Entertainment, Ltd.*, 116 B.R. 194 (Bankr. C.D. Cal. 1990) (the bankruptcy court held that federal copyright laws stipulate copyright must be recorded federally in order to perfect that security interest); *In re AEG Acquisition Corp.*, 127 B.R. 34 (C.D. Cal. 1991), *aff'd* 161 B.R. 50 (9th Cir. 1993) (federal filing is the exclusive method of perfection for federally registered copyrights).

⁵⁴³ *E.g.*, *AEG Acquisition Corp.*, 127 B.R. 34 (it was held that copyrights must be registered with the Copyright Office in order to perfect a security interest in them. Thus, according to this decision, it would seem there can be no perfected security interest in an unregistered copyright); *In re Avalon Software, Inc.*, 209 B.R. 517 (Bank. D. Ariz. 1997).

⁵⁴⁴ *E.g.*, *World Auxiliary Power*, 303 F.3d at 1128; *Aerocon Engineering Inc. v. Silicon Valley Bank* 244 B.R. 149 (Bank. N.D. Cal. 1999).

⁵⁴⁵ *See Makovicka* (2012) "Security Interests in IP - Part 2: Collateralizing & Creating Security Interests in IP," *supra note* 515 at 23.

such as requiring the debtor to promptly notify the creditor as soon as the debtor registers the previously unregistered copyrights. With the notification, the lender would take appropriate action immediately to perfect the security interests in the copyright subsequently registered with the Copyright office.⁵⁴⁶

The same problem also exists for the dual-registration of security interests in future patent and federal trademarks. As the registration of security assignment in the USPTO is possible only for registered patent and federal trademarks, the creditors must make the same contractual arrangement in the security agreement, register the security interest first at the UCC and take active monitoring in order to make the federal USPTO filing as soon as the future patent and federal trademarks get registered (*See* also the Section 4.3.2.2 D on future IP).

In the case of state-level UCC registration, there is another complicated issue about in which state to register. A deeper discussion into this issue requires a comprehensive exploration into the choice of laws and is beyond the scope of our comparative study.

In sum, the rules for perfecting security interests vary for different types of IP.⁵⁴⁷ The absence of uniform rules for all kinds of IP, and the dual-registration system for patents and federal trademarks, have been criticized for giving rise to a great deal of legal uncertainty, being time-consuming and cost-inefficient. In practice, many security agreements may simply include all of the debtor's IP, registered or unregistered, existing or future, as collateral. The creditors should be very careful to ensure that their security interests are properly perfected. As early as the 1980s, there were plenty of efforts at building a more integrated and rationalized security interests recordation system at the federal level, in order to bring greater certainty into the

⁵⁴⁶ *Ibid.*, at 23.

⁵⁴⁷ For perfecting a security interest in a registered copyright, a single federal registration of the security interest in the Copyright Office is sufficient. For perfecting a security interest in an unregistered copyright, although a state-level UCC registration might be adequate for perfection, the best practice may be to register the unregistered copyright when it is possible and immediately register the security interests with the Copyright Office. For patents and federally registered trademarks, the best practice is always to take a dual-registration with both the federal-level USPTO and the state-level UCC. For state-level registered trademarks and common law unregistered trademarks, perfection may only be accomplished by a state-level UCC filing.

recording of security interests in the federal IP.⁵⁴⁸ However, not many actual improvements have been done.

4.3.3.2 A Notice-based registration system

For a state-level UCC registration, perfection of a security interest in IP requires only a recordation of a financing statement, which is designed to give rudimentary public notice about the existence of a security interest established by the debtor and the secured party in the described collateral, or in the indicated “types” of collateral. The description requirement for the financial statement is even **less stringent** than that for the general description in the security agreement. A financing statement only needs to indicate the names of the debtor and the secured party and the covered collateral.⁵⁴⁹ A simple description of the collateral as “all assets (or all personal property) of the debtor, now owned or hereafter acquired” will suffice to perfect a security interest in any IP owned by the debtor, as long as the “general intangibles” category or some more precise description is used in the security agreement.⁵⁵⁰ If the parties aim at claiming all general intangibles (including all IP assets), a collateral description as simple as “all general intangibles” is sufficient. Of course, parties are always able to (and actually should) identify the IP collateral more specifically. The registries do not make any scrutiny.

For patents and federally registered trademark, a dual-registration is highly recommended. A registration with the federal USPTO is also necessary to make the security interests effective against subsequent assignees. For registration at the USPTO, filing a mere “notice” is insufficient; the security agreement must be registered. The creditor can choose to record **the whole original security agreement** or, alternatively, **an abbreviated agreement**, which restates the grant of the security interests, specifically identifies the encumbered patents and trademarks in compliance

⁵⁴⁸ These problems have been the subject of a great deal of work over several years, beginning with the International Trademark Association at least as early as the late 1980s and, more recently, by the Joint Task Force of the Business Law and Intellectual Property Law Sections of the American Bar Association (the “Federal Intellectual Property Security Act” advances the IP community). The AIPLA supports uniformity in the various systems for filing security interests or ownership changes involving federal IP rights.

⁵⁴⁹ UCC § 9-502.

⁵⁵⁰ UCC § 9-504(2). Note: in the security agreement for the purpose of creating security interests in IP, an even more general description of collateral as “all the debtor’s assets” or “all the debtor’s personal property” or using words of similar import does not reasonably identify the collateral, *see* UCC § 9-108(c).

with USPTO recording requirements, and cross-references the security agreement.⁵⁵¹ The latter way can reveal less information about the security agreement to the public.

The filing requirement of the USPTO for more specific reference to the encumbered IP can create problems for perfecting the security interests in future IP, which have not existed and may not be specifically referred to the time of filing. In order to safeguard its security interest continues to be perfected in future IP, the creditors should take additional care and steps as mentioned in Section 4.3.2.2 D.

4.3.3.3 Priority rules

A. Conflicting security interests

In the US, the priority among conflicting security interests in the same collateral is also established by the time of filing.⁵⁵²

B. Pre-existing license/assignment vs. security interests – Grace Period problem

Following the “first-to-file rule” and the “principle of continuation of disposition”, a properly “perfected” security interest in a collateral only affects the transactions occurring afterwards. When an IP owner creates security interests in its own IP as collateral, the pre-existing license in the encumbered IP is not affected by the later security interest.

One issue having been comprehensively discussed about the priority order between the pre-existing assignment and security interests is the “grace period” in IP law. For patents and federally registered trademarks, there is a “generous” three-month look-back grace period for registering “assignment, grant or conveyance” with the USPTO.⁵⁵³ The grace period allows an assignee to register his assignment within three months from the date of assignment and still keep the priority back to the date of assignment, instead of the actual registration-date. A creditor cannot be completely sure about its priority order even after a completely diligent and accurate search at the

⁵⁵¹ See, e.g., *Moldo v. Matsco (In re Cybernetic Servs., Inc.)*, 252 F. 3d 1039 (9th Cir. 2001).

⁵⁵² UCC § 9-322(a).

⁵⁵³ As to patents, Section 261 of the Patent Act states that “an assignment, grant or conveyance shall be void as against any subsequent purchaser or mortgagee for a valuable consideration, without notice, unless it is recorded in the Patent and Trademark Office within three months from its date or prior to the date of such subsequent purchase or mortgage.” 35 U.S.C. § 261. Similar rules exist under the Section 1060 of the Lanham Act as well (15 U.S.C. §1060).

USPTO, because it may find that its security interests in the patents or trademarks cannot be used against some assignees because the assignments had happened before his search but just had not been recorded yet by the time of search.⁵⁵⁴ Only another post-closing search can reveal the existence of all the existing transactions. Although, in practice, creditors are advised to require representations or warranty from the debtor guaranteeing that no competing assignments have been granted, the legal uncertainty still exists and increases the transaction cost.

When a licensee uses its interests under an IP license as collateral, the pre-existing license is “partially” prior to the security interests. If there is an anti-assignment or anti-encumbrance clause in the pre-existing IP license agreement, the US law invalidates such a clause to the extent that it impairs the creation or perfection (note: but not the enforcement) of security interests in the IP license (see further discussion in Chapter 5).⁵⁵⁵

C. Secured creditors and subsequent licensees/assignees – with ordinary course non-exclusive licensee exception

In the UCC-9, the general rule on the priority order among secured creditors and subsequent licensees and assignees is that, a properly “perfected” security interest in collateral continues after a sale, license, exchange, or other disposition of the collateral, unless the secured creditor authorized the disposition free of the security interest.⁵⁵⁶ Same rule applies to the case of IP collateralization. A bone fide licensee takes the license free of “unperfected” security interests.⁵⁵⁷

An exceptional protection is given to the “non-exclusive licensees in ordinary course

⁵⁵⁴ Alice Haemmerli, “Insecurity Interests: Where Intellectual Property and Commercial Law Collide,” *Columbia Law Review* 96, no. 7 (1996): 1645–1752. For example, if patent holder A assigns its patent to assignee B on 1st January, B can register the assignment any day before 1st April (the registration keeps the priority back to 1st January). On 1st February, when patent holder A is negotiating with the lender C about using the patent as collateral, even when the lender C diligently checks all the recordation at the USPTO, he cannot find any record showing that the patent has been assigned to B. Based on the check, the lender C accepts the patent as collateral on the 1st March. However, later, the lender C may surprisingly find out that the assignee B has registered the assignment on 20th February, which is later than the check day (1st February) but earlier than the creation of the security interests (1st March), and still within the grace-period (till 1st April). As the registration on 20th February actually keeps the priority back from 1st January, the lender C finds out that its security interests in the patent created on 1st March is “void” against the assignee B. The lender C cannot enforce the security interests against the assignee B at all.

⁵⁵⁵ UCC 9-408 (a) and (d).

⁵⁵⁶ UCC § 9-315.

⁵⁵⁷ UCC § 9-317(d).

of business”,⁵⁵⁸ who can take its rights under a “non-exclusive” license free of a prior perfected security interest created by the licensor, even when the licensee knows of the existence of the security interests.⁵⁵⁹ The “non-exclusive” restriction was added in the last minute before the final approval of the Revised UCC-9, mainly because of the pressure from segments of the Copyright Bar that was against the extension to exclusive copyright licenses.⁵⁶⁰ The ordinary course of business exception only holds a non-exclusive licensee free of a security interest created by its immediate ordinary course licensor.⁵⁶¹

4.3.4 Enforcement

In US law, with the silence in federal laws, the enforcement of security interests in all types of IP is governed by the UCC-9 or other applicable state laws. Upon default, a secured lender has a variety of non-exclusive UCC-9 mechanisms to get recovery.⁵⁶² The secured creditor may reduce a claim to judgment, foreclose, or otherwise enforce the claim or security interest by any available judicial or non-judicial procedure inside or outside the structure of the statute.⁵⁶³

With the consent from the debtor, the secured creditor may exercise the legal right to

⁵⁵⁸ UCC § 9-321(a) (321 [License of General Intangible and Lessee of Goods in Ordinary Course of Business] (a) [“Licensee in ordinary course of business.”])”In this section, “licensee in ordinary course of business” means a person that becomes a licensee of a general intangible in good faith, without knowledge that the license violates the rights of another person in the general intangible, and in the ordinary course from a person in the business of licensing general intangibles of that kind. A person becomes a licensee in the ordinary course if the license to the person comports with the usual or customary practices in the kind of business in which the licensor is engaged or with the licensor’s own usual or customary practices.”)

⁵⁵⁹ UCC § 9-321(b).

⁵⁶⁰ See Murphy (2002) “Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property”, *supra note* 494 at 518.

⁵⁶¹ *Ibid.*, at 519 (giving examples that “If for example, the licensor grants an unauthorized **exclusive** license to use the intellectual property while such property is already subject to a perfected security interest created by the licensor, the exclusive licensee takes subject to the perfected security interest. If thereafter, the exclusive licensee grants a nonexclusive sublicense, the **nonexclusive licensee** could not rely on section 9-321(b) for protection against the security party, even if the sublicense was taken in the ordinary course. The nonexclusive sublicensee would not hold the sublicense free of the original perfected security interest because that interest was not created by its immediately ordinary course licensor.”)

⁵⁶² See UCC § 9-601(c)

⁵⁶³ See UCC § 9-601(a) (providing rights of the secured party after debtor default. “After default, a secured party... may reduce a claim to judgment, foreclose, or otherwise enforce the claim, [or] security interest..., by any available judicial procedure); UCC § 9-609, cmt. 3 (providing that the secured party’s right to repossess collateral either through self-help or judicial means. The secured party has several options: (1) it can initiate an action for payment of the outstanding loan; (2) it can request judicial intervention to foreclose on the collateral; or (3) it can exercise self-help to seize the collateral so long as no breach of the peace occurs).

“strict foreclosure” and keep the IP collateral in full or partial satisfaction of the debt (or called “acceptance in satisfaction”).⁵⁶⁴ As the consequences of a strict foreclosure, the secured party acquires all of debtor’s rights in collateral and the debt is discharged, meaning the secured creditor cannot pursue the debtor for any deficiency. If the secured party later sells the collateral to a third party, the debtor is not entitled to any surplus yielded.⁵⁶⁵ This remedy provides great flexibility and is often used in peaceful workouts. Otherwise, the usual method of disposition is a UCC foreclosure sale, in which the secured lender may sell the collateral in a public or private disposition and apply the proceeds to the satisfaction of the debt, through either judicial or non-judicial procedure.⁵⁶⁶

A problematic issue in the foreclose sale of IP collateral is how to target the correct “regular market” in order to conform with the “commercially reasonable” requirement under the UCC 9. In the case of IP collateralization, as typically no universally recognized “regular market” for patents, trademarks, or copyrights exists in most cases, ensuring that a disposition is “commercially reasonable” presents difficulties.⁵⁶⁷ Case law has established that the most difficult part in the disposition process for the secured creditor is to locate the best market,⁵⁶⁸ to make sufficient adverting efforts in the best market,⁵⁶⁹ and to disclose necessary information about the encumbered IP, in order to find the most promising buyers and to allow the potential buyers to make appropriate evaluation of the encumbered IP.⁵⁷⁰ In some cases the best market for the encumbered IP may not even be the same as the market for the debtor’s business as a

⁵⁶⁴ See UCC § 9-620 [Acceptance of Collateral in Full or Partial Satisfaction of Obligation].

⁵⁶⁵ See U.C.C. § 9-622 [Effects of acceptance of Collateral]; U.C.C. § 9-622 cmt. 2.

⁵⁶⁶ See Jeff Makovicka and Chris Bikus, “Security Interests in IP - Part 3: Realizing on IP Collateral,” *Nebraska Banker* August (2012): 20–21 at 20.

⁵⁶⁷ Makovicka and Bikus (2012), *ibid*, at 21.

⁵⁶⁸ In *In re Four Star Music Co.*, 2 B.R. 454 (Bankr. M.D. Tenn. 1979) (four Star Music involved the sale of a copyrighted music catalog that was held not to have been carried out pursuant to commercially reasonable practices based upon the lender’s failure to seek specialized advice, obtain competent appraisal, and make attempts to reach logical purchasers).

⁵⁶⁹ Advertising in the correct market is equally important to a commercially reasonable disposition. In the case of IP with a specific use within a specific industry, trade publications and the appropriate sections of publications in general circulation may be required. See *Connex Press, Inc. v. International Airmotive, Inc.*, 436 F. Supp. 51, 55 (D.D.C. 1977) (an advertisement for an airplane which appeared in the Wall Street Journal but not in the “Aviation” section is not advertised “in the correct market”).

⁵⁷⁰ Such advertising should reach the relevant market and also disclose whatever information necessary to allow buyers in the particular trade to value the assets involved. *In re Four Star Music Co., Inc.*, 2 B.R. at 462– 63 (in disposing of IP rights in a music catalogue, the secured party must make significant attempts to reach the most logical purchasers, and the basic information, which should be made available to potential buyers, must be accumulated).

whole.⁵⁷¹ So secured creditors are advised to enlist the debtor or other persons who know the debtor’s business, or similar kinds of IP as the encumbered IP, to assist in finding the correct market.

With so much legal uncertainty regarding whether a foreclose sale of IP collateral conforms with the “commercially reasonable” requirement under the UCC 9, the “safest” way of having a “clean” enforcement of security interests in IP is through the judicial process.⁵⁷²

4.4 UNCITRAL’s Supplement on IP Collateralization

4.4.1 Background

4.4.1.1 Other international efforts

The international community has noticed the imperative need to articulate effective principles for secured transactions involving IP and has been working on promoting harmony between the secured transaction law and IP law for a long time. The fragmentation of laws pertaining to border-crossing IP collateralization is multiplied due to the legal diversity and pluralism in the international context. However, in line with their status at the national level, IP law and secured transaction law, at the international level, are traditionally subject to two separate regulatory administrative frameworks. International organizations specialized in IP laws or those specialized in secured transaction laws or financial laws can only make efforts within their limited regulatory frameworks and may not be able to fully take into account the developments in relevant neighboring fields. This limitation unavoidably impedes the international organizations from achieving significant progress.

The efforts in international law in the IP sector are mainly conducted by the WIPO. Traditionally, the constitutional mandate of WIPO is promoting IP protection through international cooperation.⁵⁷³ In recent years, after having recognized the trend that IP

⁵⁷¹ See *Wells Fargo Business Credit v. Environamics Corp.*, 77 Mass. App. Ct. 812, 821-22 (2010) (the dispute is about whether the WFBC’s methods of sale were commercially reasonable among dealers in the type of property that was the subject of the disposition).

⁵⁷² Makovicka and Bikus (2012), “Security Interests in IP - Part 3: Realizing on IP Collateral,” *supra note* 566 at 21.

⁵⁷³ Article 3 [**Objectives of the Organization**], the *Convention Establishing the World Intellectual Property Organization*.

is becoming an increasingly important source in secured transactions and the need to promote the effective financial exploitation of IP assets, the WIPO also started to fund research and to provide training programmes on IP financing and IP commercialization.⁵⁷⁴ The WIPO has incorporated IP collateralization into some treaties administered by it; for instance, the *Patent Law Treaty* harmonizes and streamlines formal procedures regarding patent applications and patents, and specifically refers to security interests.⁵⁷⁵ However, these rules are mainly on procedural issues and do not refer to any substantive issues on IP collateralization.

Among the international instruments regarding the modern secured transactions law,⁵⁷⁶ two of them have been endorsed by a number of countries and multilateral organizations and are valuable for the secured financing reform. They are the *World Bank Principles for Effective Insolvency and Creditor Rights System*⁵⁷⁷ and the *United Nations Convention on the Assignment of Receivables in International Trade*⁵⁷⁸ in 2001. The former has specific reference to IP collateralization, providing that there should be an “allowance of security interests in all types of movable assets [...], including [...] intellectual property and its proceeds”,⁵⁷⁹ and “special registries are beneficial in the case of certain kinds of assets, such as [...] certain types of intellectual property (such as trademarks and copyrights).”⁵⁸⁰ However, these rules contain mainly general principles and do not touch upon any specific issues. The latter proposes many important principles for creating and enforcing security interests,

⁵⁷⁴ See further information concerning these programs at: <http://www.wipo.int/sme/en/>.

⁵⁷⁵ Article 14 (Regulation) of the *Patent Law Treaty* (PLT) (providing “(1) (Content) [...] (b) The Regulations also provide rules concerning the formal requirements which Contracting Party shall be permitted to apply in respect of requests for: [...] (iii) Recordation of a license or a security interest.”

⁵⁷⁶ There are also many regional instruments, e.g. the *Model Law on Secured Transactions*, European Bank for Reconstruction and Development (EBRD), London, 1994; the *Uniform Act Organizing Securities*, the Organization for the Harmonization of Business Law in Africa, 1 January 1998; the *Law and Policy Reform at the Asian Development Bank – A Guide to Movable Registries 2000*, Asian Development Bank, December 2000; the *Model Inter-American Law on Secured Transactions*, Organization of American States, February 8, 2002. However, very few of them have incorporated specific rules concerning IP collateralization, e.g. the *Model Law on Secured Transactions* mentions IP in its Article 11, but merely states that there might be an additional registration for IP. Nor is there any expressed provision for IP collateralization in other instruments.

⁵⁷⁷ *World Bank Principles for Effective Insolvency and Creditor Rights System (Revised 2005)*, originally issued at April 2001, revised at December 2005.

⁵⁷⁸ *United Nations Convention on the Assignment of Receivables in International Trade*, United Nations General Assembly Resolution A/RES/56/81, 31 January 2002.

⁵⁷⁹ Part A (Legal Framework for Creditor Rights), A3 (Security (Movable Property)), *World Bank Principles for Effective Insolvency and Creditor Rights System (Revised 2005)*.

⁵⁸⁰ Part A (Legal Framework for Creditor Rights), A4.3 (Registry Systems), *World Bank Principles for Effective Insolvency and Creditor Rights System (Revised 2005)*.

however, without direct reference to IP.

4.4.1.2 Drafting process of the Supplement

Compared to other international efforts, the efforts of the United Nations Commission on International Trade Law (UNCITRAL)⁵⁸¹ on drafting the *Supplement dealing with security interest in intellectual property to the UNCITRAL Legislative Guide on Secured Transactions* (the Supplement) are the most important initiatives in the process of modernizing IP law and secured transaction law with a view of establishing a unitary system. It is for the first time that the international community has collectively undertaken efforts on the establishment of an efficient unitary legal framework for IP collateralization. The efforts led by UNCITRAL are supported by most of the other competent international organizations in related fields, such as, the WIPO, the World Bank and the International Monetary Fund (IMF). The active participation of experts from these international organizations has increased the diversity of professional opinions in the process of modernization. The exchange of ideas from various fields is aimed to ensure that the unitary system is consistent with principles of both modern secured transaction laws and IP laws.

The UNCITRAL firstly noticed the need to build a comprehensive system to modernize and harmonize national secured transaction laws to meet the demands of a global economy.⁵⁸² During the drafting of the *UNCITRAL Legislative Guide on Secured Transactions* (the Guide) with the goal of “alleviating the inequalities in the access to lower-cost credit between parties”,⁵⁸³ the UNCITRAL Commission started

⁵⁸¹ The UNCITRAL was established by the General Assembly of United Nations in 1966 with the general mandate of progressively harmonizing legislative reforms among Member States and unifying the laws of international trade, in order to reduce or remove the legal obstacles to the free flow of international trade among different countries and regions. While the WTO coordinates Member State’s efforts toward the harmonization of international trade law from the perspective of public international law, the UNCITRAL performs a similar role in the United Nations system for international trade law from a private law perspective.

⁵⁸² So the UNCITRAL started to draft the *Guide*, which was designed to include “a set of core principles for an efficient legal regime governing secured transactions” as well as detailed “model legislative provisions” covering almost all main issues of secured transactions law. Paragraph 357 and 458, *Report of the United Nations Commission on International Trade Law on its thirty-third session*, Official Records of General Assembly of United Nations, Fifty-fifth Session, Supplement No. 17 (A/55/17). And for an overview of UNCITRAL’s efforts in the sector of secured transactions, see Spiros V. Bazinas, “UNCITRAL’s Work in the Field of Secured Transactions,” in *Emerging Financial Markets and Secured Transactions*, ed. Joseph J. Norton and Mads Andenas, 1998, 211–18.

⁵⁸³ Paragraph 347, *Guide*. More specifically, the key objectives of the *Guide* are the following: 1. to promote low-cost credit by enhancing the availability of secured credit; 2. to allow debtors to use the full value

to realize that IP were assuming an increasingly important role in international trade as a value source of credit and thus should be included in the modern secured transaction law.⁵⁸⁴ The Commission noted that IP collateralization is generally compatible with the modern secured transaction law system recommended in the *Guide*, because the *Guide* does not mention issues relating to the existence, validity and content of the encumbered IP.⁵⁸⁵ However, it also noted that the distinctiveness of IP does bring a certain degree of incompatibility, especially on particular issues such as the creation, third-party effectiveness and enforcement of security interests. This divergence needed to be accommodated through certain adjustments.

To avoid a possible inconsistency between the *Guide* and the rules in IP laws, and to ensure that an enacting State's IP law would not be "inadvertently" changed as a consequence of the implementation of the recommendations given in the *Guide*,⁵⁸⁶ the Commission incorporated the *Guide* with Recommendation 4 (b) to prioritize national laws or international agreements concerning IP⁵⁸⁷ over the *Guide* in the event of an inconsistency.

Recommendation 4 (b)

"[T]he law should not apply to: (b) intellectual property, in so far as the provisions of the law are inconsistent with national law or international agreements, to which the State is a party, relating to intellectual property."

inherent in their assets to support credit; 3. to enable parties to obtain security rights in a simple and efficient manner; 4. to provide for equal treatment of diverse sources of credit and of diverse forms of secured transaction; 5. to validate non-possessory security rights in all types of asset; 6. to enhance certainty and transparency by providing for registration of a notice in a general security rights registry; 7. to establish clear and predictable priority rules; 8. to facilitate efficient enforcement of a secured creditors' rights; 9. to allow parties maximum flexibility to negotiate the terms of their security agreement; 10. to balance the interests of persons affected by a secured transaction; 11. to harmonize secured transactions laws, including conflict-of-laws rules. See Paragraph 46-59, Introduction, and Recommendation 1 (Key objectives of an effective and efficient secured transactions law), *Guide*.

⁵⁸⁴ Paragraph 81, *Report of United Nations Commission on International Trade Law on the Work of Its Thirty-ninth Session*, Official Records of the General Assembly, Sixty-first Session, Supplement No. 17, (A/61/17).

⁵⁸⁵ See Section A (4), A/CN.9/WG.VI/WP.42/Add.1.

⁵⁸⁶ See Paragraph 33, Part I, Commentary, *Guide*.

⁵⁸⁷ As a matter of fact, instead of "IP law", both the *Guide* and the Supplement use the expression "law relating to intellectual property", which refers to "law that governs specifically security rights in IP, and not law that generally governs security rights in various types of asset and that may happen to govern security rights in IP". For example, if a state adopted a law that applies specifically to pledges of rights in software, that would be a "law relating to intellectual property". This expression is not limited solely to statutory enactments but includes "both statutory and non-statutory law". It is broader than IP law but narrower than general contract law or property law. See Paragraph 88, Part I, Commentary, *Guide*; Paragraph 17, Supplement.

By this approach, the UNCITRAL could go on preparing the *Guide* without keeping the complicated IP issues in mind. However, the UNCITRAL also realized that this approach also has its drawbacks. It would be inefficient and impractical to separate IP laws entirely from the modern secured transaction law.⁵⁸⁸ First, this simple separation also prevents IP collateralization benefiting from the modernized secured transaction law. Second, the cross-cutting nature of IP collateralization determines that the separation is just impossible, because the adoption of suggestions in the *Guide* may still have certain implications for the national IP laws.

To address these drawbacks, the Commission determined that there was a need to draft a special annex on security interests in IP to the *Guide* as a supplement, i.e. the *UNCITRAL Legislative Guide on Secured Transactions: Supplement on Security Rights in Intellectual Property* (the Supplement).⁵⁸⁹ The *Supplement* endeavors to enhance the availability of low-cost secured credits without interfering with fundamental policies of IP law.⁵⁹⁰ It discusses ways of how the commentary and recommendations of the *Guide* would apply in the case of IP collateralization, points out possible implications which the *Guide* may have for the existing IP laws of enacting States and, only in a very few necessary cases, incorporates some modest IP-specific suggestions for enacting States.

The recommendations given in the *Guide* and the *Supplement* are non-binding rules. Enacting States are expected, with the consideration of the recommendations, to review and assess the economic efficiency of their secured transactions laws and IP laws, to identify inconsistencies among them, and to find out practical solutions to repair these inconsistencies. The final decisions on how best to domestically coordinate IP law with modernized secured transactions law would be made by enacting states themselves according to their own situations.

Because of the competing interests and heterogeneous legal cultures among the participating jurisdictions, the progress in drafting the *Supplement* was much slower

⁵⁸⁸ See Brennan (2009), “International Intellectual Property Financing: An Overview,” *supra* note 261.

⁵⁸⁹ The document was initially called the *Annex to the UNCITRAL Legislative Guide on Secured Transactions dealing with security rights in IP*, but was later changed to the *Supplement to the UNCITRAL Legislative Guide dealing with security interest in intellectual property* (the Supplement) later. See Paragraph 162, Report of the United Nations Commission on International Trade Law on the Work of Its Fortieth Session, Official Records of the General Assembly, Sixty-first Session, Supplement No. 17, A/62/17 (Part I).

⁵⁹⁰ Para 1 (Purpose of the Supplement) and para 46-52, Supplement.

than was expected.⁵⁹¹ After three years of negotiation and various drafts, the final text of the *Supplement* was eventually completed in February 2010 and approved by the United Nations General Assembly in December 2010.⁵⁹²

In the following part, we briefly discuss the controversial topics that emerged at the time of the drafting of the *Supplement* and examine the final rules in the *Supplement*. The examination is expected to reveal how the characteristics of IP give rise to numerous difficulties in the coordination of the two legal regimes and to see if the solutions adopted in the *Supplement* are effective in solving the difficulties.

4.4.2 Creation of Security Interests in IP

4.4.2.1 Transaction structure

In view of the objective of establishing a security right in a simple and efficient way,⁵⁹³ the *Guide* also makes a distinction between the **creation** and the **third-party effectiveness** of a security interest.⁵⁹⁴

With the strong influence from the UCC-9 and previous achievements in the modern secured transactions law, one basic policy of the system recommended by the *Guide* is to adopt a “functional, integrated and comprehensive” approach, which directs the focus on the substance rather than the form.⁵⁹⁵ The *Guide* treats all transactions that create a right in any movable asset (including intangibles rights) meant to secure the

⁵⁹¹ See Andrea Tosato, “The UNCITRAL Annex on Security Rights in IP: A Work in Progress,” *Journal of Intellectual Property Law & Practice* 4, no. 10 (2009): 743–750 at 746. Facing this pending dilemma, the Commission decided to first adopt the *Guide* at the resumed fortieth session in Vienna on 14 December 2007 (with the approval of the United Nations General Assembly on 11 December 2008). The *Guide* includes thousands of commentaries and 242 recommendations which are categorized into twelve chapters. It is the second text prepared by the UNCITRAL in the field of secured transaction law after the *United Nations Convention on the Assignment of Receivables in International Trade*. The Commission left the *Supplement* to further discussions under the Working Group VI. After the adoption of the *Guide*, the entrusted Working Group VI organized five sessions for discussion in cooperation with other professional organizations on some specific matters, such as Working Group V (Insolvency Law), WIPO and other IP institutions from the public and private sector as well as the Permanent Bureau of the Hague Conference on Private International Law. The various drafts can be found at: [http://www.uncitral.org/uncitral/en/commission/working_groups/6Security Interests.html](http://www.uncitral.org/uncitral/en/commission/working_groups/6Security%20Interests.html).

⁵⁹² *UNCITRAL Legislative Guide on Secured Transactions: Supplement on Security Rights in Intellectual Property*. Official Records of the General Assembly, Six-fifth Session, Supplement No. 17 (A/65/17), June 29, 2007, United Nations General Assembly Resolution 65/23 of December 2010.

⁵⁹³ Recommendation 1 (c), *Guide*; Paragraph 77, *Supplement*.

⁵⁹⁴ Recommendation 30, *Guide*.

⁵⁹⁵ Para 101-112, Chapter I, and Recommendation 8, *Guide*

performance of an obligation (i.e. the fulfillment of security functions) as secured transactions, and uniformly covers all these transactions with an integrated notion - “security rights”.⁵⁹⁶ For intangible assets like IP, security rights are uniformly created by the execution of a proper written security agreement between the secured creditor and the debtor/grantor.

4.4.2.2 Scope of IP eligible for collateralization

Consistent with the objective of “promoting low-cost credit by enhancing the availability of secured credit”,⁵⁹⁷ the *Guide* tries to cover as many assets as possible so as to enable the debtors⁵⁹⁸ to fully exploit the maximum value of their assets as collateral.⁵⁹⁹

The property right eligible for collateral is not limited to **ownership**, but can also be a **usufruct right** or a **contractual right** under an agreement.⁶⁰⁰ Similarly, a security right can be created not only in an **existing asset** but also in an **after-acquired asset**.⁶⁰¹ The security rights in the collateral should be extended automatically to the various forms of **proceeds** of the collateral, such as natural fruits or revenues, even proceeds of proceeds, except for being explicitly excluded.⁶⁰² Multiple security rights can be created in the same assets. Under the *Guide*, the sole general requirement for an asset to be encumbered (except for receivables) is that, under the domestic laws of enacting States or previous contracts, the asset is assignable for security credit purposes.⁶⁰³

⁵⁹⁶ Recommendation 8, Guide (providing “The law should adopt a functional approach, under which it covers all rights in movable assets that are created by agreement and secured the payment or other performance of an obligation, regardless of the form of the transaction or the terminology used by the parties [...]”). Even though some functional exceptions and adjustments are given to specific assets and transactions for special needs in certain situations, they are nevertheless minimal. *See* Recommendation 9, Guide.

⁵⁹⁷ Recommendation 1 (a), Guide.

⁵⁹⁸ Under the *Guide*, the person who creates the security right is called as a “grantor”; the person who owes the obligation or debt is a “debtor”. As the security can be provided by another party, the grantor may be a third party other than the debtor.

⁵⁹⁹ Recommendation 1 (b), Guide.

⁶⁰⁰ Paragraph 13, Supplement.

⁶⁰¹ Recommendation 17, Guide. Because security rights can be created on future assets, the grantor need not have rights in the asset to be encumbered or the power to encumber it at the conclusion of the security agreement. In the case of future asset, the grantor can acquire that right or power at a later time. *See* Recommendation 13, Guide.

⁶⁰² Recommendation 19, Guide.

⁶⁰³ Recommendation 18, Guide. The *Guide* provides receivables with some exemptions from some legislative and contractual restrictions on transferability. *See* Recommendation 23-25, Guide.

A. Encompassing IP to the maximum extent

When it comes to the problem of how to guarantee maximum compatibility with IP laws at both the international and the national level, the *Guide* and the *Supplement* clarify their position that they do not intend to identify all assets that a state might consider to be IP.⁶⁰⁴ They simply define IP as,

“copyrights, trademarks, patents, service marks, trade secrets and designs and any other asset considered to be IP under the domestic law of the enacting States or under an international agreement to which the enacting State is a party (such as, for example, neighboring, allied or related rights or plant varieties).”⁶⁰⁵

And they allow enacting States to add or remove types of IP from the given list for keeping consistent with their domestic laws.⁶⁰⁶ In this way, the *Guide* and the *Supplement* try to ensure that all types of IP recognized in the domestic IP laws of enacting States may be encumbered as collateral for credit. They let the national legislators decide the characterization and assignability of different types of IP.

B. Treatment of rights under IP license agreements

The *Supplement* explains that the term “intellectual property” should be understood as comprising not only various exclusive rights enjoyed by IP owners⁶⁰⁷ but also all contractual rights enjoyed by licensors and licensees in license agreements, as long as these rights are assignable according to IP laws.⁶⁰⁸ As result, a security right in IP may be given by the **owner of the IP** or alternatively by the **licensor** or **licensee** of an IP license agreement.

a. Licensor’s right to royalty payment

⁶⁰⁴ Paragraph 54, Supplement.

⁶⁰⁵ “Intellectual property”, Section B (Terminology and interpretation), Introduction, Guide; Paragraph 18, Supplement.

⁶⁰⁶ Para 18, Supplement.

⁶⁰⁷ In the *Supplement*, the rights enjoyed by an IP owner generally include the following rights: (1) the right to enjoy and exploit its IP; (2) the exclusive right to prevent others from unauthorized use of its IP, and the right to pursue infringers and to obtain an injunction and/or monetary compensation; (3) the right to deal with authorities in the various stages of the registration process (for example, the right to file an application for the registration of intellectual property, the right to register intellectual property or to renew registration); and (4) the right to authorize others to exploit its intellectual property and the right to collect royalties. See Paragraph 54, Supplement.

⁶⁰⁸ See Paragraph 89-96, 106-107, Supplement.

In the *Supplement*, all “the retained rights of a licensor, such as the ownership right, rights associated with ownership and the rights of a licensor under a licence agreement (such as the right to grant further licences or obtain payment of royalties), may be used by the licensor as security for credit.”⁶⁰⁹

The royalties from the license and assignment of IP can be treated as *proceeds of IP*.⁶¹⁰ In this case, royalties would be automatically covered by security interests in the original IP and thus also be encumbered to secure the principal obligations, except when explicitly excluded.⁶¹¹ Meanwhile, if having been appropriately described in the security agreement, the licensor’s right to payment of royalties can also be treated as a kind of *independent asset* and therefore be encumbered as original collateral by itself.⁶¹² Under the *Supplement*, regardless of being covered by security interests in original IP or being independently financed, the licensor’s right to the payment of royalties is treated as a kind of “receivable”, i.e. a right to payment of monetary obligations.⁶¹³

During the draft process of the *Supplement*, there was extensive discussion about how to apply these exceptions given to receivables under the *Guide* to the case of IP. The *Guide* eliminates some statutory and contractual restrictions on transferability for some receivables. For statutory prohibitions, the *Guide* provides that the law should not prohibit an assignment of contractual receivables on the sole ground that the receivables are future receivables or receivables that are assigned in bulk or in part (or undivided).⁶¹⁴ For contractual prohibitions, the *Guide* provides that an assignment of a

⁶⁰⁹ Paragraph 89-97 and 188, *Supplement*; Paragraph 97, *Supplement* (providing “the other contractual rights might include, for example: (a) the licensor’s right to compel the licensee to advertise the licensed intellectual property or product with respect to which the intellectual property is used; (b) the licensor’s right to compel the licensee to market the licensed intellectual property only in a particular manner; and (c) the licensor’s right to terminate the licence agreement as a result of breach by the licensee”).

⁶¹⁰ Recommendation 19, 39, 40, 100 and 168 *Guide*; Paragraph 91 and 190, *Supplement*.

⁶¹¹ Recommendation 19, *Guide*.

⁶¹² Paragraph 97, *Supplement*.

⁶¹³ “Receivable”, Section B (Terminology and interpretation), Introduction, *Guide*; Recommendation 24, *Guide*; Paragraph 98, *Supplement*.

⁶¹⁴ Recommendation 23 (Effectiveness of a bulk assignment of receivables and an assignment of a future receivable or a part of or an undivided interest in a receivable), *Guide* (providing: “The law should provide that: (a) An assignment of contractual receivables that are not specifically identified, a future receivable or a part of or an undivided interest in a receivable is effective as between the assignor and the assignee and against the debtor of the receivable as long as, at the time of the assignment or, in the case of a future receivable, at the time it arises, it can be identified to the assignment to which it relate; and (b) unless otherwise agreed, an assignment of one or more future receivables is effective without a new act of transfer being required to assign each receivable.”);

receivable should be effective despite an anti-assignment clause.⁶¹⁵ It was concerned that applying these exceptions to receivables to IP might undermine some important policy considerations that IP laws aim to achieve, such as preventing the assignment of equitable remuneration for ensuring that the rights of authors and performers to payment are not contractually undermined by large publishers or and film producers (Section 3.4.2.2) or obstruct the licensor’s capability of controlling the licensed IP, who can use it and the flow of royalty payments.⁶¹⁶

In the end, the *Supplement* holds its standpoint that the exceptions should be retained in the context of IP, by explaining that these exemptions only apply in very limited cases and therefore do not give rise to many conflicts in IP collateralization. First, these statutory prohibitions in IP laws are on the ground of protecting the rights of authors and performers, not on the sole ground that the receivables are future receivables or receivables that are assigned in bulk or in part, so these statutory prohibitions would not be affected by this exemption to statutory prohibitions.⁶¹⁷ Second, the exception to contractual limitations only applies to these anti-assignment clauses that prohibit the licensor from assigning the “royalty arising from the sale or license of intellectual property”, but does not affect these anti-assignment clauses that prohibit the licensee from further assigning or licensing the underlying IP.⁶¹⁸ The latter kind of anti-assignment clauses would be still effective and binding; so the licensor’s capability of controlling the licensed IP, who can use it and the flow of royalty payments, is not affected at all. Third, even in the case where the exception to

⁶¹⁵ Recommendation 24 (Effectiveness of an assignment of a receivable made despite an anti-assignment clause), Guide (providing: “The law should provide that: (a) An assignment of a receivable is effective as between the assignor and the assignee and as against the debtor of the receivable notwithstanding an agreement between the initial or any subsequent assignor and the debtor of the receivable or any subsequent assignee limiting in any way the assignor’s right to assign its receivables; (b) Nothing in this recommendation affects any obligation or liability of the assignor for breach of the agreement mentioned in subparagraph (a) of this recommendation, but the other party to such an agreement may not avoid the original contract or the assignment contract on the sole ground of that breach. A person that is not a party to such an agreement is not liable on the sole ground that it had knowledge of the agreement.”).

⁶¹⁶ See Brennan (2009), “International Intellectual Property Financing: An Overview,” *supra note* 261 at 32 (providing “applying the Guide’s policy of eliminating restrictions on transferability of trade receivables to IP royalties could have the perverse effect of undermining the policy protections of small creditors both the Guide and IP laws intend to foster, just as an application of the IP rules restricting the transferability of royalties would have inappropriate consequences if applied to all forms of trade receivables.”).

⁶¹⁷ Recommendation 23 (a), Guide; Paragraph 99 and 119, Supplement.

⁶¹⁸ Recommendation 24 (a), Guide; Paragraph 102-103, 120, Supplement.

contractual limitation applies, the licensors will still be liable for damages caused by its breach of the anti-assignment agreement.⁶¹⁹

b. Licensee's interest to exploitation

Under the *Supplement*, the rights of a licensee include “the authorization given to the licensee to use the licensed IP in accordance with the terms of the licence agreement and possibly the right to enter into sub-licence agreements and the right to obtain payment of sub-royalties”.⁶²⁰ All the rights can be used as security.

However, any contractual limitation in the license agreement as to the assignability of licensed rights should be respected.⁶²¹ A licensee can use his rights to use or exploit the licensed IP as collateral,⁶²² but only if he has the power to do so (based on the *nemo dat* principle, i.e., the grantor cannot grant to the secured creditor more rights than the grantor has or may acquire in future).⁶²³ If the license agreement includes an anti-attachment or anti-assignment clause, no enforceable security right in the license can be created without the consent of the licensor.⁶²⁴ The *Supplement* suggests that the creditors should carefully check the terms and conditions of the license agreement to ensure that the creditor can actually acquire the licensee's right as satisfaction of the secured obligation at the time of post-default enforcement.⁶²⁵ We will further discuss the relevant problems in Chapter 5.

C. Future IP

One of the basic policies of the *Guide* is that the encumbered assets can cover future assets.⁶²⁶ Even though security rights in future assets may give rise to a certain

⁶¹⁹ Recommendation 24 (b), Guide; Paragraph 105 and 120, Supplement.

⁶²⁰ Paragraph 16, Supplement.

⁶²¹ Paragraph 25 and 90, Supplement.

⁶²² Paragraph 17 and 190, Supplement. The Supplement also gives an example of using the rights of a licensee as collateral. See Paragraph 41, the Supplement.

⁶²³ Recommendation 13 and 18, Guide; Paragraph 55, 82, 86, 90 and 119, Supplement (the *nemo dat (quod non habet)* principle).

⁶²⁴ Paragraph 52, Supplement. Of course, if there is no restriction on the assignability of the licensee's rights in the license agreement (which rarely happens), it is considered that the licensee's rights are freely assignable. A secured creditor can take a security right in the licensee's rights subject to the terms and conditions of the license agreement. In this case, upon the licensee-debtor's default, the secured creditor can directly enforce his security interests and dispose of the encumbered licensee to an assignee. See Paragraph 107 and 250, Supplement.

⁶²⁵ Paragraph 253, Supplement.

⁶²⁶ Recommendation 17, Guide.

liquidation dilemma upon the debtor's default, the *Guide* is strongly against imposing the statutory prohibitions on the collateralization of future assets by stipulating as follows:

“[T]echnical notions of property law should not be invoked to pose obstacles to meeting the practical need of using future assets as security to obtain credit. In addition, business debtors can protect their own interests and do not need statutory limitations on the transferability of rights in future assets. Moreover, permitting future assets to be encumbered makes it possible for debtors with insufficient present assets to obtain assets, which is likely to enhance their business and benefit all credits, including unsecured creditors. To the extent that certain debtors may need protection against unwise encumbering of future assets, this should be a matter to be addressed in other law, such as consumer protection law.”⁶²⁷

With the same position, the *Supplement* also believes that the high risk associated with future IP is a factor that should be considered by secured creditors and can be negotiated or avoided through other contractual arrangements, such as reducing the amount of secured debts or requiring additional collateral; a statutory limitation or prohibition would just restrict the parties from negotiating and therefore is not necessary.

Moreover, the *Supplement* also agrees with the standpoint that allowing the creation of security rights in future IP would enable IP right holders to obtain funds for the development of new works and to achieve the maximization of commercial utility in IP.⁶²⁸ Hence it suggests that enacting States should review their IP laws so as to make it possible to use future IP rights as collateral, as long as the assignability of these future rights has not been expressly prohibited in IP laws for some reasonable IP policy considerations.⁶²⁹

A security right is created at the time when the security right was attached to the collaterals.⁶³⁰ For a present asset, the security right would be effective as to the encumbered assets as soon as the entry of the security agreement. For a future asset, the security right would not be created until the debtor acquires rights in the encumbered asset or the power to encumber the asset.

⁶²⁷ Para 53, Chapter 2, Guide.

⁶²⁸ Para 114, Supplement.

⁶²⁹ Recommendation 17, Guide; Para 113 and 114, Supplement.

⁶³⁰ See Recommendation 13, Guide.

4.4.2.3 The preference to the general description of encumbered IP

The *Guide* has explicated that the best risk control in secured transactions is to “allow debtors to use the full value inherent in their assets to support credit”⁶³¹ and to support with sound secured transaction laws and insolvency laws, as well as “effective and efficient judicial systems and other enforcement mechanisms”⁶³². Within this system, the assessment of risk associated with collaterals should be left to parties of secured transactions to decide. The *Guide* therefore sets out only minimum requirements on the creation of a security right and chooses to “allow parties maximum flexibility to negotiate the terms of their security agreement.”⁶³³

In the formality, an agreement must be concluded in or evidenced by a written document signed by the parties.⁶³⁴ For the content, the written security agreement is only required to “identify the secured creditor and the grantor (debtor), and describe the secured obligation and the encumbered assets in a manner that reasonably allows their identification.”⁶³⁵ Enacting States are recommended to adopt the concept of “an all-asset security right”, so as to allow the debtor to encumber all of its assets, present or future ones, through a **general description** in a single document.⁶³⁶

With regard to these possible conflicts with the possible stricter requirements of IP laws on **specific description** (Section 3.3.3), the *Supplement* argues that there is no need for imposing statutory requirements on a specific description of the encumbered IP, by stating as follows,

“If the parties wish to describe the encumbered intellectual property rights in a specific way, they are always entitled to do so and will probably do so in most cases; but this should not deprive the parties of the right to describe the

⁶³¹ Recommendation 1 (b), Guide.

⁶³² Paragraph 2, Introduction, Guide.

⁶³³ Recommendation 1 (i), Guide.

⁶³⁴ It is irrelevant whether the written document is a separated agreement or a clause contained in the principal loan agreement. Furthermore, a simple written statement which by itself or in conjunction with the course of conduct between the parties has the capability of indicating the intention of the parties to create a security right is sufficient. See Recommendation 15, Guide.

⁶³⁵ Recommendation 14, Guide. Parties of a secured transaction are allowed to agree on encumbering only parts of a grantor’s asset or only for up to a limited amount, provided that they have specifically described this in their security agreement in a reasonable way. When the parties only specify the asset to be encumbered without further description or any contrary agreement, the asset is considered as being encumbered for the full value of the entirety of the grantor’s rights thereof at the time of enforcement. See Paragraph 50, Commentary Chapter 2, Guide.

⁶³⁶ Recommendation 17, Guide.

encumbered intellectual property rights in a general way.”⁶³⁷

The *Supplement* suggests that the States should consider minimizing their requirements on description, except where the specific description is for serving specific reasonable policy objectives of IP laws.⁶³⁸ And it suggests that enacting States should allow a proper description of the future IP in order to enable the creation of security rights in future IP.⁶³⁹ It tries to use this flexible approach to avoid inconsistencies with requirements in other laws, but also leaves enough autonomy to parties of secured transactions in the negotiation of their security agreements. However, it does not explain in which cases specific description is necessary for some reasonable policy objectives of IP laws at all.

4.4.2.4 Pre-default rights and obligations of debtors and secured creditors

When it comes to the allocation of pre-default rights and obligations as to the preservation and the exploitation of collaterals between the debtor and the secured creditor, the *Guide* recognizes the freedom of parties, respects the established practices,⁶⁴⁰ and actively encourages the debtor and secured creditor to draft the detailed provisions in their security agreement to fit specific practical needs.⁶⁴¹

It only imposes two mandatory rules concerning the pre-default rights and obligations. First, the party in possession of the collateral must take reasonable steps to preserve the collateral and its value,⁶⁴² and; second, the secured creditor must return the encumbered asset and cancel the registered notice upon the termination of principal obligations or the extinguishment of security interests.⁶⁴³

Apart from the mandatory limitations, the *Guide* enacts a greater number of non-mandatory rules as default rules, which would apply where the parties do not specify otherwise in their security agreement, to emphasize the maintenance rights and obligations of the secured creditor. Unless otherwise agreed, the “secured creditor” is

⁶³⁷ Paragraph 84, Supplement.

⁶³⁸ Paragraph 85, Supplement.

⁶³⁹ Paragraph 118, Supplement.

⁶⁴⁰ The *Guide* admits that, in the case without a contrary agreement, any agreed usages and any established practices between the parties can be sources of determining allocation of rights and obligations between the parties. See Recommendation 110, Guide.

⁶⁴¹ Recommendation 10, Guide.

⁶⁴² Recommendation 111, Guide.

⁶⁴³ Recommendation 112 and 72. Guide.

entitled⁶⁴⁴

- (a) to be reimbursed for reasonable expenses incurred for the preservation of an encumbered asset in its possession;
- (b) to make reasonable use of an encumbered asset in its possession and to apply the revenues it generates to the payment of the secured obligation; and
- (c) to inspect an encumbered asset in the possession of the grantor.

The *Supplement* notices that the mandatory rules and non-mandatory rules in the *Guide* are based on a physical possession of the collateral. In the case of IP collateralization, where the encumbered IP is still kept under the control of the debtor, the *Supplement* allocates the obligation to maintain the value of the encumbered IP to the debtor. It explains that in an IP-based transaction it is the “grantor/debtor” who is obliged to deal with the authorities, to renew registrations and to pursue infringers to preserve the validity and value of encumbered IP.⁶⁴⁵

Regarding the secured creditor’s concerns about the debtor’s failure in taking sufficient action to preserve the liquidation value of the encumbered IP, the *Supplement* admits in its final version that it is necessary to provide secured creditors with some alternatives to help them obtain the right to monitor the debtor’s exploitation and maintenance of the encumbered IP with the objective of protecting secured creditors’ legitimate interests.⁶⁴⁶ It therefore adds a specific recommendation to remind the secured creditor to secure its right to take necessary steps to protect its security right, i.e., “[The] law should provide that the debtor and the secured creditor may agree that the secured creditor is entitled to take steps to preserve the encumbered intellectual property.”⁶⁴⁷

4.4.3 Perfection, Publicity and Priority

4.4.3.1 The co-existence of the general registry and IP-specific registries

The *Guide* proposes a simple, notice-based, cost-efficient and effective, centralized public “general registry” system as the basic mechanism for the perfection and publicity of security rights in intangible assets, in order to enhance certainty and

⁶⁴⁴ See Recommendation 113, *Guide*. The *Guide* does not enumerate every possible non-mandatory rule but suggests enacting that States provide flexible non-mandatory rules in their laws for their specific needs.

⁶⁴⁵ Paragraph 223, *Supplement*

⁶⁴⁶ Paragraph 224-226, *Supplement*.

⁶⁴⁷ Recommendation 246, *Supplement*; Recommendation 116 bis, *Guide*.

transparency.⁶⁴⁸ The unitary general registry system allows an advance registration of later-created security interests and a consolidation of multiple registrations between the same debtor and secured creditor in a single registry record. It helps parties of secured transactions avoid the burden of making continuous registrations each time the debtor acquires a new asset or creates a new security right. The registration in the notice-based general security registry⁶⁴⁹ renders the registered security right effective against all third parties and consequently gives the secured creditor a priority over all third parties, regardless of their knowledge.⁶⁵⁰ The registry is relieved of the advance scrutiny or approval of the content of the registered notice.⁶⁵¹ The *Supplement* tries to solve the problems of coordinating the different registry systems for IP after an enacting State builds a general registry system as recommended in the *Guide*.

For unregistered IP, such as copyright and trade secrets, the introduction of the general registry system as proposed in the *Guide* would enable the financing of these IP. These unregistered IP can always be registered with the recommended general security registry to achieve the third-party effectiveness and therefore become financeable.

For registered IP, like trademarks and patents, the question of how to design a workable resolution to coordinate two systems was at the heart of discussions during the drafting of the *Supplement*.⁶⁵² On the one hand, some opinions considered that the policy rules in the *Guide* effectively simplified the achievement of third-party effectiveness of security rights, especially those in future assets, and therefore preferred to reform the current IP-specific registries. On the other hand, some other opinions believed that the IP-specific registry systems are better tailored to the characteristics of particular types of IP and work more coherently with other rules in IP laws, and consequently tended to continue the current IP practices.

⁶⁴⁸ Recommendation 1(f), *Guide*.

⁶⁴⁹ Recommendation 76, *Guide*. The notice is limited to basic information concerning the security right: (a) the identities of the parties; (b) a description of the encumbered asset in a manner that reasonably allows its identification; (c) the duration of registration; and if required in the domestic laws of the enacting State, (d) the maximum amount for which the security right may be enforced. *See* Recommendation 57 and 63, *Guide*. A registrant does not need to submit the underlying security agreement or any other evidential materials for the registration of a notice. Recommendation 54 (b), *Guide*.

⁶⁵⁰ The third-party effectiveness of a registration is achieved as from the time when the information contained in the notice is entered into the registry records and becomes searchable for third-party searchers. *See* Recommendation 32, 70 and 76, *Guide*.

⁶⁵¹ Recommendation 54 (d), *Guide*.

⁶⁵² *See* Tosato (2009) “The UNCITRAL Annex on Security Rights in IP: A Work in Progress”, *supra* note 591 at 747.

In the end, the *Supplement* chooses a modest approach, which does not recommend a profound reform of the current IP-specific registries but suggests a co-existence of specialized IP registries and the general registry as recommended in the *Guide*. It provides that, if IP laws require registration in the specialized IP registry as the only way of achieving the third-party effect, these **IP rules get priority**.⁶⁵³ In this case, a security right **cannot** be made effective against third parties by way of a registration in the general registry. In other cases without such an “IP-registry only limitation”, the *Supplement* permits the co-existence of specialized IP registry and the general registry. In the dual registration schemes, parties can choose **either** registry to achieve the third-party effect (but the registrations at IP-specific registries are given a higher priority; see the discussion in the following section).⁶⁵⁴ To maintain a harmonious co-existence of both registry systems, the *Supplement* provides some suggestions on ensuring efficient and effective communication between the two registry systems, such as maintaining both debtor-based and asset-based indexes in all registries, and the forwarding of copies and implementing a simultaneously searchable common gateway among registries.⁶⁵⁵

This approach encourages secured creditors to use IP-specific registries for achieving a maximum degree of protection, but without directly giving suggestions on reforming the IP registries, which is beyond the mandate of the UNCITRAL.

4.4.3.2 Priority rule

The *Guide* permits the co-existence of more than one security right on the same encumbered asset and centers the priority on its whole structure and designs an elaborate system of simple and clear priority rules. The *Guide*’s priority system is based on the “first-to-file rule”, the “principle of continuation of disposition” and the “principle of subordination”.⁶⁵⁶ In order to ensure the coordination between these two registry systems and to preserve the reliability of registrations under IP registries, the *Supplement* set clear priority rules.

A. Conflicting security interests

⁶⁵³ Recommendations 34 (a) (iii) and 38 (a), *Guide*; Paragraph 126, *Supplement*.

⁶⁵⁴ Paragraph 128, *Supplement*.

⁶⁵⁵ Paragraph 139, *Supplement*.

⁶⁵⁶ A secured creditor or a competing claimant can subordinate its priority unilaterally or by agreement, as long as not affecting the legitimate interests of other third parties Recommendation 94, *Guide*.

If various security rights are registered with the same registry, the priority order is determined by rules of the registry concerned. For the general registry recommended in the *Guide*, the “first-to-file rule” is adopted, i.e., the priority order is generally established on the basis of the time of registration, regardless of competing claimants’ knowledge.⁶⁵⁷

When there is a co-existence of two registry schemes, in the case of multiple security rights registered with different registries in the same IP, priority is given to the security right registered with IP-specific registries, irrespective of the time of registration.⁶⁵⁸ It is clear that in this priority system the most appropriate way for a secured creditor to achieve a maximum protection of its priority status is to register the security rights with an IP-specific registry. For multiple security rights registered at the same IP-specific registry, the priority is determined by the “first-to-file rule”.⁶⁵⁹

B. Pre-existing licensee/licensor v. security interests

The *Guide* follows the *nemo dat* principle, which requires that the grantor cannot grant to the secured creditor more rights than the grantor has or may acquire in future.⁶⁶⁰ Accordingly, the *Supplement* explains the priority orders in several complicated cases.

For the case where a grantor is the IP owner who creates security interests in its IP itself and had previously granted an exclusive license to a third party (as in Section 3.3.2.2 B and problems discussed in Section 3.5.2), the *Supplement* explains that, “upon default, the secured creditor would be **unable** to grant another licence covering the same use within the same geographical and time limits of the licence”, as the grantor itself had no such right to do so.⁶⁶¹ So, the pre-existing licensee would not be affected by the subsequent security interests.

For the case where a IP owner grants a security interest in its rights (to royalties) as a licensor against the licensee, and the licensee also grants a security interest in its rights (to sub-royalties) as a sub-licensor against the sub-licensee (similar as in Section

⁶⁵⁷ Recommendation 76(a) and 93, *Guide*; Paragraph 175-178, *Supplement*.

⁶⁵⁸ Recommendation 77 (a), *Guide*. Paragraph 138, 181, *Supplement*.

⁶⁵⁹ Recommendation 77 (b), *Guide*. Paragraph 181, *Supplement*.

⁶⁶⁰ See explanation on the *nemo dat* principle in *supra* note 623 and its accompanying text.

⁶⁶¹ Paragraph 237, *Supplement* (“the secured creditor may be able to grant another licence outside the geographical or time limits of the exclusive licence previously granted by the grantor.”)

3.3.2.2 C and problems discussed in Section 3.5.2),⁶⁶² the *Supplement* explains that there is no problem of priority order between the two security interests, since they actually encumber different assets. While for the first case the collateral is the licensor's right to royalties owed by the licensee; for the latter case the collateral is the licensee's right to sub-royalties owed by the sub-licensee.⁶⁶³ And for the cases where the first licensor worries that the security rights in the licensee's rights to sub-royalties may have an impact on its capability to collect royalties from the licensee, the *Supplement* suggests that the first licensor should use contract terms to protect its interests, such as prohibiting the licensee from granting a security right in its right to the sub-royalties.⁶⁶⁴ With the *nemo dat* principle, these contractual restrictions are unconditionally enforceable under the *Supplement*.

For the case where an IP licensee uses its interests in an IP license as collateral, the *Supplement* prioritizes the IP licensor's control in the license agreement. If the license agreement includes an anti-attachment clause or an anti-assignment clause, no enforceable security right in the license can be created without the consent of the licensor (see further discussion in Chapter 5).⁶⁶⁵

C. Security interests vs. subsequent assignees/licenses

With the “principle of continuation of disposition”, the rights of a subsequent assignee or licensee of an encumbered asset (and any person that subsequently acquires rights

⁶⁶² As in Section 3.3.2.2 B and problems discussed in Section 3.5.2.

⁶⁶³ Paragraph 213, *Supplement*.

⁶⁶⁴ Paragraph 216, *Supplement* (providing “for example, the licensor can protect its rights by: (a) ensuring that its secured creditor registers first a notice of its security right in the general security rights registry; (b) ensuring that its secured creditor registers first a document or notice in the relevant intellectual property registry; (c) requiring the secured creditor of the licensee to enter into a subordination agreement with the licensor's secured creditor before granting a licence; (d) prohibiting the licensee from granting a security right in its right to the payment of sub-royalties; (e) terminating the licence in cases where the licensee created a security right in its sub-royalties in breach of such a prohibition; or (f) prior to the licensee as sub-licensor granting a security right in its right to the payment of sub-royalties to its secured creditor, granting a security right in its right to payment of a percentage of the sub-royalties and agreeing that any sub-licensee pay its sub-royalties directly to an account of the licensor. The Guide does not interfere with any agreements of this kind between licensor and licensee, if they are effective under law relating to intellectual property and contract law. In addition, the licensor could insist that the licensee grant to the licensor a security right in its right to the payment of sub-royalties and take as a secured creditor the steps just mentioned”).

⁶⁶⁵ Paragraph 52, the *Supplement*. See Para 107 and 250, the *Supplement* (providing “Of course, if there is no restriction on the assignability of the licensee's rights in the license agreement (which rarely happens), it is considered that the licensee's rights are freely assignable. A secured creditor can take a security right in the licensee's rights subject to the terms and conditions of the license agreement. In this case, upon the licensee-debtor's default, the secured creditor can directly enforce his security interests and dispose the encumbered licensee to an assignee.”).

in the encumbered asset from this assignee or licensee) are generally subject to the pre-existing (and properly perfected) security rights created on the asset,⁶⁶⁶ except for where such a transaction happens with authorization from the secured creditor⁶⁶⁷ or is subject to an “ordinary course of the assignor’s business”.⁶⁶⁸

However, if a security interest is required to be perfected at the IP-specific registry, then a subsequent assignee or licensee of the encumbered asset takes the asset free of the pre-existing security interest registered at the general security rights registry only, since such a security interest does not have third-party effectiveness,⁶⁶⁹ and any person that subsequently acquires rights in the encumbered asset from that assignee or licensee also acquires its rights free of that pre-existing security interest.⁶⁷⁰

D. Ordinary course of business exception

The *Guide* gives an “ordinary course of business exception” to the “first-to-file rule” and the “principle of continuation of disposition”. According to the exception, in the ordinary course of the debtor’s business, a good faith buyer or non-exclusive licensee who, without knowledge of pre-existing security rights or contractual limitations in the encumbered asset, would acquire the asset free of pre-existing security rights and contractual limitations.⁶⁷¹ In the *Guide*, this exception is given mainly for the commercial practice of tangible movables and for protecting “every-day, legitimate transactions”, because for most tangible goods, the usual expectation is that security rights do not continue after the sale in the ordinary course of business.

Applying this exception to IP collateralization gives rise to intensive debates during the draft of the *Supplement*. The proponents argue that the incorporation of the exception into the case of IP also matches the expectation in commercial practice of

⁶⁶⁶ For the discussion on subsequent assignees, see Recommendation 31, 69-82, Guide; Paragraph 175, 181-183, Supplement; for the discussion on subsequent licensees, see Paragraph 188-190, Supplement.

⁶⁶⁷ Recommendation 80(a), Guide; Paragraph 184, Supplement.

⁶⁶⁸ Recommendation 81(a), Guide; Paragraph 184, Supplement.

⁶⁶⁹ For the discussion on subsequent assignees, see Recommendation 78, Guide; Paragraph 181-183, Supplement; for the discussion on subsequent licensees, see Paragraph 188-190, Supplement.

⁶⁷⁰ Recommendation 31 and 82, Guide; Paragraph 181-183, Supplement.

⁶⁷¹ Recommendation 81 (c), Guide (providing “The rights of a non-exclusive licensee of an intangible asset licensed in the ordinary course of the licensor’s business are not affected by a security right in the asset, provided that, at the time of the conclusion of the licence agreement, the licensee does not have knowledge that the licence violates the rights of the secured creditor under the security agreement.”)

IP.⁶⁷² For example, “the incorporation would ensure that off-the-shelf software purchasers would not lose their end-user licenses in the event of the execution of a security over the copyright associated with that particular computer program.”⁶⁷³ By contrast, the opponents mainly argue that the “ordinary course of business exception” is a very foreign and ambiguous concept to IP laws and may cause lots of uncertainties.⁶⁷⁴

After intensive debates during the draft, the “ordinary course of business exception” is **retained** in the *Supplement*. The commentary of the *Supplement* explains that this exception protects good faith purchasers and non-exclusive licensees in the ordinary course of business from the enforcement of pre-existing security rights in the encumbered IP and also saves them from the significant burden of searching the pre-existing security rights created on the underlying IP.⁶⁷⁵ On the other hand, the exception is limited to certain “non-exclusive licenses” in “everyday, legitimate transactions” only and the good faith buyer or licensee should have no knowledge of pre-existing security rights.⁶⁷⁶ So the exception does not adversely affect the secured creditor’s interests, because in the case of default the secured creditor is still entitled to collect the royalties from these licenses as the repayment of the principal obligation.⁶⁷⁷ The *Supplement* encourages the secured creditors to include some terms in the security agreement in order to ensure its capability of collecting these royalties.⁶⁷⁸ It is believed that such a limited exception will not have any substantial impact on the substance of IP laws.

⁶⁷² See Tosato (2009) “The UNCITRAL Annex on Security Rights in IP: A Work in Progress”, *supra note* 591 at 748.

⁶⁷³ *Ibid* at 748.

⁶⁷⁴ *Ibid* at 748 (providing the opponents’ main dissenting arguments are as follows: “First, the ordinary course of business exception is foreign to many jurisdictions and consequently difficult to implement. Second, this concept ‘has no precedent in intellectual property law’ that only recognizes exclusive and non-exclusive licences, without distinguishing whether they are granted in the ordinary course of business. Third, the *Guide* provides no definition of an ordinary course of business, nor of its fundamental elements; therefore, while this concept may be relatively clear in the concept of tangible good, its application remains unclear for IP rights. Furthermore, it was affirmed that this exception would not be desirable even if it were successfully introduced, as lenders would be discouraged from taking IP rights as collateral due to the faculty for right owners to grant licences free from the security. Lastly, it was observed that policies directed at protecting specific transactions, such as off-the-shelf software purchases, should be realized by other means, rather than by introducing categories that might potentially destabilize the whole IP legal regime.”).

⁶⁷⁵ Paragraph 195-200, *Supplement*.

⁶⁷⁶ Recommendation 81 (c), *Guide*; Para 198 and 205-212, *Supplement*.

⁶⁷⁷ Paragraph 198, *Supplement*.

⁶⁷⁸ Paragraph 197, *Supplement*.

4.4.4 Enforcement

The *Guide* establishes the enforcement remedies based on the assumption that “the enforcement remedies must be tailored to ensure the most effective and efficient enforcement while ensuring appropriate protection of the rights of the grantor and the third parties”.⁶⁷⁹ It provides a secured creditor with several post-default enforcement remedies, including (a) taking possession of the encumbered asset; (b) acquiring the encumbered asset; (c) selling, leasing, licensing or otherwise disposing of the encumbered asset on behalf of the debtor.⁶⁸⁰ These enforcement remedies are cumulative⁶⁸¹ and may be exercised through judicial proceedings or by extrajudicial enforcement of the secured creditor.⁶⁸² The security right is extinct after the full satisfaction of the secure obligation⁶⁸³ and any surplus arising from the enforcement would be returned to the debtor.⁶⁸⁴

For the case where the grantor is a licensee, which uses its rights under the license agreement (mainly the right to exploitation) as collateral (Section 3.3.2.2 D and discussion in Section 4.4.3.2), the secured creditor can enforce the security interest and dispose of the collateral to an assignee, only if there is no anti-assignment or anti-attachment clause in the license agreement or the licensor consents to the enforcement.⁶⁸⁵

The *Supplement* noted that, as states typically do not provide specific enforcement remedies for IP collateralization, applying these enforcement remedies to IP collateralization does not give rise to many problems. Therefore, the *Supplement*

⁶⁷⁹ Paragraph 223, Supplement.

⁶⁸⁰ Recommendation 141 (a) and (b), Guide.

⁶⁸¹ Recommendation 143, Guide (providing “The law should provide that the exercise of one post-default right does not prevent the exercise of another right, except to the extent that the exercise of one right has made the exercise of another right impossible”).

⁶⁸² Recommendation 142, Guide. The extrajudicial enforcement is possible only where the debtor has consented in the security agreement or where, after default, the secured creditor has sent an advance notification to the debtor and all relevant parties with interests in the collaterals and received no expressed objection from the parties noted (Recommendation 147-151 and 156-158, Guide). The notice need not be given if the encumbered asset is perishable, may decline in value speedily or is of a kind sold on a recognized market (Recommendation 149, Guide). An assignee or licensee that acquires the grantor’s right in the encumbered collateral via an extrajudicial enforcement takes the asset free of the security rights of the enforcing secured creditor and any other lower-ranking secured creditor, but still subject to higher-ranking security rights of the enforcing secured creditor (Recommendation 161-163, Guide).

⁶⁸³ Recommendation 140, Guide.

⁶⁸⁴ Recommendation 152, Guide.

⁶⁸⁵ Paragraph 250, Supplement.

clarifies the rules in some cases but gives no specific recommendation on the enforcement for IP collateralization.

4.5 Comparison

Reading the general criteria set in Chapter 3, we hereby have a comparative examination on whether the legal rules in China, the US, and the UNCITRAL Supplement have properly addressed the contradictions between IP law and secured transaction law as to IP collateralization. We will evaluate the effectiveness of the different approach, mainly from the perspectives of risk controlling and transaction cost reduction. The comparison is expected to help us identify the problem in Chinese law and to see if Chinese law can learn from other jurisdictions in order to solve the problems.

4.5.1 Creation

It has been established in Chapter 3 that, with respect to the creation of security interests in IP, the most important issue is to see if the legal rules for IP collateralization are flexible and clear enough to enable innovators to make full use of their IP as collateral in a simple and inexpensive way. The law is expected to

- (1) unify rules for different kinds of IP in order reduce legal uncertainty;
- (2) set only minimal requirements on creation in order to reduce the transaction cost;
- (3) give broad but clear guidance on the scope of IP eligible for collateralization in order to ensure legal certainty;
- (4) provide the maximum autonomy to parties in order to allow parties to control and reduce transaction risks via free negotiation;
- (5) make an appropriate allocation of the pre-default rights and obligations on the exploitation and preservation of the encumbered IP.

We then comparatively examine if the legal rules in China, the US, and the UNCITRAL Supplement are effective and efficient as to the creation.

4.5.1.1 Transaction structure

All of China, the US, and the *UNCITRAL's Supplement* have differentiated between creation and perfection of security interests in IP and set few requirement on the

creation. All the three legal regimes choose to subject all IP collateralization transactions to the same secured transaction legal framework. Both the UCC-9 and the *UNCITRAL's Supplement* have adopted the “functional and integrated” approach. They replace the various pre-existing security devices with a functional concept “security interests/rights”, and subject all transactions that play the role of security to the same legal structure. Although Chinese law has not replaced all the security devices with the concept of “security interests” or a similar concept yet and still keeps various security devices, “pledge” is set as the only way of using IP as collateral. This unitary approach in secured transaction law is expected to largely reduce legal uncertainty and to save the transaction cost of comparing different security devices.

However, at the domestic level, neither China nor the US has set uniform rules for patent, copyright and trademarks. In both China and the US, many specific issues on IP collateralization are not subject to the unitary secured transaction law only, but more to other uncoordinated IP-specific laws. The IP laws in China merely stipulate that IP collateralization is a way of exploitation of IP but provides no specific provision regarding the work of IP collateralization. There are only two provisions in the *Property Law* specifically addressing the issues of IP collateralization. In most cases, it is the rules for the pledge of tangible movables that apply to IP collateralization by analogy. Therefore, the most specific rules that are directly relevant to IP collateralization are scattered in the three departmental regulations respectively for trademarks, patents and copyrights.⁶⁸⁶ The examination above showed that among the three departmental regulations there are significant disparities on many core issues, such as the requirements for the description of encumbered IP in the security contract (Section 4.2.2.3), the creation of security interest in future IP (Section 4.2.2.2 C), the prohibition on the creation of multiple pledges (Section 4.2.2.4 A), and the documents needed for registration (for the perfection purpose, Section 4.2.3.2). Similarly, in the US, patents, copyrights and inter-state registered trademarks are also subject to separate federal laws, which do not provide the same level of exemptions to the UCC-9, so the perfection rules turn out to be very different for trademarks, patents and copyrights (Section 4.3.3.1). Without coordination with and among IP laws, the rules for specific issues in the end still vary for different types of IP.

The disparities among IP laws mainly come from the fact that patent, copyright and

⁶⁸⁶ See more details in Section 4.2.1.4. E.

trademark are traditionally subject to separated legal regimes. Although the IP system has a core idea, i.e., providing incentives to innovation, the economic rationales underlying each type of IP are quite different.⁶⁸⁷ Providing separated legal regimes has its advantages in building different statutory schemes to provide more appropriate rules for each type of IP. However, it is obvious that these disparities noticed above are not the intended results for better fitting the different characteristics of each type of IP, but are rather a consequence of the absence of a unitary approach following the uniform principles set in the secured transaction law.

For other types of IP rather than patent, copyright and trademark, laws in the US and in China have adopted different approaches. In the US, for the other types of IP, like unregistered trademark, in-state registered trademark, no federal law exemption exists. Therefore, the modernized UCC-9 would apply. Although the dual registration system in the US has been criticized for increasing transaction cost, it also has some advantages for those types of IP without federal registry regimes, which can still be used as collateral, by being perfected at the UCC-9 general registry for all assets. However, in China, the *Property Law* remains vague in many core issues such as the registry process, priority order and enforcement remedies. And no general registry for all assets exists. In the end, without separated implementing regulations or special registries for these IP, IP collateralization is basically not feasible for them in practice; just as happened in reality.

4.5.1.2 Scope of IP eligible for collateralization

The UNCITRAL's *Guide and Supplement*, the *UCC-9* of the US and the *Property Law* of China have imposed only minimal requirements on the eligibility of collateral, namely, being assignable according to corresponding IP laws (note: Chinese Property Law restricts “trademarks” to “registered trademarks” only). These general secured transaction laws leave it for IP laws to decide the content and the assignability of a specific IP right. This flexible approach is expected to be able to avoid conflicts with IP laws and encompass various IP to the maximum extent. The drawbacks of this approach may be not so obvious when reading the *Supplement* or the secured transaction laws alone. When it comes to specific issues, the drawbacks become apparent due to the fragmentation between secured transaction laws and IP laws.

⁶⁸⁷ See more details in *supra* note 39.

A. Terminology ambiguity

First, the divergence in the terminologies in the general secured transaction law and IP laws can give rise to uncertainty as to the assignability of a specific IP right. The confusion between “moral rights” and “personal rights” discussed in Section 4.2.2.2 A is a good example to show the divergences in terminology and the diversity in legal traditions of property laws and IP laws can create problems for determining the scope of IP rights eligible for collateralization. This need for clarification demonstrates that simply leaving all the matters on assignability of a specific IP for the IP laws and IP specialists to decide might not be the best way to solve the divergences.⁶⁸⁸

Determining whether a specific IP right is assignable or not for the purpose of secured transaction requires a good communication between IP specialists and finance specialists. Giving certain clear explanations of some essential and easily confusing terms in legal documents would be of great help in clarifying some of the ambiguity caused by the divergence in terminologies and in bridging the gaps in the communication between experts in different legal subfields. However, the *Supplement* does not help much in this regard.⁶⁸⁹ It is without doubt that the avoidance of discussing specific issues or giving explanation regarding “the nature and legal attributes” of terms in IP laws made it is easier for the UNCITRAL to reach consensus on the *Supplement*, albeit at the cost of missing an important opportunity to decrease the ongoing fragmentation between different laws.

B. The Treatment of rights under IP license agreements

One of the core objectives of the *Supplement* is to subject all IP rights to the same set of rules. According to the *Supplement*, the term of IP should also include all contractual rights enjoyed by licensors and licensees in license agreements, including

⁶⁸⁸ See also in Nguyen (2007), “Collateralizing Intellectual Property,” *supra* note 527 at 45 (providing “As the modern economy has increasingly moved towards using intangible property as a most valuable corporate asset, however, Article 9 must be adapted for the interests of involved parties and all others who benefit from the creation and dissemination of intellectual property rights. This can be accomplished by including in Article 9 definitions of specific forms of intellectual property, such as copyrights, patents, trademarks, and trade secrets.”)

⁶⁸⁹ In this regard, the *Supplement* is expected to provide some useful guidance on explaining terminologies. Such explanations do not need to consider the specific conditions of every country. A simple reference to some commonly accepted IP international treaties would be enough and helpful. However, except for the fourteen terms mentioned in Section C of the Introduction, the remaining part of the *Supplement* does not give any explanation regarding “the nature and legal attributes” of terms in IP law, See Paragraph 62, Supplement.

the licensor's right to collect royalties, the licensee/sub-licensor's right to collect sub-royalties, the licensee's right to exploit the underlying IP in accordance with the terms of the license agreement. The *Supplement* subjects all of them to the same set of rules, except for some special rules for receivables (Section 4.4.2.2 B). US law adopts a similar approach (Section 4.3.2.2 B).

At the first glance, Chinese law may appear to have adopted the same approach. The *Chinese Property Law* does not make any distinction between different types of IP, types of debtors, as well as forms of interests. It seems as though all rights of IP holders or rights of parties under license agreements or related contractual rights are uniformly treated. Nevertheless, the strict separation model adopted in IP laws can easily destroy such a harmonious picture, by artificially dividing closely related rights into separate categories. Then the decentralized asset-specific registries and diversity in registry practice subject the closely related rights to different treatments (Section 4.2.2.2 B). The post-royalties are treated as proceeds and therefore automatically covered by the security interests in the original IP. By contrast, the pre-royalties can be used as independent collateral but must be registered with a separate specific registry for account receivables only and subject to a totally different set of rules for the pledge of **account receivables**. Furthermore, a licensee's right to exploitation under the license agreement is deemed as a kind of **contractual claim** created by the license agreement, and cannot be used as collateral at all.

The dogmatic separation places a premium requirement on specialized knowledge of complicated categories of rights in IP and knowledge of their counterpart-categories in secured transaction laws. These requirements impose a lot of additional legal uncertainties and costs in the process of the determination of the applicable rules, especially for those transactions covering a range of different rights in various types of IP. They complicate the utilization of the monetary value in IP and also bring difficulties for subsequent inquirers to find out all the pre-established security interests in an IP.

The survey done by the SIPO in 2014 shows that in China smaller enterprises are more likely to issue patent licenses, i.e., 11.6% of micro-sized enterprises give patent license while only 7.3% of large-sized enterprises give patent license.⁶⁹⁰ Although this survey does not explicitly reveal the reason, it is easy to understand that this licensing

⁶⁹⁰ See SIPO et al. (2016) "Survey Report on Chinese Patent Data of 2015", *supra* note 404 at 14.

preference may come from the fact that smaller enterprises usually do not have all the capabilities and resources to accomplish the whole process from the research and innovation, to the production and to the distribution of products alone. Licensing out their patents allows them to authorize the innovations to more capable parties for the following-up innovation or production and meanwhile to recover their investment in innovation from the licensing fee. This survey result also shows that the market entities which are the worst affected by the legal uncertainties from these dogmatic distinctions would be these micro-or-small-sized enterprises, which happen to the parties that need bank loans the most.

4.5.1.3 Collateral description in the security agreement and the use of future IP as collateral

Based on the consideration that leaving parties the broad freedom of contract is the most efficient way of facilitating the secured credit, all of the *UNCITRAL's Supplement*, the UCC-9 and the *Property Law* of China, keeps the statutory requirements for formality and content of security agreements to the minimum extent. With the general description, the parties are given the maximum flexibility in making their own negotiation on risk or cost control. The parties are always free to (and actually should) make more specific-listing description to ensure the legal certainty of the transaction. The allowance for general description makes the creation of security rights in “future assets” and the creation of “all-asset security interests” possible; these are two core policies which a modern secured transaction law is expected to achieve.

For the US, the problems about using future IP as collateral come from the registration requirements for the perfection purpose (Section 4.3.2.2 D and 4.3.3.1). There is no problem to “create” security interest in future IP or all-asset security interests over IP, because the applicable law on this issue is the UCC-9, which allows very general description in the security agreement. Nevertheless, with the dual-registration system, the security interests in patents and federal trademarks have to be registered at the federal USPTO in order to be effective against subsequent assignees. The security interests in copyright have to be registered at the federal Copyright Office in order to be effective against subsequent assignees and creditors. And the registrations can only be done to registered IP. Therefore, if a creditor wants to have a security interest with third-party effectiveness in all IP of the debtor, the creditor has to specifically refer to each IP. If any future IP is included, the creditor will have to make a registration at the

general UCC-9 registry first and then keep closely monitoring the debtor's activity and continuously make separate new federal security interest registration as soon as the unregistered IP becomes registered (Section 4.3.2.2 D). These arrangements require a lot of continuous efforts in monitoring and making timely registrations. Any negligence can make the security interest ineffective against a certain third party and put the creditor's interest at risk. All these factors give rise to high transaction cost and great legal uncertainty.

For China, there are more obstacles. First, whereas the creditors in the US at least can make a registration at the general UCC-9 registry to perfect the security interest in future patents and federal trademarks against subsequent creditors (not against subsequent assignees), the absence of a general security interest registry in China makes the registration at the IP-specific registries the only way for perfecting security interest in IP (against all parties). So, when the IP-specific registry schemes make it impossible to perfect the security interest in a future IP, there is no other alternative.

Second, although the Chinese *Property Law* has not imposed any mandatory requirement, just has some non-mandatory suggestions, on the clauses of pledge contract, the specific departmental implementing regulations for patents and trademarks turn these suggestions on specific description into mandatory rules. The mandatory rules on specific description make the creation of security interests over all assets or the creation of security interests over future patents and trademarks are not practically feasible in China.

Third, there is a statutory prohibition on the creation of security interests in the right to patent application. The corresponding explanatory document takes the "obvious lack of certainty in law" as a justifiable argument for claiming that the right to patent application cannot be "a property right with legal validity", as the reason for the prohibition (see Section 4.2.2.2 C). However, as the right to a patent application is a legally recognized right by the *Chinese Patent Law* and is expressly assignable against remuneration,⁶⁹¹ it is sufficient to conclude that the law has recognized the legal validity of the right to a patent application being a property right. There is no reason to doubt its validity and exclude it from being used as collateral.

Some Chinese scholars explain that the "obvious lack of certainty in law" here refers

⁶⁹¹ Article 10, Patent Law of 2008.

to the high risks associated with the disapproval of the application.⁶⁹² However, risk itself is neither a plausible argument for denying the legal validity nor a reason for the strict statutory prohibition. As a matter of fact, the employment of any asset as collateral is always associated with certain risks. Even for granted patents, the risk of invalidation may not be lower than the risk of a disapproval of patent application, especially nowadays where the patent invalidation has already become a common defense strategy used by defendants in IP-related proceedings.⁶⁹³

Even though the risks associated with the collateral are significant factors that should be carefully considered under the secured transaction laws, it does not necessarily mean that the law should narrow down the scope of eligible collateral to those assets without risks or with risks at an extremely low level. If that were the case, very few assets would be eligible. The subprime crisis in 2008 has proven that even real estates, which was generally considered as the most suitable collateral, is also associated with quite high risks. The risk of collateral is an essential factor that should be carefully considered by parties of secured transactions.

Simply excluding assets with some risks from being used as collateral is not necessary and against the essence of modern secured transaction laws. From the law and economics perspective, respecting the freedom of contract doctrine would allow parties of secured transactions freely to negotiate over and choose ways to balance interests and risks, such as to reduce the amount of secured debts or to require additional collateral. A sophisticated legal regime is established for reducing the transaction cost of negotiation and for providing a backup plan. This approach is more effective and efficient than simply limiting the scope of the collateral, which would interfere with the negotiation and strictly exclude the possibility of some assets being used as collateral. It shows that current Chinese rules tend to use an oversimplified and crude way to ensure safety even at the expense of efficiency.

There are two things worth mentioning. First, the CBRC, as the competent department regulating banks in China, explicitly instructs the commercial banks to create security interests in the future patents and copyrights as collateral, in order to ensure the liquidation value and to reduce transaction risks.⁶⁹⁴ It is the departmental regulations

⁶⁹² See Che and Li (2005), *On New Issues in the Legal Regime of Secured Transactions* (担保法律制度新问题研究), *supra* note 421 at 181.

⁶⁹³ See Lipton (2010) "Security Interests in Intellectual Property", *supra* note 145 at 300;

⁶⁹⁴ Article 23, *Guiding Opinions for Commercial Banks on Operating IP collateralization*, *supra* note 378.

that prevent banks from doing so. Prohibiting the use of future IP as collateral actually prevents the creditor from taking effective risk-control.

Second, as the departmental regulation for the registration of security interests in copyright has **not** required specific description, the creation and perfection of security interests in future copyright is feasible and has been practiced with many successful cases (Section 4.2.2.2 C). The successful experience proves that, in the case without unnecessary restrictions, Chinese market participants do have the capacity of making proper contractual arrangements to control the relevant risks. The Chinese regulators' underestimation of the risk-control capabilities of the market participants obstructs the practice.

As result, it is argued here that Chinese laws should follow the suggestions in the *Supplement* to provide some special provisions to allow a proper description of IP in future works and all kinds of IP in the security agreement, as long as such description allows the reasonable identification of the underlying collateral; and should remove the prohibition on the pledge of the right to patent application.

4.5.1.4 Pre-default rights and obligations of debtors and secured creditors

With regard to the pre-default rights and obligations, US law does not give any specific clauses. All the terms are left for parties to negotiate. According to the difference that the encumbered IP is still kept under the control of the debtor during the term, the *Supplement* allocates the obligation of maintaining the value of the encumbered IP to the grantor/debtor and requires that the grantor/debtor must take reasonable steps to preserve the collateral and its value, including dealing with the authorities, renewing registrations and pursuing infringers to preserve the validity and value of encumbered IP.⁶⁹⁵ With the notice of the necessity for secured creditors to effectively monitor the debtor's exploitation and maintenance of the encumbered IP, the *Supplement* adds a specific recommendation to remind the secured creditors to include a term that allows them to take steps to preserve the encumbered intellectual property.⁶⁹⁶ For other matters like the creation of re-pledge or multiple pledges, the *Supplement* sets only non-mandatory default rules.

See also the discussion on the obvious benefits of allowing the use of future IP as collateral in Section 3.4.2.3.

⁶⁹⁵ Recommendation 111, Guide; Paragraph 223, Supplement.

⁶⁹⁶ Recommendation 246, Supplement; Recommendation 116 bis, Guide.

Compared with the *Supplement*, although the Chinese *Property Law* leaves most issues regarding allocation of pre-default rights and obligations to the security agreement, it imposes more mandatory rules and stricter non-mandatory rules than the *Supplement*.

A. Mandatory rules

For the mandatory rules for which the parties cannot contract around by prior agreement, the Chinese *Property Law* imposes the obligation of maintenance to the pledgor/debtor, and also directly grants to the secured creditor the right to monitor. It even requires the registries to keep the secured creditor updated with the current statement of the pledged IP to ensure that the secured creditor can take active action against depreciation in a timely manner (see Section 4.2.2.4 A-a). As a result, the additional recommendation given under the *Supplement* actually becomes mandatory in China. The additional mandatory rules grant the secured creditors more rights and stronger protection without interfering with the freedom of contract. They are therefore beneficial.

Nevertheless, the strict prohibitions on the creation of multiple pledges and re-pledge (see Section 4.2.2.4 A-b&c) are obstructive. With the fight from the law and economics movement, the academics have reached a “surprising consensus” that mandatory rules are “justifiable” in two cases only: first, the society wants to protect parties within the contract, from the perspective of paternalism; second, society wants to protect the parties outside the contract, from the perspective of controlling externalities.⁶⁹⁷ Mandatory rules are justified “only if unregulated contracting would be socially deleterious because parties internal or external to the contract cannot adequately protect themselves.”⁶⁹⁸

We do not see any plausible justification here for the strict prohibition in the Chinese law. It is obvious that these prohibitions are for ensuring the certainty of secured transactions. The modern secured transaction law has developed socially efficient ways to encourage the full exploitation of the inherent value of the encumbered assets and at the same time protect the interests of parties, by relying on a combination of

⁶⁹⁷ Ian Ayres and Robert Gertner, “Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules,” *The Yale Law Journal* 99, no. 1 (1989): 87–130 at 88.

⁶⁹⁸ *Ibid.*, at 88.

statutory rules and freedom of contract. It permits the creation of re-pledge or multi-pledges in the same encumbered collateral, and then supplements parties with a transparent publicity system and sophisticated priority rules to determine the priority order among competing claims. By contrast, the Chinese law adopts an oversimplified approach to exclude the possibility of negotiation. It seriously undermines the parties' autonomy on balancing interests and controlling risks based on their own consideration of relevant risks and costs. Some monetary value in IP is just lost. It is therefore suggested here that these prohibitions on multiple pledge and sub-pledge should be eased to keep the mandatory rules to the minimum.

B. Non-mandatory default rules

As a matter of fact, in many cases the Chinese legislators' concern on the certainty of transactions can also be addressed by prescribing non-mandatory default rules without interfering with the parties' autonomy because they can be modified by the prior agreement of the parties. Default rules play the roles of reminding parties of important issues during the drafting process and filling gap for incomplete contracts where the parties "cannot negotiate terms specifically to cover all contingencies".⁶⁹⁹ They save the transaction costs on negotiation and compliance.

For default rules, we can see that the Chinese law and the *Supplement* choose different settings, which would lead to different "nudging effects". According to the "nudging theory", as making an explicit choice or switching choices take time, attention and cost, people tend to have an "anchoring" bias to stay with the default rules.⁷⁰⁰ Default rules can determine what would happen if people choose to do nothing. While the expression in Chinese rules is "unless otherwise agreed, [...] is prohibited from doing [...]",⁷⁰¹ the expression in the *Supplement* is "unless otherwise agreed, [...] is entitled

⁶⁹⁹ Randy E. Barnett, "The Sound of Silence: Default Rules and Contractual Consent," *Virginia Law Review* 78 (1992): 821-911 at 822. See also Douglas G. Baird and Thomas H. Jackson, "Fraudulent Conveyance Law and Its Proper Domain," *Vanderbilt Law Review* 38 (1985): 829-855 at 835-836 (specifically arguing that the default rules governing the debtor-creditor relationship "should provide all the parties with the type of contract that they would have agreed to if they had had the time and money to bargain over all aspects of their deal." and should represent "one kind of control that creditors generally would want to impose and that debtors generally would agree to accept").

⁷⁰⁰ Cass R. Sunstein, "Deciding by Default," *University of Pennsylvania Law Review* 162, no. 1 (2013): 1-58.

⁷⁰¹ E.g., Article 227 (2), Property Law; Article 15 of the Patent Regulation of 2010 (providing "During the pledge term of a patent, the SIPO shall disapprove the waiver of the patent right if the pledgor fails to provide evidentiary materials on the pledgee's consent to his waiver of the right.")

to [...]”.⁷⁰²

We will now take the rules on the further assignment and license of the encumbered IP as an example. The Chinese default rule is that, “after the property rights in IP are pledged, the pledgor cannot further assign or license the encumbered IP, except with the express consent from the secured creditor.”⁷⁰³ The Chinese default rule requires an expressed consent for further assignment/license, so no further assignment/license if people choose to do nothing. This default rule shows the Chinese law’s tendency to restrict continuous exploitation. This default rule determines that the grantor/debtor should always negotiate for the creditor’s consent to each further assignment or license. This approach has its advantage that the creditor would be always be informed about changes which have occurred to the pledged IP.

By contrast, the *Supplement* includes a default rule that a further assignment or license is feasible except for being expressly prohibited, and reminds the secured creditors that they have the right to control the debtor’s exploitation of the encumbered IP by writing such prohibition into the security agreement.⁷⁰⁴ This approach still can effectively protect the creditors’ interests but saves the negotiation cost for the cases where the creditors do not want to impose prohibitions on the exploitation. This default rule reflects the *Supplement*’s tendency to encourage the continuous exploitation of collaterals.

While under Chinese law a further assignment and the license by the grantor/debtor can be possible only with the expressed consent of the creditor, the *Guide* provides a different treatment of the assignment and the license depending on whether it is made with or without the debtor’s consent. While the authorized assignments and licenses are free from the pre-existing security rights, the unauthorized ones are valid for a *bona fide* third party but still subject to pre-existing security rights, which would be

⁷⁰² E.g., Recommendation 133 of the Guide (providing “unless otherwise agreed, the secured creditor is entitled: (a) to be reimbursed for reasonable expenses incurred for the preservation of an encumbered asset in its possession; (b) to make reasonable use of an encumbered asset in its possession and to apply the revenues it generates to the payment of the secured obligation; and (c) to inspect an encumbered asset in the possession of the grantor.”)

⁷⁰³ Article 227 (2), Property Law of China (providing “After the property rights in intellectual property are pledged, the pledgor cannot further assign or license the encumbered IP, except with consent from the secured creditor.”)

⁷⁰⁴ Paragraph 222, Supplement (providing “An owner/creditor and its secured creditor may agree between themselves that: [...] the owner/grantor may not grant licences (in particular exclusive licenses) without the consent of the secured creditor.”)

automatically extended to royalties from the unauthorized assignments or licenses.⁷⁰⁵ Even in the unconsented cases, upon the debtor's default, the secured creditor can always request an enforcement of the pre-existing security right, which still covers the encumbered IP and is automatically extended to royalties from the unauthorized assignments or licenses. And the secured creditor's right to require the grantor/debtor to take all responsibility for the breach of contractual limitation is not prejudged. Therefore, the legitimate interests of a secured creditor can still be effectively protected.

As explained in Section 3.4.4, keeping efficient exploitation of the encumbered IP during the pledge period is crucial for preserving the liquidation value and beneficial to both the creditor and the debtor. The secured creditor may not intentionally block further assignment or license, but they may hold-up for some private benefits or may be reluctant to give authorization because they are not familiar with IP or their risk-aversion. Their hold-up and risk aversion can affect the grantor/debtor's decision (see further discussion on a similar case in Chapter 5 to see how a third party's incentive to hold-up and risk-aversion can restrict the debtor's decision making and have an impact on the total social welfare). Under the current Chinese law, if the secured creditor refuses to consent, then the debtor cannot make further assignment and license at all. The grantor has no way to protect its interests from the secured creditors' hold-up on giving consents to further assignments and licenses, especially in the case where the grantor will rely on its royalty income to pay off the secured obligation. By contrast, under the *Supplement*, the possibility of making further assignments or licenses despite contractual limitations gives the grantor/debtor a greater autonomy on making exploitation decisions in line with its own business considerations, without worrying about being held-up or blocked by the creditor. Through this approach, as the secured creditor's interests can be protected to the maximum, the debtor may still achieve the full exploitation of its encumbered IP.

This divergence in setting up default rules clearly reflects the *Supplement's* tendency to encourage the continuous exploitation of collaterals, and the Chinese law's tendency to restrict the exploitation.

⁷⁰⁵ Recommendation 81, Guide.

4.5.2 Perfection, Publicity and Priority

According to the criteria established in Chapter 3, in order to provide creditors with a simple, streamlined, comprehensible, expeditious, and inexpensive method for the perfection, publicity and priority of security interests in IP, the law is expected to:

- (1) set clear guidance about where and how to properly give notice of the security interests; and specify, if with multiple registry schemes, the priority of registrations at different registries;
- (2) make it is possible to have a whole business collateralization, create floating security interests, or use future (after-acquired) assets as collateral, in the case of IP collateralization.
- (3) give clear priority rules on competing interests, including also those of the additional third parties specifically for IP collateralization, such as the pre-existing and subsequent licensors and licensees.

4.5.2.1 Registration schemes

In both of the US and China, security interests in IP are perfected mainly with IP-specific registries. The *Supplement* agrees that this specialized approach has its advantages. It is more suitable for satisfying the specific requirements of each type of IP and this makes it easier for the specialized competent authority to administer registry affairs. So, the *Supplement* does not suggest a profound reform of the current IP-specific registries and allows the co-existence of specialized IP registries and the general registry suggested by the *Guide*. To guarantee a harmonious co-existence of both registry systems, it provides priority to the registrations at the IP-specific registries and gives some suggestions on ensuring the efficient and effective communication between the two registry systems (Section 4.4.3.1).

For the US, there has been a long-lasting debate about the dual-registration system for security interests in IP. The co-existence of a federal-level IP specific registry and a state-level UCC-9 general security interest registry for all kinds of assets result in a dual-registration problem, especially for patents and federally registered trademarks (Section 4.3.3.1). While the UCC-9 registry only asks for notice-registration, the federal IP specific registry requires more documents and more specific description. The specific description requirements in the federal IP-specific registries creates problems for perfecting the security interests in all-asset or in future IP (Section

4.3.2.2 D and 4.3.3.2).

Opponents claim that the dual-registration system gives rise to cost duplicity and great legal uncertainties in the effectiveness and the priority order, which can make the transactions time-consuming and cost-inefficient. They therefore argue for centralizing the registration to the federal IP-specific registries.⁷⁰⁶

On the other hand, some proponents argue that the dual-registration has two main advantages. First, it allows the other types of IP without specific federal registry to be perfected at the state-level UCC-9 registry. For these types of IP, without federal IP law exemptions, all the benefits of the modernized UCC-9 rules can be applied without worrying about any conflicts with IP laws. Second, while the specific description requirements in the federal IP-specific registries make it impossible to create security interests in all-asset or in future IP, an additional state-level UCC-9 registration and a cross-reference may solve the problem. With the help of electronic registration, a fast cross-reference would make a simultaneous dual-registration easily done. In this case, the transaction cost and legal uncertainty can be largely reduced and the benefits of both registry systems can be achieved at the same time. Then the US rules would be actually quite consistent with the recommendations given in the *Supplement*.

As a result, we can see that, in the US, the co-existence of two registration schemes is not the problem. The main uncertainties mainly come from the unclear preemption rule and the lack of specific reference to the security interests in IP in the federal IP laws. With clearer preemption rule and a well-designed electronic registration with cross-reference, the dual-registration system can display its advantages (those argued by the proponents) without bringing uncertainties.

In China, there exists no dual-registration problem. For patents, copyrights and trademarks, security interests can be perfected only in IP-specific registries. And there are specific departmental administrative regulations for registries regarding trademarks, patents and copyrights. These specific rules have the advantage of being clear and straightforward. However, the absence of uniform rules or principles guiding the works of these decentralized IP registries results in numerous inconsistencies among these registry systems and consequently increases the uncertainties in law (Section

⁷⁰⁶ See discussion on the efforts in *supra* note 548.

4.2.3). Furthermore, the absence of a general security interest for all assets makes the perfection of security interests in the other types of IP rather than trademarks, patents and copyrights just not feasible in practice (Section 4.2.3.1).

It is therefore suggested here that a group of rules with uniform underlying principles should be introduced to either the *Property Law* or the IP laws to guide the administrative operations in specialized IP registry systems. And establishing a general security interests registry for all assets can make the perfection of security interests in other types of IP possible as well.

4.5.2.2 Registration requirements

In a simple notice-based registry system recommended under the *Guide* and adopted in the US under the UCC-9 or in IP-specific registries, a registration does not go through any scrutiny over the information provided and becomes effective as of the moment the information in the notice become searchable for third parties (note: the IP-specific registries require more specific description but do not conduct any scrutiny).⁷⁰⁷ By contrast, in China, the cumbersome and prohibitive registration process for perfecting security interests IP imposes too many statutory requirements on the information and documents to be submitted, and conducts a substantive scrutiny of the submitted documents and information.

It is easy to understand that the document-based registry with substantive scrutiny adopted in China aims to ensure the accuracy of the registration records, for protecting debtors from unauthorized registrations or other potential abuses and for allowing all third parties to rely on the records to assume the existence of the security rights in the encumbered collateral. However, these purposes can be achieved with the much less cumbersome notice-based registry recommended by the *Guide* and the *Supplement* as well.⁷⁰⁸

First, the mere registration of a notice is also sufficient for notifying the public about the existence of the security rights in the collateral, which is the exact purpose of the

⁷⁰⁷ Recommendation 32 and 70, *Guide*.

⁷⁰⁸ See comparison between the notice-based registration and the document-based registration can also be found at: Asian Development Bank, *Law and Policy Reform at the Asian Development Bank – A Guide to Movable Registries 2000* (December 2000), paragraph 75-82, available at: http://www.adb.org/documents/reports/movables_registries/default.asp. See also Fleisig et al. (2006) *Reforming Collateral Laws to Increase Access to Finance*, *supra* note 292 at 39.

registry system for perfection. In China, in order to avoid exposing the economic situations of pledgors and pledgees, the final records available for public enquiry are actually limited to the names of pledgor and pledge, basic information of the collateral, registration date of pledge and duration of pledge only,⁷⁰⁹ exactly the same as the information required under the notice-based registry recommended by the *Supplement*. Therefore, most of the information and documents required under the Chinese laws do not help in notifying the public at all, but they impose an onerous burden on both registrants and specific registries for providing, archiving and scrutinizing the necessary documents, and slow down the whole registry process. The costs in terms of time and money incurred to the registrants on the preparation of these documents, and those incurred to registrars on administration and the examination of these documents, will eventually be imposed upon the parties of the secured transaction, and in particular upon the debtors in most cases because of credit rationing. All these costs can be largely reduced under the notice-based registry system. Meanwhile, the abundance of information and documents submitted also make the electronic entry and retrieval of records extremely complicated and time-consuming. The SAIC admitted that the quantity of the documents for review “present[s] a major hurdle for it to adopt computerized online registration.”⁷¹⁰ By contrast, the information required in a notice registration is limited and usually with a standard format, which makes the establishment of a multilingual or electronic registration system much easier and more convenient.

Second, the debtors’ concerns about unauthorized or fraudulent registrations or other abuses and the other concerns about incorrect information in the notice can be relieved by the accompanying correction rules under the *Guide* as well. For example, the *Guide* provides precise rules for protecting the reliance of third parties on information in the notice,⁷¹¹ entitles debtors to compel cancellations or amendments of registrations through simply judicial or administrative proceedings,⁷¹² and allows imposing administrative penalties on unauthorized registrants or for fraudulent conveyances to

⁷⁰⁹ Article 14, Patent Pledge Regulation of 2010; Article 21-23, Copyright Pledge Regulation of 2011.

⁷¹⁰ See Su Linhan, “Security Interests under China’s New Property Law,” *China Secured Finance Bulletin* 1 (2008) at 7.

⁷¹¹ Recommendation 58-60; 66-67, *Guide*.

⁷¹² Recommendation 72 (b), *Guide*.

an appropriate extent, with the consideration about the relevant risk and administering cost.⁷¹³

In sum, we can see that the additional burdens imposed by the cumbersome document-based registry do not bring any additional benefits that the notice-based registry cannot give. These unnecessary burdens virtually obstruct the debtor's ability to get access to credit through IP collateralization. As a result, it is proposed here that it would be better to learn from the *Guide* to adopt the simple notice-based registration system and to introduce the accompanying correction rules for protecting debtors from fraudulent conveyances.

4.5.2.3 Priority

Although it seems that the problem of the “three-month look back grace period” in the US law (Section 4.3.3.3 B) does not concern China at all, the serious administrative delay caused by the strict scrutiny of the abundant documents and information during the registry process in fact can also lead to substantive delay between the application date and the actual registration date, which can consequently result in the same (maybe even worse) uncertainties to the priority order among conflicting claims (Section 4.2.3.2).

Compared to the complicated priority rules in the US (Section 4.3.3.3) and in the *Supplement* (Section 4.4.3.2), the priority rules in China are extremely simple. There is no need to discuss the priority order among various pledges in the same IP, because re-pledge (of all IP) and multi-pledge (of patents) are explicitly prohibited. Similarly, there is no need to discuss the priority order between security interests and subsequent further licenses or assignments, because the latter are possible only with consent from the secured creditor and there is no “ordinary course of business” exception in Chinese law for IP collateralization at all.

The clear priority order among conflicting claims in the current Chinese law for IP collateralization is not the intentional results of systematically designed priority rules but a consequence deriving from the prohibitive restrictions on the exploitation of encumbered IP. The approach adversely affects the ability of the debtor to fully exploit the monetary value of the encumbered IP. It obstructs the debtor's capability of

⁷¹³ Recommendation 55 (c) and 72 (b), *Guide*.

generating revenues to pay back the principal claim and also the secured creditor's realization of security interests upon default.

This problem cannot be solved by changes in priority rules only. All the relevant rules shall be changed to remove all these prohibitive restrictions on the creation and perfection of security interests, to give parties a greater autonomy on allocating the obligations and rights and arranging further exploitation of the pledged IP, and then to provide clear priority rules for parties and judicial authorities to determine the priority order in the enforcement of security interests in IP. In this case, the recommendations in the *Guide* and *Supplement* are helpful.

4.5.3 Enforcement

In order to ensure an effective and efficient enforcement process to safeguard the creditor's interests on the debtor's default and make appropriate protection of the rights of the debtor and third parties, the rules for enforcement are expected to

- provide the creditor with certain, expeditious and inexpensive remedies;
- allow and also ensure that the creditor can exercise its security interests in a timely manner;
- provide remedies for the debtor against collusion between the creditor and the assignee in the enforcement;
- provide some remedies for the licensees to claim or protect their interests

Regarding the enforcement, the *Supplement* does not provide any specific recommendation for IP collateralization and US case law has established some rules about "locating the best market" to make "commercially reasonable" disposition of the encumbered IP (Section 4.3.4). Chinese law has no special rules for IP collateralization either, but by a simple *mutatis mutandis* application of the general rules pertaining to tangible assets in the *Property Law* to the enforcement of security interests in IP.

The substantive Chinese rules governing the rights of the creditor to exercise the enforcement remedies are generally clear. The security interests in IP can only be enforced by one of the three remedies: conversion, (public or private) auction and sale. There is no other alternative for debtors to receive a proportional liquidation value. Chinese law gives some protection to the debtor/pledgee. Although without specific procedure rule providing the debtors with a market price protection like that in the US

counterpart, the *Property Law* allows the debtor to request a judicial action if the debtor does not agree with the disposition value of the pledged IP. This remedy provides a more or less equivalent protection for the debtor against collusion between the creditor and the assignee in the enforcement (Section 4.2.4). It also gives the debtor/pledgor the right to request the pledgee to promptly enforce the pledge at its maturity or to request compensation for any damage caused by delayed enforcement. However, no rule in Chinese law addresses the remedies for licensees to claim or protect their interests.

In summary, the enforcement and remedy provisions in Chinese law for IP collateralization seem rudimentary and lack sophistication. The Chinese law should therefore aim at providing parties with more flexible alternatives and take into account more interests. However, in this regards, neither the Supplement nor the US law have clear rules for China to learn from.

Although a detailed discussion of the enforcement process is beyond the scope of our analysis, it is worth emphasizing that a well-designed specific enforcement mechanism is perhaps much less important than an effective enforcement process with clarity, predictability, and execution. A slow, expensive and corrupted enforcement process can take all the benefits of secured transactions away and discourage creditors from engaging in IP collateralization from the first place. However, the factors determining the efficiency of an enforcement process cannot be simply improved by the changes in the substantive legal rules.

4.6 Summary of Findings

The findings from the comparative analysis above can be summarized as follows,

Effectiveness criteria	UNCITRAL		US	China
	Creation			
(1) Unifying rules for different kinds of IP in order to reduce legal uncertainty;	Yes, but has to refer to specific IP laws	No	No	No, separate IP-specific regulations without unitary guiding rules
(2) Setting only minimal requirements on creation in order to reduce the transaction cost	Yes	Yes	Yes	Yes in property law; but IP-specific departmental rules impose additional specific description requirements and prohibitions, which make it impossible to use future patents, future trademarks and the right to patent application as collateral
(3) Giving broad but clear guidance on the scope of IP eligible for collateralization in order to ensure legal certainty	Yes, but has to refer to specific IP law	Yes, also needs to refer to specific IP law	Yes, also needs to refer to specific IP law	Yes in property law; but not clear when reading with IP laws. Practically infeasible for other types of IP without IP-specific registries to be used as collateral
(4) Providing the maximum autonomy to parties in order to allow parties to control and reduce transaction risks via free negotiation	Yes	Yes	Yes	Yes in property law; but IP-specific departmental rules put lots of mandatory restrictions
(5) Making an appropriate allocation of the pre-default rights and obligations on the exploitation and preservation of the encumbered IP	Yes, some additional recommendations	No specific reference	No specific reference	No re-pledge for all IP, and no multi-pledge for patents; more prohibitive default rules, especially for further assignment and license
Perfection (publicity and priority)				
(1) Setting clear guidance about where and how to properly give notice of the security interests; and specify, if with multiple registry schemes, the priority of registrations at different registries	Yes	Unclear preemption rule and uncertain case law	Unclear preemption rule and uncertain case law	Yes, IP-specific registries only
(2) Making it possible to have a whole business	Yes	Possible in the	Possible in the	Impossible for a whole business collateralization.

collateralization, create floating security interests, or use future (after-acquired) assets as collateral, in the case of IP collateralization			UCC-9, but difficult with registration at IP-specific registers	Impossible to use future patents and trademarks as collateral
(3) The registration and public system should be simple, comprehensible, expeditious, and inexpensive	Yes		Not for now, because of the uncoordinated dual-registration system	No, the registry system is strict document-based with substantive scrutiny over comprehensive matters
(4) Giving clear priority rules on competing interests, including also those of the additional third parties specifically for IP collateralization, such as the pre-existing and subsequent licensors and licensees	Yes. Also with the ordinary course non-exclusive licensee exception		With the grace-period problem; and the ordinary course non-exclusive licensee exception	Clear for the priority among security interests, pre-existing licenses vs. security interests; no need to discuss security interests vs. subsequent assignees/licenses
Enforcement				
(1) Providing the creditor with certain, expeditious and inexpensive remedies	Yes		Yes	Three remedies
(2) Allowing and also ensure the creditor exercise its security interests in a timely manner	No specific reference		No specific reference	Yes
(3) Providing remedies for the debtor against collusion between the creditor and the assignee in the enforcement	No specific reference		Yes, requirement on being “commercially reasonable”	Yes, judicial auction
(4) Providing some remedies for the licensees to claim or protect their interests	No specific reference		No specific reference	No specific reference

From the comparative analysis on the strengths and weaknesses of the general legal frameworks in relation to the criteria of creation, perfection (publicity and priority) and enforcement of security interests in IP, we find that all the three legal frameworks have some particular aspects could be improved from the perspectives of risk controlling and transaction cost reduction.

4.6.1 Problems in US Law

For US law, the comparative analysis reveals that the main problems are still about the lack of specific rules and the dual-registration system. In general, the parties are left with great autonomy in controlling and balancing risks through negotiation and the law does not impose prohibitions over active exploitation of encumbered IP. However, because of the absence of any document specifically addressing IP collateralization, parties have to go through all relevant legal documents and cases to figure out the applying rules and have to adopt lots of remedies to ensure sufficient protection against the uncertainties. All these efforts to reduce the substantial legal uncertainties result in high transaction cost.

However, while most literature focuses on criticizing the co-existence of two registration schemes in the US, our analysis shows that the real problems under the dual-registration system are the unclear exemption rule and the lack of cross-reference between the registries. The current general security interest registry established under the UCC-9 at the state level can actually act as a good supplementary scheme to facilitate the creation of security interests in all IP of the debtor and in future IP, without the need for making compound reform of the IP-specific registries and practice. So, our analysis does not support the proposal of centralizing the registration to the federal IP-specific registries. With a clearer preemption rule and a well-designed electronic registration with cross-referencing, the current dual-registration system could display its advantage without bringing uncertainties.

4.6.2 Problems in Chinese Law

For China, the comparative study helps us identify several main problems.

4.6.2.1 Lack of coordination among rules

First and foremost, great legal uncertainties come from the fact that the current legal

regime regarding IP collateralization is a chaotic patchwork of uncoordinated fragmented documents and rules with plenty of contradictions and gaps.

Most of the specific rules directly on IP collateralization are scattered in the three departmental regulations for trademarks, patents and copyrights. The absence of unitary guidance from *Property Law* or IP laws results in significant disparities on many core issues, such as the requirements on the description of encumbered IP, the documents needed for registration, the use of future IP as collateral, and the creation of multiple pledge. These disparities are results of the absence of unitary guidance and the lack of coordination, not for catering to different economics rationales.

Meanwhile, when the *Property Law* remains vague in many core issues such as the registry process, priority order and enforcement remedies, it is not feasible to use the other types of IP rather than trademarks, patents and copyrights as collateral in practice. The absence of a general security interests registry makes it impossible (or expensive) to create all-asset security interests over IP.

The lack of coordination among the rules for different kinds of IP, the ambiguity in the terminology, the lack of precise rules on assignment, and the dogmatic separation among rights in IP call for further clarifications from IP law and unitary guidance from the *Property Law*. IP collateralizations involving all kinds of IP would be treated alike under a common set of principles, with accommodation of specific needs for each kind of IP.

As a result, in order to reduce the transaction cost brought by legal uncertainties, the first structural reform on the general legal framework in China should be reducing the fragmentation and making rules more compatible and coherent with each other.

4.6.2.2 Paternalistic bias

Second, the Chinese general legal framework for IP collateralization controls the risk by paternalistic regulation rather than through supplementary supports. From the law and economics perspective, respecting the autonomy of parties and the freedom of contract would allow parties of secured transactions freely to negotiate over their transactions and choose ways to balance interests and risks, such as to reduce the amount of secured debts or to require additional collaterals. With the successful experience which has proven that the best way of promoting the development of secured transactions is to give contracting parties the maximum flexibility in

structuring their transactions, the *Guide* has explained that the best risk control in secured transactions is to “allow debtors to use the full value inherent in their assets to support credit”,⁷¹⁴ to give parties the “maximum flexibility to negotiate the terms of their security agreement,”⁷¹⁵ and to support with sound secured transaction laws and insolvency laws, as well as “effective and efficient judicial systems and other enforcement mechanisms”.⁷¹⁶ So, the *Guide* and the *Supplement* (and also the UCC-9 of the US) set out only minimum requirements on the creation of security rights, support the creation of multiple pledges and re-pledge on the same encumbered assets, and encourage parties to make proper arrangements on the subsequent exploitation of the encumbered IP. In addition, to reduce the possible risks of fraud or hidden information for all parties including relevant third parties, they provide sophisticated priority rules and enforcement remedies to protect the legitimate interests of all parties and the public welfare in the case where something goes wrong.

Nevertheless, the general legal framework in China chooses the exact opposite approach. In general, the Chinese rules on the creation, perfection (including publicity and priority) and enforcement are very simple, quite clear and straightforward. It seems to have kept the legal uncertainty at a low level. In fact, the prohibitive Chinese rules limit the scope of IP eligible for collateralization to ownership only, require specific description of encumbered IP, prohibit the use of the right to patent application as collateral, build a burdensome document-based registry system with substantial scrutiny, restrict the subsequent exploitation of encumbered IP during the loan term, and prevent the parties from negotiating over matters like multi-pledge or re-pledge.

All these prohibitive “risk-control” mechanisms only make IP collateralization become more expensive and time-consuming, and obstruct the parties from fully exploiting the monetary value in their IP, but do not better serve their objectives of ensuring the certainty of transaction and the prevention of frauds. For example, we have shown that the burdensome document-based registry system does not achieve a better informing function than the notice-based registry system and the latter can also effectively prevent fraudulent conveyances or incorrect information through providing accompanying correction mechanisms and imposing administrative penalties.

⁷¹⁴ Recommendation 1 (b), *Guide*.

⁷¹⁵ Recommendation 1 (i), *Guide*.

⁷¹⁶ Paragraph 2, Introduction, *Guide*.

These prohibitions also show that “law-making [in China] has a strong paternalistic bias due to the fundamental mistrust of the risk management capabilities of transacting parties.”⁷¹⁷ For example, the legal prohibitions on the creation of security interests in future patents and trademarks or in the rights to patent application are imposed to protect parties from legal uncertainty. However, the successful experience of using future copyright as collateral to fund projects has proven that, when there is no prohibition on the creation of security interests in future copyright, the Chinese market participants do have the capacity of making proper contractual arrangements to control the relevant risks. It is the paternalistic bias and mistrust that restricts the market participants from practicing. The whole legal system for IP collateralization is overly troublesome and prohibitive. The fact that, faced with such a great market demand for credit, less than 0.1% of the total valid patents have been used as collateral in 2012 clearly demonstrates an obvious under-employment of patents as collateral.

In other words, Chinese rules prefer an easy regulatory approach even at the expense of wasting the value inherent in IP. To change the status quo, there is an urgent need to extend the scope of IP eligible for collateralization beyond ownership only, to remove these legal prohibitions on the creation of security interests in future IP, to provide parties with greater autonomy in negotiating contract terms, to allow parties to make appropriate identifiable description of the IP to be encumbered and negotiate over matters like multi-pledge or re-pledge, to make it possible to use future IP as collateral, to encourage parties to make proper arrangements on subsequent exploitation of encumbered IP during the loan term, and to largely simplify the registry scheme.

4.6.2.3 Insufficient protection

Third, the current Chinese rules cannot provide creditors with sufficient protection upon the debtor’s default at all. Because of the troublesome prohibitions, the priority rules in Chinese law for IP collateralization are extremely simple. As a matter of fact, there are two main approaches to control the risks regarding IP collateralization, i.e., pre-control or post-control.

⁷¹⁷ See Linhan Su, “Secured Transactions Law Reform in China: Can a Commercial Law Serve the Needs of the Market?,” *China Secured Finance Bulletin* 1 (2008) at 10.

Clearly, the *Guide* and the *Supplement* (and also the UCC-9 of the US) have chosen the post-control mechanism. They do not interfere with the parties' autonomy but establish a group of sophisticated rules for the priority order and enforcement remedies, to ensure that security interests can function effectively as a kind of "backup mechanism" upon the debtor's default. Sophisticated priority rules and enforcement remedies lower the secured creditor's lending risk by enhancing the secured creditor's capability of extracting the salvage value from the collateral through a disposition of the encumbered collateral, and also achieve a proper balance with the other competing claimers' interests.

By contrast, Chinese law has chosen the pre-control mechanism, by imposing prohibitive restrictions and remaining vague on the priority order and enforcement remedies. The *Property Law* just applies these provisions for tangible movables *mutatis mutandis* to the case of IP collateralization. This approach does take into account the peculiar characteristics of IP and therefore cannot effectively protect the creditors' interests when liquidation occurs or signs of trouble show up. After removing all these obstructive prohibitions, Chinese law calls for the introduction of more sophisticated priority rules and enforcement remedies.

4.6.2.4 Need for a structural reform

The large number of economic stimuli policies issued in recent years reflect that the Central Government of China has realized the necessity of stimulating IP collateralization for solving funding problems for SMEs, especially those high-tech ones for their needs for R&D investments. The legal changes since 2006 also show that the central legislative body of China, at the conceptual level, has noticed the importance of an effective and efficient legal framework for IP collateralization.

However, all these problems revealed above suggest that the current legal framework governing IP collateralization is still unfit for meeting the actual economic demands in practice. Although these legal efforts have removed some minor legal obstacles for IP collateralization in China, they constitute a timid patchwork that is incapable of overcoming many deep-seated problems or meeting the current financial demands of both IP right holders and fund providers.

Our comparative analysis reveals that the current deficiencies cannot be easily fixed by way of small modifications. A structural reform of the current general legal framework governing IP collateralization has to be done to establish more unitary

guidance rules for reducing legal uncertainty, and to transform the current prohibitive pre-control system into a more sophisticated post-control system. Nevertheless, the tendency of path dependence and the fear to a dramatic departure from the long-standing legal tradition might be the biggest obstacle to such a structural reform.

4.6.3 Problems in the UNCITRAL's Efforts

Meanwhile, this comparative study also allows us to examine the possible effects of the *Supplement* on IP collateralization in a national context. The World Bank once praised that the *Supplement* because it “offers a generally acceptable intellectual basis for the solution of a number of intricate legal problems in different legal system.”⁷¹⁸ The *Supplement* does make certain adjustments to accommodate the divergence between IP law and secured transaction law, for example, adopting a flexible definition of “intellectual property” to encompass various types of IP and abundant rights in IP to a maximum extent, allocates the maintenance obligation to the debtors to encourage the exploitation of encumbered IP, reminds secured creditors of the needs to protect their rights to maintain the encumbered IP without imposing restrictions, prioritizes the registrations in the IP-specific registries to those in the general security registry, to mention but a few. These efforts take into account the characteristics of IP and provide clear directions on making domestic adjustments to build an efficient legal regime for secured transactions and equally to ensure the effective protection and exercise of IP. This is just what the *Supplement* is expected to achieve.⁷¹⁹

However, throughout the text of the *Supplement*, it is more common to see commentaries merely clarifying further the provisions contained in the *Guide* in the context of IP, without giving any specific suggestions on how to reconcile these rules with IP laws by simply saying “(the issue) is a matter of law relating to intellectual

⁷¹⁸ *Draft Supplement to the UNCITRAL Legislative Guide on Secured Transactions dealing with security rights in intellectual property - Compilation of comments by Governments and international organizations*, A/CN.9/701, UNCITRAL, 2 June 2010, at 3, available at: <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/V10/541/00/PDF/V1054100.pdf?OpenElement> (the World Bank praises the contribution of the *Supplement* that ““The (draft) Supplement recognizes that each jurisdiction may have specific rules governing intellectual property and seeks to accommodate these regimes in addressing the issue of security interests; the (draft) Supplement thus offers a generally acceptable intellectual basis for the solution of a number of intricate legal problems in different legal system”).

⁷¹⁹ Paragraph 1 (Objective), *Supplement*.

property”⁷²⁰, and “this matter would be left to law relating to intellectual property”.⁷²¹ Recommendation 4 (b), entitled “Limitations on Scope”, is designed to draw a clear boundary to limit the scope of application of the *Guide* and the *Supplement* to the cases without inconsistency with rules regulating IP, in order to guarantee the coherence between the laws on secured transactions and those on IP. The limitation on the authority competence forces the *Supplement* to keep using Recommendation 4 (b) as the shield to avoid having a deeper discussion of IP laws.

Our comparative study shows that the general security laws in China and the US, namely, the *Property Law* and the *UCC-9*, are actually quite consistent with the recommendations given in the *Guide* in almost all aspects. However, most of the problems identified above in China actually come from the IP-specific rules. Therefore, some changes have to be made in these IP-specific rules as well. However, the existence of Recommendation 4 (b) makes it basically impossible for the *Supplement* to have an in-depth discussion on core issues or to propose any substantive suggestions to the adjustments in IP laws.

As a result, it may conclude that the *Supplement* indeed reflects some of the recent achievements in the secured transaction law sector and provides plenty of basic principles for modernizing laws for IP collateralization. However, the *Supplement*’s approach of simply prioritizing rules governing IP does not help much in reconciling the general secured transactions law with IP laws, even in specific jurisdictions that actually adopt the recommendations thereof.

A comparative study on the efforts of the *Supplement* helps us identify the problems in current Chinese law, but it cannot give many recommendations that can be directly used to make the legal changes, because these changes have to be done in IP laws. Simply prioritizing IP rules is not a solution for sure. In the end, we need much deeper analysis of IP laws and of specific issues, and examine how the different economic reasoning under IP and other assets can give rise to conflicts. The next Chapter is an example about what the law and economics analysis can contribute in this regard.

⁷²⁰ For example, Paragraph 88, 93, 96, 123, 159, 189, 199, Supplement.

⁷²¹ For example, Paragraph 24, 174, 176, Supplement.

Chapter 5 Enforceability of Restrictive Clauses in IP Licenses in Secured Transactions

5.1 Introduction

The objective of modern secured transaction law is to expand the scope of assets eligible for being collateral for providing low-cost credit.⁷²² From the perspective of secured transaction law, any asset that has monetary value and is assignable can be encumbered as collateral.⁷²³ In the current international intellectual property (IP) finance practice, IP licenses have been used as collateral for getting external debt finance in order to support some investments.

As discussed in Section 3.3.2.2, as IP licensing has become the main way of IP exploitation, in a licensing relationship, both the licensor and the licensee have some rights with monetary value under the license agreement (the specific rights depend more on the contents of license agreements).

Nowadays, IP licensing has become a main way of IP exploitation, especially in the software industry. Based on a license agreement, an IP rights owner (as the licensor) grants the other party (as the licensee) the permission to (exclusively or non-exclusively) exploit the innovation underlying the IP protection in exchange for an agreed payment. The other party's exploitation otherwise would be an infringement of the patent in the case without the license. For different types of IP, license agreements can be in the form of copyright license agreement, technology license agreement, trademark license and franchise agreement. A license can also be in the form of a contractual license or a non-contractual license (as in the case of a statutory or a compulsory license), an exclusive or a non-exclusive license. The agreed payment can be in the form of fixed fee or royalties, or a down payment plus a running royalty.⁷²⁴ In a licensing relationship, both the licensor and the licensee have some rights with monetary value under the license agreement (the specific rights depend more on the contents of license agreements.).

⁷²² See, e.g., N. Orkun Akseli, *International Secured Transactions Law: Facilitation of Credit and International Conventions and Instruments* (New York: Routledge, 2011) at 55–73.

⁷²³ See more detailed discussion in Section 2.3.1 A.

⁷²⁴ See Nalin Kulatilaka and Lihui Lin, "Impact of Licensing on Investment and Financing of Technology Development," *Management Science* 52, no. 12 (2006): 1824 – 1837 (showing that firms' investment and licensing strategies depend critically on the firms' financial constraints and the expected market conditions).

For an IP owner/licensor, giving a license can retain the ownership and control over IP, and meanwhile broaden the reach of IP into different and more markets and bring an additional source of revenue. In addition, IP licenses also provide IP owners/licensors with a way to maintain market power via cross licensing or help attract external finance to mitigate financial constraints.⁷²⁵ Under normal circumstances, the licensor has many contractual rights, such as the right to compel the licensee to advertise or use the licensed IP or related products in line with the terms in the license agreement and the right to terminate the license agreement upon the licensee's breach. The main monetary interest the licensor has in a license is the right to collect the agreed payment. Licensing is one of the main ways that create rewards for innovation.

For a licensee, the license grants him the authorization to manufacture, sell, import, export, distribute or market various goods or services in accordance with the terms of the license. Without the license, these exploitations may be prevented. For instance, a cell phone manufacturer may not be able to produce or sell phones without the license to use a certain patented telecommunication technology. Getting a license helps the licensee to save the R&D costs in developing the protected innovation itself or engineering workaround. The permission to use or exploit IP may also help the licensee to obtain some competitive advantage over its competitors.⁷²⁶ The main monetary value of a license to the licensee comes from the authorization to use or exploit the underlying innovation protected by IP without being worried about being sued by the IP holder (the licensor). According to the International Accounting Standards (IAS), licensing (or royalty) agreements are clarified as intangible "assets" in the balance sheet, regardless of whether they are transferable or separable from the entity or from other rights and obligations.⁷²⁷

While it has been a common practice for licensors to use their "rights to payment of royalties" (usually characterized as "receivables") as collateral, the potential of allowing licensees to use IP licenses as collateral also gains some attention.⁷²⁸

⁷²⁵ See Kulatilaka and Lin (2006) (pointing out that some firms may adopt a licensing strategy to discourage competitors' development efforts and appropriate value via licensing revenues)

⁷²⁶ See more detailed discussion in the social benefits of IP licensing in Section 3.3.2.2 A.

⁷²⁷ International Accounting Standards [38.12], *supra* note 201.

⁷²⁸ See, e.g., Dietmar Harhoff, "The Role of Patents and Licenses in Securing External Finance for Innovation," in *Handbook of Research on Innovation and and Entrepreneurship (Elgar Original Reference)*, ed. David B. Audretsch et al. (Edward Elgar, 2011), Peter Picht, "Collateralizing IP Licenses: Present Deficiencies And Proposals For Reform," *AIPLA Quarterly Journal* 41, no. 3 (2013): 423–465 at 426.

From the licensee's perspective, allowing the use of their IP licenses (or its interests in IP licenses), which may be the most important value source of all its assets, as collateral would enable licensees to leverage their future income from the licenses for satisfying the current cash needs for their operation and growth investment.

From the lenders' perspective, they predict the borrower's repayment basing it on the debtor's capability of generating the cash flow to service the debt and the liquidation value of the collateral at the foreclosure sale (the signaling effect discussed in Section 2.4.1.1 and 2.4.2.1). On the one hand, the license fee is determined by the licensee's capability in generating a steady stream of revenue from getting the license. So, it is directly correlated with the licensee/debtor's capability of generating the cash flow to service the debt. On the other hand, the fact that the licensee asks for the license can prove the practical applicability of the underlying innovation. The practical applicability predicts the demand from other firms competing in the same market, which helps the lender to assess the liquidation value of the license.

As we have discussed in Section 2.4.1.2 and 2.4.2.2, the mainstream law and economics literature in secured transaction has established that some efficiency of the secured transactions are from the disciplinary role of collateral in controlling the post-lending moral hazard problem. For many high-tech companies, an IP license frequently represents an intrinsic component of the "going concern value of the whole company". For instance, if a cell phone manufacturer cannot be able to produce or sell phones without the license to use a certain patented telecommunication technology, then the net value of the manufacturer may just worth the "liquidation value of the manufacturing plant and raw materials". For the lender, the higher percentage is the IP license worth as to the total going concern value of the licensee-debtor, the greater the disciplinary role that the encumbered license can play.⁷²⁹ The lender would then be more willing to accept the license as collateral. The disciplinary role of IP license can alleviate the credit-rationing problem and help more welfare-enhancing projects to be financed.

However, in the current Chinese law, a licensee is strictly prohibited from using his IP license as collateral (Section 5.3.1). The strict statutory prohibition prevents the licensees from leveraging the monetary rights in their licenses and consequently forgoes many welfare-enhancing projects. Chinese law therefore should learn from other jurisdictions to design proper rules for allowing a licensee to use its rights under

⁷²⁹ See Lacker (1991) "Why Is There Debt?", *supra* note 254; Tirole (2006) "The Theory of Corporate Finance", *supra* note 256, And more detailed discussion in Section 2.4.2.2.

an IP license as collateral.

Nevertheless, in these jurisdictions where the licensee's use of an IP license as collateral is allowed, some terms in the license agreement that prohibit or restrict the (security) assignment of the license can obstruct a licensee from obtaining a security interest in its license. These terms sometimes are called anti-assignment clauses or anti-encumbrance clauses (uniformly referred to as "restrictive clauses" hereafter). A typical restrictive clause looks as follows,

"the licensee should not assign, sell, mortgage, pledge, or in any manner transfer the license contract or any interest herein whether voluntary or involuntary or by operation of law without the prior written consent of the licensor."

These restrictive clauses give a licensor the final power to consent to or refuse the licensee's use of IP license as collateral. The issue concerned here is that, while these restrictive clauses allow the licensors to keep better control over their IP, they also restrict the licensees' borrowing capabilities.

So, there is a tension between the licensee's need for credit and the licensor's interests to protect itself against the potential detrimental effects of the security interests in IP license. IP laws and the secured transaction regime reflect very different perspectives regarding this tension and hence have different preferences on the enforceability of these restrictive terms. While IP laws are in favor of enforcing these restrictive terms for keeping the licensor's control over the license, the secured transaction regime tends to invalidate them for helping licensees get access to credit. Then the issues concerned here are: the preference of which law should prevail? Should the law give the licensor the power to consent or refuse the licensee's use of license as collateral? If no, why; if yes, what should be the extent of the licensor's power? The enforceability of these restrictive terms is the answer to this question.

For now, there are two main approaches in the existing legislations around the world on the enforceability of these restrictive terms. The majority of the legislations follow the approach adopted by the UNCITRAL's Supplement, which simply respects personal autonomy and freedom of contract, and therefore unconditionally enforces the contractual restrictions (Section 3.2). On the other hand, US law gives an exception to IP license by allowing the licensee's creation of *limited* security interests in IP license notwithstanding contractual restrictions (Section 3.3).

This dissertation is not aimed at providing a practical instruction for practitioners on how to use licenses as collateral, but at exploring the problems in existing legal rules. Therefore, in the analysis, we do not trap the analysis within the logic like - “since IP licenses are contractual or prohibited from free assignment without the licensors’ consent in the current law of most jurisdictions, they cannot and should not be used as collateral.” We do not take all existing legal rules as given. Instead, we explore the deeper reasons why these contractual restrictions are included in IP licenses in the first place. And then we employ law and economics methodologies to examine if unconditional enforcement of these contractual restrictions would lead to desired social results, especially in the specific context of secured transactions. We make a comparative study on these two different approaches adopted in the UNCITRAL’s Supplement and in the US law, by examining their effects on negotiation, incentives, collateral requirements and investment decision.

In the remaining part, Section 5.2 illustrates a road map about the contractual relationships among the relevant parties and describes the conflicting interests of the relevant parties and the different preferences of IP laws and secured transactions in solving the conflicts. Section 5.3 gives an overview of the different approaches in China, the United States and in the UNCITRAL Supplement for IP. Section 5.4 uses a simple formal debt finance moral hazard model to set up the analytic framework. Section 5.5 applies the analytic framework to examine the consequences of the two different approaches for different kinds of licenses (public or private) on welfare grounds. The examination helps us to reveal the real problem of unconditionally enforcing the anti-assignment clauses in the case of secured transaction, especially for the case of using IP licenses as collateral. In the end, the conclusion section summarizes all the findings and recognizes the limitations. Since the economic rationales underlying each type of IP are similar but not exactly the same, this chapter uses the generic term “IP” in a general way but the analysis is mainly focused on patents in order to illustrate relevant problems.

5.2 Policy Considerations

This section firstly illustrates a road map concerning the contractual relationships among the relevant parties and describes the interests of each party involved. It then gives a brief intuitive explanation about the factors and core principles that should be considered in assessing policy implementations and in giving policy implications in the later sections.

5.2.1 Road Map of the Contractual Relations

Secured transactions with IP licenses are complex because four parties and three contractual relationships are involved. The complicated contractual relationships can be illustrated as follows,

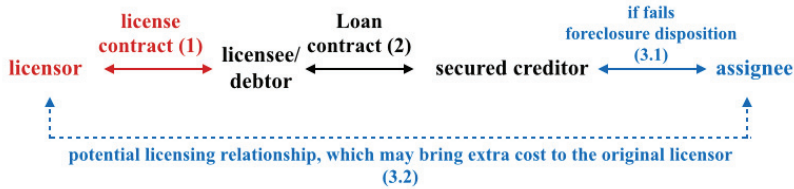


Figure 5.1 Contractual relationships among all parties involved

A. The license relationship between the licensor and the licensee

The initial contractual relationship is the license agreement between an IP licensor and a licensee (relationship 1 in Figure 5.1). According to the license agreement, the IP licensor grants an exclusive or nonexclusive license to the licensee in return for a license fee, which is usually in the form of fixed payments plus royalties.⁷³⁰ Correspondingly, the licensee pays the license fee in exchange for the rights to use the innovation underlying the license subject to the contractual terms in the license agreement. Licensing is one of the main ways that create rewards for innovation (see more details in Section 3.3.2.2 A).

B. The security relationship between the licensee-debtor and the creditor

The second contractual relationship is the security agreement between the licensee-debtor and the secured creditor (relationship 2 in Figure 5.1). In the security agreement, the licensee uses its rights under the license, mainly the right to (exclusive)⁷³¹ exploitation, as collateral and grants the lender (as the secured creditor)

⁷³⁰ See the detailed discussion on the economic reasoning of this kind of payment structure at Scotchmer (2004) "Innovation and Incentive", *supra note* 39 at 161-196.

⁷³¹ IP licenses can be "exclusive", where the licensor cannot make another license with the same scope, or "non-exclusive", where the licensor can. Non-exclusive licenses, in many countries, are non-assignable by law, and, even in countries where assignment is possible, have much less monetary value. For simplicity, this Chapter focuses on exclusive licenses.

security interests in the license. The security interests allow the secured creditor to dispose of the encumbered license in a foreclosure sale upon the licensee-debtor's default, and to get refunded from the foreclosure sale prior to other parties as the repayment of the debt. The security interests work as a self-disciplinary mechanism to control the licensee-debtor's post-lending misbehaviors and ensure the creditor receive the repayment in the case of licensee-debtor's default (See the detailed discussion in Section 2.4.1.2 and 2.4.2.2).

C. The potential license relationship between the licensor and the assignee

The first license agreement and the second security agreement are separately concluded between different parties but closely interdependent.

First, the performance of each contractual relationship has a strong influence on the other one. On the one hand, the license agreement directly determines the collateralizing value of the license in the security agreement. On the other hand, the security agreement influences the performance of the license agreement. While the security agreement can bring external finance and consequently improve the licensee's payment capacity, it also may totally change the license relationship in the case of foreclosure disposition upon the licensee-debtor's default.

Second, the interaction between the two direct contractual relations may give rise to a change of the contractual counterparty to the licensor. A foreclosure disposition of the encumbered license upon the licensee-debtor's default would place the encumbered license in the disposition sale. The encumbered license would be assigned to an assignee (relationship 3.1 in Figure 5.1). In this case, in spite of the fact that there is no direct contractual relation between the licensor and the assignee, both parties may have to fulfill and accept performance according to the terms of the original license agreement between the licensor and the original licensee (relationship 3.2 in Figure 1). The licensor may have to deal with a new licensee (i.e., the assignee) without his prior knowledge or consent.

5.2.2 Reasons to Include Restrictive Clauses in License Contracts

The licensor's main concern here is that dealing with an assignee without prior knowledge or consent may bring extra risks or costs for the licensor to fulfill its obligation under the license agreement or increase some other costs outside the license.

One main cost may come from the fact that the license may fall into the hands of the licensor's prime competitor. At the auction of the foreclosure sale, the IP license might be assigned to the licensor's prime competitor. The competitor might use the underlying technology to develop or produce his own products, which are substitutions or improved products to the licensor's products and hence can erode the licensor's profits. Alternatively, the competitor might suppress or shut down the production and sale of the licensed products as part of its business strategy to drive the licensor out of the market. In the above cases, the competitor would not have been granted the license by the licensor or, even if have been granted, would have been demanded a much higher license fee or with less favorable terms. The competitor may therefore have an opportunistic incentive to seek an existing license from a foreclosure sale, instead of directly contracting with the licensor for a license, which otherwise might be impossible or too expensive.⁷³² In the worst case, the competitor may even have the incentive to arbitrage the investment funded by the secured transaction in order to increase the opportunity of purchasing the license from the foreclosure sale. The competitor's opportunistic behavior would undermine the licensor's profit from his license.

And in some other cases, the licensor's concerns about the licenses may fall into the hands of someone not qualified or deserving. As the value of IP is exploitation-specific, the licensors want to make sure that the IP licenses are effectively exploited by someone who has both the expertise and financial resources to provide products or service.⁷³³ Unqualified products or service may ruin the reputation of the licensor and consequently bring extra costs to the licensor in the way of damage, higher performance costs or risks.

The licensor's fear of losing control over the identity of the licensee without his knowledge or approval requires him to take some actions to protect his private interests. Since the licensor and the assignee are not interrelated by a direct contractual relationship, the licensor cannot directly control the relationship with the assignee. The incorporation of restrictive terms on the security interest assignment in the license agreement therefore becomes the licensors' self-help solution to protect themselves from having to deal with someone who he has refused to deal with

⁷³² See Raymond T. Nimmer, "Breaking Barriers: The Relation Between Contract And Intellectual Property Law," *Berkeley Technology Law Journal* 13 (1998): 827-889 at 857.

⁷³³ This chapter focuses on patent, but this problem is more serious in the case of trademarks, which designed for identifying to the public the source of goods or services. Uncontrolled licensing may result in the misleading or even a fraud to the public.

directly in the first place. The anti-assignment clause, if effective, enables a licensor to continue to control the use of the license, the counterpart it has to deal with, and to keep informed with the changes of the counterpart.

5.2.3 Enforceability of Restrictive Clauses

However, the problem here is that, while these restrictive terms can protect licensors from opportunistic behavior, they also give a licensor the final power to consent to or refuse the licensee's use of IP license as collateral. The enforceability of these contractual restrictive terms would determine the incentives of all the parties involved. The IP laws and the secured transaction legal regime reflect very different perspectives on these contractual restrictive terms and hence have different preferences on the enforceability. There is a basic tension between freedom of contract principles and concerns about restraints on alienation.

5.2.3.1 The perspective of IP laws

The core idea of the IP regime is to provide the incentives to create innovations, disclose knowledge, and put the knowledge and innovations into use. IP protection entitles the innovators with the legitimate right to exclude others from practicing their innovations. The statutory exclusivity allows the innovators to charge monopoly price and drag profits for covering their investments in R&D and to disclose knowledge without worrying about the free-rider problems. IP laws focus on facilitating innovators to use this legitimate exclusion to maximize the value that can be derived from the innovations.

Licensing is a main way for innovators to generate profits and for putting protected innovations into use. In order to maximize the profits, it is in the licensor's interest to find the licensee with the highest net value (the benefits minus the costs). However, the judgment about who is the best licensee is very subjective, depending on the licensee's valuation about the profits from the license and the associated cost as to the licensor. IP laws therefore generally respect the freedom of contract in licensing of IP, by letting the parties explore the information and to sort out the bargain, and simply enforcing the contract terms. Licensors are allowed to freely decide to whom and to what extent the licensors want to grant rights of exploitation.

For the licensors' interests, the IP laws would favor the enforcement of these restrictive terms. Losing control over the identity of the licensees may bring

substantial costs to the licensors. The costs would undermine the licensors' profits from the innovations and consequently remove the IP holders' incentive to license or to innovate. A licensor therefore should have a legitimate interest in protecting himself against an unwanted change of his contractual partner and the other detrimental effects that could result from a particular secured transaction. Enforcing the constrictive terms would entitle the licensor to the final say on approving the creation of security interests in the licensee's rights under the license.

However, there is a growing opinion that, for encouraging the application of innovative technologies, the IP laws should not always support enforcing restrictive terms. The competitor's opportunistic behavior would undermine the licensor's profit from his license but would not necessarily be socially inefficient. In recent years, there have been comprehensive discussions on the adverse effects of the IP licensing on promoting the application of innovation.⁷³⁴ Licensors may make their license decision for private interests instead of for productive efficiency. In this case, offering the assignees another opportunity to avoid the patentee's abuse of patent rights might be socially efficient in some cases. But this opinion is still controversial and has not been widely accepted.

Furthermore, it is worth noting that, although license agreements are in general still considered to be contractual, they are gradually gaining some "proprietary" characteristics. For example, to stimulate patent licensing and to help patentees indicate their willingness to grant licenses, the Intellectual Property Office of the United Kingdom (UKIPO) encourages patent holders to have their patents endorsed with "licences of right" (LORs) in the register of patents, to the effect that licenses under the patent are to be available "as of right".⁷³⁵ When a granted patent is endorsed with the LOR, the patent owner only needs to pay half of the usual annual renewal fees, but also **must** grant a license to anyone who wants one. The license will still be on terms agreed between the licensor and the licensee. However, if the license terms cannot be agreed between the parties, then the UKIPO will intervene and set the terms. A similar LOR

⁷³⁴ See the general discussion on the adverse effects of IP system in Section 2.1.1.2. See the adverse effects of IP licensing in, for example, Michael L. Katz and Carl Shapiro, "On the Licensing of Innovations," *The RAND Journal of Economics* 16, no. 4 (1985): 504–520; Simon Genevaz, "Against Immunity for Unilateral Refusals to Deal in Intellectual Property: Why Antitrust Law Should Not Distinguish between IP and Other Property Rights," *Berkeley Technology Law Journal* 19, no. 2 (2004): 741–784.

⁷³⁵ Section 46, UK Patent Act 1977 (as amended) [2014 version] [Patentee's application for entry in register that licences are available as of right]. See more information at the website of the Intellectual Property Office of the United Kingdom, available at <https://www.gov.uk/guidance/licensing-intellectual-property>.

practice exists in Singapore as well.⁷³⁶

Moreover, some IP-specialized practitioners established the world's first market-based and fully transparent patent license exchange platform, i.e., Intellectual Property Exchange International, Inc. (IPXI), in 2009. The IPXI attempted to convert non-exclusive patent licenses into a standardized, transparent, and tradable instrument called the Unit License Rights Contracts (ULR contracts).⁷³⁷ The ULR Contracts transformed private licensing of technology into tradable products. They were expected to "enable IP holders [...] to more efficiently monetize patents and other IP brought to the market through non-exclusive licensing, while also allowing buyers to purchase at market-established prices."⁷³⁸ Although it eventually failed in 2015,⁷³⁹ these efforts in creating the IPXI show that some practitioners have noticed the potentials of commoditizing and trading IP licenses.

5.2.3.2 The perspective of secured transaction law

By contrast, the secured transaction law views economic activities from the standpoint of spurring the availability of low-cost credit in order to facilitate the movement of goods and services. In order to accomplish this, it seeks to allow debtors to easily use the full value inherent in their assets to support credit in a safe, fair, efficient and transparent capital market.

⁷³⁶ See more information at the website of the Intellectual Property Office of Singapore (IPOS), available at <http://www.ipos.gov.sg/AboutIP/TypesofIP/WhatIsIntellectualProperty/WhatIsapatent/Managingandenforcingyourpatent.aspx>.

⁷³⁷ See "Response to Intellectual Property Exchange International, INC.'s Request for Business Review Letter", U.S. Department of Justice, 26-03-2013, available at <https://www.justice.gov/atr/response-intellectual-property-exchange-international-incs-request-business-review-letter>.

⁷³⁸ The citation is from Ruud Peters, Executive Vice President and Chief Intellectual Property Officer of Philips, cited from "Intellectual Property Exchange International Welcomes Corporate and University Founding Members", Eastern Standard Time, 13-12-2011, available at <http://www.businesswire.com/news/home/20111213005444/en/Intellectual-Property-Exchange-International-Welcomes-Corporate-University>. See also, "Response to Intellectual Property Exchange International, INC.'s Request for Business Review Letter", U.S. Department of Justice, 26-03-2013, available at <https://www.justice.gov/atr/response-intellectual-property-exchange-international-incs-request-business-review-letter>.

⁷³⁹ Many factors may contribute to IPXI's failure, such as, the lack of incentive for potential licensees (infringers) to get a license without litigation threats in the current litigation driven licensing system, the incompatibility with the cross-licensing practice, the immaturity of the price setting model, the divergence between the "pay-up-front" requirement of the ULR contract and the normal "pay-as-you-go" royalty based system, the small license portfolio and the lack of market confidence in the business model. See Jorge L. Contreras, "Frاند Market Failure: IPXT'S Standards-Essential Patent License Exchange," *Chicago-Kent Journal of Intellectual Property* 15, no. 2 (2016): 419–40.

From the perspective of secured transaction law, enforcing the restrictive terms would impair and limit the licensee-debtors' ability to negotiate with the lender/creditor for leveraging the value in a license. It is believed that costless private negotiation can move the property rights to the highest-value users, which is an efficient market result; and laws could be structured to remove the impediments to private negotiation (Normative Coase Theorem).⁷⁴⁰ Free alienability of property rights is the foundation for costly private negotiation.⁷⁴¹ However, the restrictive terms can impair the free alienability of the "licensee's rights in the license". They make a licensee's creation and a creditor's enforcement of security interests in the "licensee's rights in the license" totally conditional on the IP holder-licensor's decision. As a fundamental rule of secured transactions, a lender would be willing to provide finance, only if he can be convinced that he can enforce his security interests in the encumbered collateral upon the debtor's default. The enforcement not only allows the secured creditor to get some recovery from the salvage value of encumbered collateral, but also enables the secured creditor to put credible threat to the debtor to remove the debtor's post-lending misbehaving (see Section 2.4.2.2). When the enforcement of security interests in the licensee is totally conditioned on the IP holder-licensor's decision, which is uncertain and might be inefficient, the lenders generally would not like to accept the "licensee's rights in the license" as collateral. In this case, a licensee's capability of leveraging the economic value of his rights under a license will be highly restricted or even practically impossible. The financial potential in the licensee's right in the license would be wasted. Wealth-enhancing investment opportunities will be forgone because of the lack of investments.

In this case, disrespecting the contractual restrictive clauses would encourage the lender's acceptance of IP license as collateral. There is a growing view that, because of their inhibiting effect on secured credit, these restrictive terms should be rendered unenforceable by secured transactions law, not only in the context of IP licenses, but also in other asset contexts in which such restrictive clauses arise.⁷⁴²

⁷⁴⁰ See the "Normative Coase Theorem" in Robert B. Cooter and Thomas Ulen, *Law and Economics*, 6th Edition (Pearson, 2011) at 92.

⁷⁴¹ Nevertheless, in some cases with problems like externality, imperfect information, prisoner's dilemmas, free riders, and high cost of administering alternative policies, some restrictions on the alienability of property may promote efficiency. See detailed discussion in Susan Rose-Ackerman, "Inalienability and the Theory of Property Rights," *Columbia Law Review* 85 (1985): 931–69.

⁷⁴² See Akseli (2011) "International Secured Transactions Law: Facilitation of Credit and International Conventions and Instruments" *supra note* 722.

5.2.3.3 The tension between IP law and secured transaction law

The basic tensions between IP laws and secured transaction law comes from the licensors' seeking to protect themselves from enduring potential detrimental effects of the security interests in IP license and the lenders' attempting to secure adequate collateral for their loans.

On the one hand, enforcing these restrictive terms for the IP laws' purpose of protecting licensors might allow the licensors to opportunistically withhold consent to a wealth-enhancing security assignment of an IP license in order to extract profits from the licensee-borrower's business. Lenders would then lack incentives to provide credit. Some further innovative activities might be impossible because of the lack of credit.

On the other hand, invalidating these restrictive terms for the secured transaction law's purpose of encouraging lending might make it difficult or impossible for the licensor to control the detrimental effects of the secured transaction on him. The inability to contract around this risk can undermine the holder-licensor's incentive to license and so forgo efficient license transactions. The license agreement directly determines the collateralizing value of the license in the security agreement. Without the underlying license relationship, the use of license as collateral is impossible.

The interdependence between these contracts determine that there should be a balance between the secured transaction law's objective of fostering the use of IP license as collateral in order to help the licensees get better access to credit, and the IP laws' objective of maintaining the IP holder-licensor's incentive to license and innovate.

The following Section 3 will show how different approaches have been implemented in practice for resolving the tension. Then Section 4 will use a formal model to show how the interests of each of the parties affected by the transaction are addressed and balanced.

5.3 Policy Implementation

5.3.1 China

In China, the general rule about the assignability of a contract is that the contractual rights can be assigned and that the anti-assignment clauses are binding. In the specific

case for the assignment of IP licenses, the default rule is that a licensee's attempted assignment is allowed only with express consent from the licensor, unless the license agreement has clearly indicated otherwise.

In current Chinese law, IP collateralization has been accepted as a financial mean of IP exploitation under IP laws. It has to be executed under the security device "pledge" (*zhiquan*) according to the secured transaction law.⁷⁴³ The *Real Rights Law*, which is the principal legal document governing secured transactions in China, has set only the minimum requirements on the eligibility of collateral, i.e., being property rights with monetary value and assignable.⁷⁴⁴ Just according to the *Real Rights Law*, it seems that the licensee's rights in the IP license can be used as collateral, as long as there is express consent from the licensor.

Similarly, in the *Guiding Opinions for Commercial Banks on Operating IP collateralization*, the China Banking Regulatory Commission (CBRC) also specifically instructs the commercial banks that "in the case where licensees create a pledge, the consent from the original IP holder or the licensor is required."⁷⁴⁵ This instruction implies that the CBRC, as the state administrative department of the banks, does allow banks to accept licensee's use of rights in license as collateral.

However, the specific regulatory rules for the registration of security interests in patents, trademarks and copyrights explicitly stipulate that the pledgor in registration has to be the "recorded title-holder" of the IP to be pledged.⁷⁴⁶ As a licensee cannot be the "recorded title-holder" of an IP in current Chinese IP law, this registration requirement makes it impossible for a licensee to have a security interest with third-party effectiveness in its right to exploitation, even with express consent from the licensor. In theory, a creditor can still choose to create a security interest which is effective between the parties only, without making a registration.⁷⁴⁷ However, such an unperfected interest ineffective against third parties is just meaningless for the purpose of security interests.

In summary, although the licensee's use of its rights under an IP license as collateral is

⁷⁴³ See detailed discussion in Section 4.2.2.

⁷⁴⁴ Article 223 (5), *Real Rights Law*.

⁷⁴⁵ Article 8, *Guiding Opinions for Commercial Banks on Operating IP collateralization*, *supra* note 378.

⁷⁴⁶ See Article 12 (2), *Patent Pledge regulation of 2010*; Article 8, *Regulation on the Registration Procedures for Pledge of Exclusive Rights to Use Registered Trademarks (2009)*; and Article 12, *Measures for the Registration of Pledge of Copyright (2010)*.

⁷⁴⁷ Note: the security interest cannot be called a pledge, because, as explained in Section 4.2.2.1, by nature, pledge is real right which is effective against all third parties.

allowed under the *Real Rights Law* and with the banks' acceptance, it cannot be done in practice because of the restrictions in the registration rules for the perfection purpose.

5.3.2 UNCITRAL's Supplement

For now, the most important international effort on improving law for promoting IP collateralization is done by the United Nations Commission on International Trade Law (UNCITRAL), i.e., the *UNCITRAL Legislative Guide on Secured Transactions: Supplement on Security Rights in Intellectual Property* (The Supplement).⁷⁴⁸ Although the *Supplement* was designed with the objective of promoting secured credit with respect to IP, it absolutely prioritizes the objective of IP laws. It sets a guiding principle that the objective of a secured transaction law to promote credit shall be achieved without undermining the objectives of IP laws to “prevent unauthorized use of IP, to protect the value of IP and thus to encourage further innovation and creativity.”⁷⁴⁹

With this guiding principle, the *Supplement* prioritizes the IP licensor's control over the IP to the licensee's need for credit, and chooses not to interfere with the licensor's decision by simply enforcing contractual restrictive clauses. It argues, “it is important for the licensor to retain control over the licensed intellectual property and who can use it. If such control cannot be exercised, the value of the licensed intellectual property may be materially impaired or lost completely.”⁷⁵⁰ The *Supplement* explicitly stipulates that the secured transaction law should **not** affect the licensor-IP holder's ability and right to limit the assignability of its IP rights.⁷⁵¹ Any contractual limitation in the license agreement as to the assignability of licensed rights should be respected.⁷⁵²

Therefore, under the *UNCITRAL's Supplement*, a licensee can use the license (or the interests in the granted authorization to use or exploit the licensed IP) as collateral,⁷⁵³ but only if he has the power to do so (based on the *nemo dat* principle, i.e., the grantor cannot grant to the secured creditor more rights than the grantor has or may acquire in

⁷⁴⁸ See detailed discussion in Section 4.4.1.

⁷⁴⁹ Para 49, the Supplement.

⁷⁵⁰ Para 107, the Supplement.

⁷⁵¹ Para 20 and 90, the Supplement.

⁷⁵² Paragraph 25 and 90, the Supplement.

⁷⁵³ Paragraph 17, the Supplement. The Supplement also gives an example of using the rights of a licensee as collateral, *see* Para 41, the Supplement.

the future).⁷⁵⁴ In the case without anti-assignment clause or with consent from the licensor, the licensee can use the license (or its interests in the license) as collateral; the secured creditor will take a security interest in the license (or the licensee's interests in the license) subject to the terms and conditions of the license agreement.⁷⁵⁵ If the license agreement includes an anti-attachment clause or an anti-assignment clause, no enforceable security right in the license can be created without the consent of the licensor.⁷⁵⁶

5.3.3 US

In the US, it has been held long that contract rights are generally assignable, unless the terms of contract or statutes indicate otherwise.⁷⁵⁷ Nevertheless, the statutes and courts also show a trend towards imposing limitations on enforcing anti-assignment clauses in the contract.⁷⁵⁸ In the early days, statutes and courts strictly favored the freedom of contract and simply invalidated any attempted assignments notwithstanding anti-assignment clauses, and regardless of the specific words used in the clauses.⁷⁵⁹ As contract rights were viewed as “personal” to the contracting parties by then, the obligor should have had the right to deal only with the counterparty with whom it originally contracted.⁷⁶⁰ Gradually, statutes and courts started to **limit** the validity of anti-assignment clauses. They preferred to hold the attempted assignments as breaches of contract but still keep these assignments effective, unless the anti-assignment clause has expressly stated that the attempted assignments would be

⁷⁵⁴ Recommendation 13 and 18, the Guide; Para 55, 82, 86, 90 and 119, the Supplement (the *nemo dat (quod non habet)* principle).

⁷⁵⁵ Para 107, the Supplement.

⁷⁵⁶ Paragraph 52, the Supplement. See Para 107 and 250, the Supplement (providing “Of course, if there is no restriction on the assignability of the licensee’s rights in the licensee agreement (which rarely happens), it is considered that the licensee’s rights are freely assignable. A secured creditor can take a security right in the licensee’s rights subject to the terms and conditions of the license agreement. In this case, upon the licensee-debtor’s default, the secured creditor can directly enforce his security interests and dispose the encumbered licensee to an assignee.”).

⁷⁵⁷ Grover C. Grismore, “Effect of a Restriction on Assignment in a Contract,” *Michigan Law Review* 31, no. 3 (1933): 299–319 at 299.

⁷⁵⁸ Gregory Scott Crespi, “Selling Structured Settlements: The Uncertain Effect of Anti-Assignment Clauses,” *Pepperdine Law Review* 28 (2000): 787–818 at 794.

⁷⁵⁹ Grismore (1933) “Effect of a Restriction on Assignment in a Contract,” *supra note 757*.

⁷⁶⁰ Joy Anderson, “Case Note: Contracts—Looking for ‘Something’: Minnesota’s New Rule for Interpreting Anti-Assignment Clauses in Travertine Corp. v. Lexington-Silverwood,” *William Mitchell Law Review* 32, no. 4 (2005): 1435–1463 at 1437-1440.

invalid⁷⁶¹ or there is compelling public policy favoring invalidation of the attempted assignments.⁷⁶² It is believed that the damage remedy is sufficient for compensating the obligor for damages actually suffered as a result of an assignment.⁷⁶³ In recent years, the statutes started to provide **exceptional rules** invalidating express contractual restrictions on assignment in some specific cases:⁷⁶⁴

- The first case is about invalidating contractual restrictions on the assignability of interests in land. The main argument is that restraints on the alienation of property interests in land are generally unlawful.
- The second case is mainly about the right to receive money due or money to become due.⁷⁶⁵ The main argument is that, an obligor of rights to payment usually discharges its obligation by simply making the payment. Paying the assignee instead of the original obligee (i.e., the assignor) is unlikely to increase any cost or risk of performance to the obligor. As the obligor would not be prejudiced by the assignment, there is also no legitimate interest in enforcing restrictions on assignment. In addition, allowing free assignability can save the cost of renegotiation and therefore be socially efficient.⁷⁶⁶
- Some other cases of invalidation of anti-assignment clauses are mainly found in laws relating to bankruptcy⁷⁶⁷ and secured transactions.⁷⁶⁸

⁷⁶¹ Article 322(2)b, the Restatement (Second) of Contract (1981) (providing “A contract term prohibiting assignment of rights under the contract, unless a different intention is manifested ... gives the obligor a right to damages for breach of the terms forbidding assignment but does not render the assignment ineffective.”)

⁷⁶² For example, in *Cook, Inc. v. Boston Scientific Corp.*, 333 F.3d 737, 742 (7th Cir.2003), Judge Ponsor states that “whether the assignment should be valid or not should depend on examination of the circumstance of the contract. ... An assignment violating an anti-assignment clause would be invalid if it violated public policy.”

⁷⁶³ *Rumbin v. Utica Mutual Insurance Co.* 757 A.2d 526 (Conn. 2000).

⁷⁶⁴ See Edwin E. Smith, “Article 9 in Revision: A Proposal for Permitting Security Interests in Nonassignable Contracts and Permits,” *Loyola of Los Angeles Law Review* 28 (1994): 335–350 at 338.

⁷⁶⁵ For example, for the sale of goods and where one party to the contract has breached, U.C.C § 2-210 (2) allows the other party to assign his right to damages regardless of an anti-assignment clause. And the original U.C.C. § 9-318(4) invalidates all restrictions on the assignment of an account or on the creation of a security interest in a general intangible for money due or become due.

⁷⁶⁶ Richard A. Epstein, “Why Restrain Alienation?,” *Columbia Law Review* 85, no. 5 (1985): 970–990 at 972.

⁷⁶⁷ Under federal bankruptcy law, a trustee in bankruptcy has the ability to assign an executory contract or lease despite an anti-assignment restriction.

⁷⁶⁸ In the case of secured transaction, even with a clearly expressed prohibition in the security agreement, U.C.C § 9-401 entitles a debtor to make effective assignment of his rights in collateral (the secured lender may still claim for a breach of contract or a termination of contract). U.C.C § 9-406 completely invalidates anti-assignment clauses restricting the creation, perfection and enforcement of a security interest in an account or general intangible for money due or to become due. In the case of a lease of goods, U.C.C § §

Nevertheless, except for the clear statutory exceptional rules for restricted specific cases, anti-assignment clauses are still routinely enforced as part of essential freedom of contract. The intention of the parties to the contract is presumed based on a literal explanation of the contractual terms.

For the purpose of UCC-9, it has been drafted to reflect a position that the “The law should not impair the ability of debtors to secure as much or as little of their debts with as much or as little of their existing and future property as they deem appropriate.”⁷⁶⁹ An IP licensee’s “rights that arise under a license of intellectual property, including the right to exploit the intellectual property without liability for infringement” can be used as collateral, by being categorized as a kind of “non-payment general intangible”.⁷⁷⁰ While the UCC-9 generally respects the contractual restrictions on security interest assignments,⁷⁷¹ US law intervenes by adding a specific exceptional provision, the UCC § 9-408, in its 2001 Revision to allow an IP licensee to create “limited” security interests in its rights under an IP license notwithstanding contractual restrictions.⁷⁷²

With the intention of making non-payment general intangibles more readily useable as collateral, the exceptional UCC 9-408 *partially* invalidates the contractual and statutory restrictions on security interest assignment of rights arising from all non-payment general intangibles (including a licensee’s rights in an IP license),⁷⁷³

2A-303(3) also *conditionally* permits the creation or enforcement of a security interest in the lessee’s interests under the lease agreement notwithstanding the anti-assignment clause.

⁷⁶⁹ See Steven L. Harris and Charles W. Jr. Mooney, “A Property-Based Theory of Security Interests: Taking Debtors’ Choices Seriously,” *Virginia Law Review* 80 (1994): 2021–2072 at 2021. Note: the authors are reporters for the Drafting Committee to Revised U.C.C. Article 9 and were reporters for the Permanent Editorial Board U.C.C Article 9 Study Committee.

⁷⁷⁰ Where a licensee uses its rights in an IP license as collateral, the rights fall into the category of “general intangible” under the UCC-9. See Official Comment 5d to U.C.C § 9-102 (2010) (providing “As used in the definition of general intangible, things in action includes rights that arise under a license of intellectual property, including the right to exploit the intellectual property without liability for infringement.”). “General intangible” can be further subcategorized into “payment intangible” and “non-payment intangible”. U.C.C. § 9-102 (a)(61) (defining “payment intangible” as “general intangible under which the account debtor’s principle obligation is to pay money”). Non-payment intangible refers to the rest of general intangible. So a licensee’s rights in an IP license are further categorized as “non-payment general intangible”.

⁷⁷¹ U.C.C. § 9-401 [Rights of Third Parties: Alienability of Debtor’s Rights] (providing: “(a) [Other law governs alienability; exceptions.] Except as otherwise provided in subsection (b) and Section 9-406, 9-407, 9-408, and 9-409, whether a debtor’s rights in collateral may be voluntarily or involuntarily transferred is governed by law other than this article.”)

⁷⁷² Thomas E. Plank, “The Limited Security Interests in Non-Assignable Collateral under Revised Article 9,” *American Bankruptcy Institute Law Review* 9 (2001): 323–349 at 325.

⁷⁷³ The contractual and statutory restrictions on security interest assignment of rights arising from “payment general intangible” are regulated under U.C.C. § 9-406 (2010).

respectively, in UCC 9-408 (a) and (c). For the contractual restrictions, the UCC 9-408(a) stipulates:

9-408 [Restrictions on Assignment of Promissory Notes, Health-Care-Insurance Receivables, and Certain General Intangibles Ineffective.]

(a) [Term restricting assignment generally ineffective]

Except as otherwise provided in subsection (b), a term [...] in an agreement between an account debtor and a debtor which relates to [...] a general intangible, including a contract, permit, **license**, or franchise, and which term prohibits, restricts, or requires the consent of [...] the account debtor to, the assignment or transfer of, or creation, attachment, or perfection of a security interest in, the [...] general intangible, is **ineffective** to the extent that the term:

- (1) would impair the creation, attachment, or perfection of a security interest; or
- (2) provides that the assignment or transfer or the creation, attachment, or perfection of the security interest may give rise to a default, breach, right of recoupment, claim, defense, termination, right of termination, or remedy under the [...] general intangible.”

If there is an anti-assignment or anti-encumbrance clause in the IP license agreement between the licensee (as the debtor⁷⁷⁴) and the licensor (as the account debtor,⁷⁷⁵ who owes a duty to the debtor) constricting the licensee from using his rights in the IP license (as a kind of non-payment general intangible) as collateral, the UCC 9-408 (a) invalidates such a clause to the extent that it impairs the creation or perfection (note: but not the enforcement) of security interests in the IP license. A security interest assignment is regarded as valid even when the creditor is fully aware of the existence of the restrictive provisions.⁷⁷⁶ Even if the clause clearly stipulates that a security assignment would give rise to a default, breach, right of recoupment, claim, defense, termination, right of termination, or remedy, such a clause is also ineffective as to the

⁷⁷⁴ U.C.C. § 9-102 (a) (28) (2010) (defining “debtor” as “(a) a person having an interest, other than a security interest or other lien, in the collateral, whether or not the person is an obligor.”) The IP licensees fall into the scope of “debtor”. See Murphy (2002), “Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property,” *supra note* 494 at 465.

⁷⁷⁵ U.C.C. § 9-102 (a) (3) (2010) (defining “account debtor” as “a person obligated on ... (a) general intangible.”) The Official Comment 5h to U.C.C. § 9-102 (2010) uses franchise contract as an example (“For example, if a franchisee uses its rights under a franchise agreement (a general intangible) as collateral, then the franchisor is an account debtor.”) The same logic will apply to license contract as well. So, in the case where a licensee uses its rights under a license agreement (a general intangible) as collateral, then the IP licensor is an “account debtor”. See also Murphy (2002), “Proposal for a Centralized and Integrated Registry for Security Interests in Intellectual Property”, *supra note* 494 at 465.

⁷⁷⁶ See Alexis Freeman, “Internet Domain Name Security Interests: Why Debtors Can Grant Them And Lenders Can Take Them in This New Type of Hybrid Property,” *American Bankruptcy Institute Journal* 10 (2002): 853–889 at 886.

creation and perfection of security interests.⁷⁷⁷ Notwithstanding express contractual restrictions, the creation and perfection of security interests in the licensee's rights are valid and do not constitute a default or breach under the license agreement at all.

One of the drafters explains that the exceptional invalidation of contractual restrictions in UCC 9-408(a) aims to "make the value of otherwise non-assignable rights under a license available to licensees so that they can obtain more credit (and be more likely to pay their debts, including license fees)."⁷⁷⁸ It is argued that, as the anti-assignment clauses are designed to prevent a licensor from being adversely affected by the security assignment from the licensee to an unauthorized assignee; without enforcement, just the creation and perfection of security interests in the licensee's interests under the license would not have any actual effect on the licensor. As the licensor would not be prejudiced by the creation and perfection only, there is also no legitimate interest in enforcing the restrictions on creation and perfection of security interests.⁷⁷⁹

For the same reason, it is believed that the time for law to intervene should be when the licensor's interests might be actually affected, i.e., the time of enforcing the security interest in the license. With this belief, the UCC 9-408(d) restricts the invalidation within a narrower scope for "non-payment intangible" than in the UCC 9-406, which completely invalidates contractual restrictions on the assignability of various rights to "payment intangible"⁷⁸⁰ as to all of the creation, perfection and enforcement of security interests.⁷⁸¹ Section 9-408(d) stipulates as follows:

⁷⁷⁷ U.C.C. § 9-408 (a) (2) (2010).

⁷⁷⁸ See Steven O. Weise, "The Financing of Intellectual Property Under Revised Article 9," *Chicago-Kent Law Review* 74, no. 3 (1999): 1077–1107 at 1093-1094. The Official Comments also confirm with this explanation. See U.C.C. § 9-408 cmt. 2 (2012) (stipulating "This section makes ineffective any attempt to restrict the assignment of a general intangible, [...], whether the restriction appears in [...] the agreement between an account debtor and a debtor (subsection (a)) or in a rule of law, including a statute or governmental rule or regulation (subsection (c)). This result allows the creation, attachment, and perfection of a security interest in a general intangible, such as an agreement for the nonexclusive license of software, [...], without giving rise to a default or breach by the assignor or from triggering a remedy of the account debtor [...]. This enhances the ability of certain debtors to obtain credit. On the other hand, subsection (d) protects the other party the account debtor on a general intangible [...] from adverse effects arising from the security interest. It leaves the account debtors or obligated persons rights and obligations unaffected in all material respects if a restriction rendered ineffective by subsection (a) or (c) would be effective under law other than Article 9.")

⁷⁷⁹ *Ibid.*

⁷⁸⁰ A "payment intangible" is defined as a "general intangible under which the account debtor's principle obligation is to pay money" (U.C.C. § 9-102 (a)(61)).

⁷⁸¹ The rights to payment covered under the U.C.C. § 9-406 include accounts, chattel paper, payment intangibles, and promissory note. An obligor of rights to payment usually discharges its obligations by

9-408(d) [Limitation on Ineffectiveness under Subsections (a) and (c)]

To the extent that a term [...] in an agreement between an account debtor and a debtor which relates to a [...] general intangible [...] would be effective under law other than this article but is ineffective under subsection (a) or (c), the creation, attachment, or perfection of a security interest in the [...] general intangible:

- (1) is **not enforceable** against [...] the account debtor;
- (2) does not impose a duty or obligation on [...] the account debtor;
- (3) does not require [...] the account debtor to recognize the security interest, pay or render performance to the secured party, or accept payment or performance from the secured party;
- (4) does not entitle the secured party to use or assign the debtor's rights under the [...] general intangible, including any related information or materials furnished to the debtor in the transaction giving rise to the [...] general intangible;
- (5) does not entitle the secured party to use, assign, possess, or have access to any trade secrets or confidential information of [...] the account debtor; and
- (6) does not entitle the secured party to enforce the security interest in the [...] general intangible.”

UCC 9-408(d) provides that, if a prohibition or restriction clause on the assignment of some object is enforceable under law other than the UCC-9, then the invalidation of contractual restrictions under UCC 9-408(a) does **not** extend to the **enforcement** of security interests in that object. Where the IP licensee's right is concerned, the general rule is that the express contractual prohibitions in IP licenses on the assignment of such right are routinely enforced.⁷⁸² So, according to the UCC 9-408(d), the anti-assignment clause and events of default are still fully effective with regard to any attempted enforcement of the security interest in a IP licensee's rights under an IP license. Reading UCC 9-408 (a) and (d) together, it becomes clear that, although a creditor can have a perfected security interest in an IP licensee's rights under a license notwithstanding contractual restrictions in the license agreement (9-408 (a)); the creditor, without the licensor's consent, cannot enforce the security interests against the licensor, nor directly assign the encumbered interests in the process of foreclosure (9-408 (d)).⁷⁸³ Therefore, although the creditor still has a valid

simply paying the payment. Paying the secured creditor instead of the obligee-debtor usually does not increase any cost or risk as to the obligor. The obligor is not prejudiced by the assignment and hence does not care whether the secured creditor can enforce the security interest against it or not. For this reason, there is no legitimate interest to enforce contractual restrictions on the assignability of various rights to “payment intangible”. The invalidation of invalidates contractual restrictions on the assignability of various rights to “payment intangible” is a principle that has been widely accepted at the international level.

⁷⁸² Brennan (2001) “Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version),” *supra* note 302 at 402-404.

⁷⁸³ Brennan (2001) “Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version),” *supra* note 302 at 410.

security interest as against a bankruptcy trustee or other secured parties of the licensee/debtor, the creditor cannot directly liquidate the encumbered license without the licensor's consent. Any attempted enforcement of the security interest in the licensee's rights can lead to a default by the licensee under the original license agreement. The Official Comments explain that the limitation on enforcement in UCC 9-408(d) "ensures that these affected persons [i.e., licensors] are not affected adversely thereby [i.e., by the licensee's security assignment]. That provision removes any burden or adverse effects on those persons for which a rational basis could exist to restrict the effectiveness of an assignment or to the exercise of any remedies."⁷⁸⁴

The approach adopted in UCC 9-408 comes from the practical experience of creating security interests in the Federal Communications Commission (FCC) broadcast licenses.⁷⁸⁵ The Federal Communication Act includes an anti-assignment policy in order to keep the power of determining and controlling the licensee of an FCC broadcast license. In the early cases, the anti-assignment policy was held to prevent taking a security interest in an FCC license.⁷⁸⁶ In 1994, however, the FCC explicitly recognized that its responsibility for controlling the licensee did **not** extend to controlling the proceeds from a sale approved by the FCC.⁷⁸⁷ The later federal cases support the view and uphold effective security interest in the proceeds of an approved

⁷⁸⁴ U.C.C § 9-408, cmt 6 (Rev.1998) ; see also U.C.C § 9-408, cmt 2 (2010) "subsection (d) protects the other party the account debtor on a general intangible ... from adverse effects arising from the security interest." However, there are some opposite opinions. Brennan (2001) "Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version)," *supra note* 302 at 397-413 (arguing that 9-408 does adversely affect the licensor's ability to collect royalties, because it makes the royalties otherwise payable to IP licensors who are junior to pre-existing floating liens against licensees).

⁷⁸⁵ See Weise (1999) "The Financing of Intellectual Property Under Revised Article 9," *supra note* 778 at 1092-1093 (providing "Existing law generally permits the creation and perfection of security interests in otherwise nontransferable rights. The Drafting Committee modeled its approach on the law that applies to FCC licenses. Well-established law permits creation, attachment, and perfection of a security interest in the licensee's rights under an FCC license and the proceeds of that right, subject to the FCC's control over the actual enforcement of that security interest by the FCC's exercise of its power to approve or disapprove a transferee. The law that applies to FCC licenses permits the enforcement of the security interest in the proceeds, but not the enforcement of the security interest in the FCC license itself, without the consent of the FCC. Surely the public policy supporting the interest of the FCC in supervising who acts under an FCC license is no less worthy of protection than the interest of a software licensor in supervising who acts under a software license"); see also Timothy J. Boyce, "Collateralizing Nonassignable Contracts, Licenses, and Permits: Half a Loaf Is Better than No Loaf," *Business Law* 52 (1996): 559-75.

⁷⁸⁶ *In re Merkley*, 94 F.C.C.2d 829, 830 (1983), *aff'd*, 776 F.2d 365 (D.C. Cir. 1985). See Boyce (1996) "Collateralizing Nonassignable Contracts, Licenses, and Permits: Half a Loaf Is Better than No Loaf," *ibid* at 563-66 (discussing evolution of FCC policy).

⁷⁸⁷ *In re Cheskey*, 9 F.C.C.R. 968, 987 (1994).

sale of an FCC license.⁷⁸⁸ The FCC's change in policy and relevant federal cases provide solid support for permitting the creation and perfection of "limited" security interests in a non-payment general intangible notwithstanding contractual or statutory restrictions under UCC 9-408.

The proponents of UCC 9-408 claim that even a limited security interest has its value. A security interest in collateral automatically continues to the proceeds of the collateral notwithstanding any sale or other disposition of the collateral.⁷⁸⁹ Even if a secured creditor cannot directly enforce a security interest in the encumbered license, the secured lender still has a valid security interest in the *proceeds* arising from a consented post-petition assignment of the encumbered IP license in the future, against a bankruptcy trustee or other secured parties of the licensee.⁷⁹⁰ As one of the drafters, Weise (1999) states that "Once the licensee's rights have been transformed into money, the licensor no longer has an intellectual property interest to protect. If the licensee does transfer its rights (for example, with the consent of the licensor, pursuant to a bankruptcy court orders or otherwise), the secured party is entitled to enforce its security interest in the proceeds generated by a transfer of the licensee's rights. That does not interfere with the licensor's interest in controlling who uses the licensee's rights under the license."⁷⁹¹ This approach is believed to allow creditors to share "half the loaf" in the value of IP licenses, which is better than no loaf at all, as in the case of unconditionally enforcing restrictive terms in the previous UCC-9 rules.⁷⁹² Other commentators think these limited security interests allow a debtor to obtain lower cost secured financing while protecting the interests of the related third

⁷⁸⁸ See, e.g., *MLQ Investors, L.P. v. Pacific Quadracasting, Inc.*, 146 F.3d 746 (9th Cir. 1998) at 748-749 (holding that a "creditor may obtain a security interest in the **proceeds** of the sale of an FCC license, and such an interest constitutes a 'general intangible' that may be perfected prior to the sale of the license."; *State St. Bank & Trust Co.*, 833 F. Supp. at 48-49 (stating bank has security interest in right to remuneration from transfer of broadcasting licenses); *In re Ridgely Comm., Inc.*, 139 B.R. 374, 378-79 (Bankr. D. Md. 1992) (finding right to transfer license concerned F.C.C. and licensee but right to remuneration for transfer concerned only two private parties). See Plank (2001) "The Limited Security Interests in Non-Assignable Collateral under Revised Article 9," *supra* note 772 at 347-348.

⁷⁸⁹ See U.C.C 9-315 [Secured Party's Rights on Disposition of Collateral and in Proceeds] (a) [Disposition of collateral: continuation of security interest or agricultural lien; proceeds.]

⁷⁹⁰ See Weise (1999) "The Financing of Intellectual Property Under Revised Article 9," *supra* note 778 (stating that the reason is for allowing the secured creditor to seize the proceeds); see also Ronald J. Mann, "Secured Credit and Software Financing," *Cornell Law Review* 85 (1999): 134-188 (discussing the creditors' interests in obtaining security interests in software is to preserve the claims to the firm value generated from software).

⁷⁹¹ See Weise (1999) "The Financing of Intellectual Property Under Revised Article 9," *supra* note 778 at 1096.

⁷⁹² See Boyce (1996) "Collateralizing Nonassignable Contracts, Licenses, and Permits: Half a Loaf Is Better than No Loaf," *supra* note 785 at 559-575.

party as well.⁷⁹³ Since UCC 9-408 keeps licensors intact, the Intellectual Property Law Section of the American Bar Association also supports the UCC 9-408 and believes it “strikes an appropriate balance” among the interests of all parties involved.⁷⁹⁴

Nevertheless, some other scholars argue that an unenforceable “toothless” security interest created under UCC 9-408 does not constitute any collateralizing value to the creditor, because few creditors would take a financial risk to create a security interest in an IP license knowing that they might not be able to directly enforce the security interest or dispose of the collateral.⁷⁹⁵ In the end, the enforceability of the security interest is purely based on the licensor’s consent. If the licensor intentionally blocks the transaction or keeps refusing to assign the license to anyone, then the lender just cannot recover anything from the disposition at all. Creating this kind of limited security interests is simply meaningless for the lenders in practice. The Revised UCC 9-408 therefore has been criticized as conflicting “not only with legislative intent to enhance the ability of debtors to obtain credit, but also with the guiding principle of fostering the use of IP licenses as collateral.”⁷⁹⁶

5.4 Model Setting

All of these discussions and comments above start from a literal explanation of the contractual terms and follow with a very general and intuitive analysis. None of them has done a law and economics analysis on the real underlying reason for a statutory intervention. According to the economic paradigm of the efficiency properties of “freedom of contract”, it is generally believed that, in the usual cases without high transaction costs or serious informational asymmetry or (positive/negative) externalities or for some strong public policy considerations, the free negotiation between the contractual parties can move the property to the most-valued holder and

⁷⁹³ See Plank (2001) “The Limited Security Interests in Non-Assignable Collateral under Revised Article 9,” *supra note 772* at 323-324, and 348.

⁷⁹⁴ See Weise (1999) “The Financing of Intellectual Property Under Revised Article 9,” *supra note 778* at 1079.

⁷⁹⁵ See Freeman (2002) “Internet Domain Name Security Interests: Why Debtors Can Grant Them And Lenders Can Take Them in This New Type of Hybrid Property,” *supra note 776* at 886; Picht (2013) “Collateralizing IP Licenses: Present Deficiencies And Proposals For Reform,” *supra note 772* at 437.

⁷⁹⁶ See Picht (2013) “Collateralizing IP Licenses: Present Deficiencies And Proposals For Reform,” *supra note 772* at 440.

reach the socially efficient result.⁷⁹⁷ So, unless there are valid market failure arguments to prove that the free negotiation would lead to market failure or for favoring some specific public policy consideration, the property law usually does not infringe on the parties' freedom to contract, it just executes what the parties have literally agreed. For this reason, justifying a statutory intervention always needs to prove that there is a market failure that cannot be solved by party negotiation, or there are some strong public policy considerations supporting the intervention.

In order to explain why and how the law should intervene, several questions should be explored first.

- Is there any market failure caused by enforcing the anti-assignment clauses in the context of secured transaction, especially for IP collateralization?
- Where does the social inefficiency come from in the first place?
- Why cannot free negotiation lead to the socially efficient result?

In order to answer these questions, we need to understand the essence of secured transactions, the role that collateral is playing in a secured transaction (see Section 2.4), the incentive of all the parties involved and how the negotiations take place among all the parties.

The following model analysis begins by describing a very simple post-lending moral hazard model established by Tirole (2006). From the discussion in Section 5.2.2, it is summarized that the main reason to include restrictive clauses such as an anti-assignment or anti-attachment clause in license contract is for the licensor to avoid the potential adverse effects of the change of assignee/licensee, who may bring extra costs to the licensor in the way of damage, higher performance costs or risks (See Section 2.2). We introduce the concept of "third-party cost" into the simple model of Tirole (2006) to uniformly represent these potential adverse effects, in order to fit into our context of IP collateralization. The modified setting can show how the negotiations in license agreement and security agreement occur and how the different legal rules can change the surplus distribution in negotiations and influence all the parties' incentives of participation. Comparing the equilibriums under different rules can reveal if there is any market failure in the free negotiation so that we can see if there is need and space for the law to intervene with the contractual restrictive terms in license agreements. The possible limitations and implications will be discussed in

⁷⁹⁷ See Epstein (1985) "Why Restrain Alienation?," *Columbia Law Review* 85, no. 5 (1985): 970–990 at 972. *supra* note 766.

the end as the conclusion.

This study may give implications for the enforceability of anti-assignment clauses in other cases as well, but it has no intention to claim for invalidating anti-assignment clauses for all purposes. We mainly want to discuss the problem of enforcing an anti-assignment clause in the case of secured transactions, especially for cases involving IP licenses.

5.4.1 The Original Two-Party Moral Hazard Model

The debt finance model established by Tirole (2006) is chosen because it is simple but is still able to capture the most basic ideas expressed in the literature about the role of collateral in controlling the post-lending moral hazard problem and reducing risk for the lender, and also easy to be expanded to comprise other factors.⁷⁹⁸ We firstly present the basic model of Tirole (2006) and then make some modification to fit into our context of IP collateralization. The basic model is presented as follows.

Project. It is assumed that a risk-neutral entrepreneur E faces an investment opportunity on a project. The project needs an investment with the size of I and yields verifiable revenue $R > 0$ in the case of success or 0 in the case of failure. If the borrower exerts efforts, the project yields a high probability of success p_H .

Debt finance and the post-lending moral hazard problem. The entrepreneur has no initial cash, so it needs a loan with the size of I to fund the project. Of course, in order to get a lower interest rate, the borrower would always promise to take high effort. However, there is an information asymmetry about the borrower's efforts in the project after getting the loan. It is very difficult or even impossible for most lenders to directly observe or monitor the borrower's efforts (the lenders can only verify the resulted revenue). The entrepreneur, as a borrower, is subject to a post-lending moral hazard problem and faces a choice between behaving ("work," "exert effort," "take no private benefit") and misbehaving for private benefit ("consume the loan", "shirk", "shift attention to another project"). In the case of misbehaving, the borrower enjoys a private benefit $B > 0$ ("profit from consuming the loan", "disutility of effort saved by shirking", "profit from other projects") but the project yields a lower probability of success $p_L = p_H - \Delta p$ with $\Delta p > 0$. With $p_H R - I > 0$ and $p_L R - I < 0$, the lender would provide the loan only in the absence of moral hazard.

⁷⁹⁸ Tirole (2006), *The Theory of Corporate Finance*, *supra* note 256.

These factors about the project, i.e., R and I , are determined by the characteristics of the project; factors like p_H , and p_L are determined by the characteristics of the borrower, and the private benefit B is determined by the cost of the borrower's efforts and the profits of outside options. They are exogenous as to the borrower and the lender, and assumed to be known to both the parties at the time of making the lending decision. In other words, there is no ex ante information asymmetry nor adverse selection problem.

The timeline is summarized in Figure 5.2 as follows,

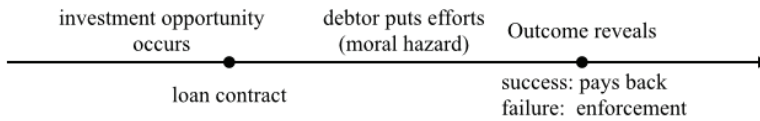


Figure 5.2 Timeline for the basic debt finance moral hazard model

Debt finance with (fixed) collateral. Because of the ex post moral hazard problem, the lender needs to impose some punishment on the borrower in the case of poor performance. Since the borrower has no initial cash on hand and the project's failure brings no income, the only possible punishment is the seizing of some existing assets of the borrower. The lender L provides the loan only if the borrower can offer a contingent collateral, which the lender can seize upon the project's failure. So the borrower has to offer some of its assets as collateral, which is worth A to the borrower and would be worth βA at the foreclosure sale (with $\beta < 1$), to make a credible commitment on behaving as to the lender.⁷⁹⁹

In Tirole's original model, the borrower can encumber an arbitrary amount of collateral A , with $0 \leq A \leq \bar{A}$ and \bar{A} is the maximum collateral that the borrower can offer. For example, in the case of using ordinary tangible assets as collateral, the borrower can use parts of the land or some of its machines or inventory as collateral. With $\beta < 1$, the foreclosure sale means a transfer of the collateral from the borrower, the party with a higher valuation, to the lender (or an assignee), the party with a lower

⁷⁹⁹ In the eminent works in secured transactions, such as Jeffrey M. Lacker, "Why Is There Debt?," *FRB Richmond Economic Review* 77, no. 4 (1991): 3–19, it is usually assumed that the important condition that is required for a collateralized debt contract to be optimal is that the collateral should be more valuable to the borrower than to the lender, i.e., $\beta < 1$. See also Jean Tirole (2006) "*The Theory of Corporate Finance*" *supra* note 256, at 177-180.

valuation. The value loss in the transfer would eventually be borne by the borrower. It means that putting collateral is costly for the borrower. For maximizing the expected profit, the borrower would always like to choose the minimum amount of A that is just large enough to make a credible commitment on behaving.

However, in some cases, a borrower may have a fixed collateral. For example, if an IP licensee uses its rights under a specific license as collateral, the license has to be disposed of as a whole upon the project's failure. There is no way to just dispose of a part of the IP license to make a profit-maximizing collateral decision. Faced with an investment opportunity, and with a fixed amount of collateral on hand, the borrower can only decide if it is going to use the whole asset as collateral to make the investment or not (if it is, then the borrower would lose the whole collateral in the disposition sale). The borrower chooses to invest only if the value of collateral A is large enough to make a credible commitment on behaving (**the borrower's incentive constraint**), but also at the same time cannot be too large in order to still get positive payoffs from the investment (**the borrower's rationality constraint**).

For better fitting into our analysis on the specific case of using the IP license as collateral, we hereafter assume that the collateral is **fixed** in our model. The assumption is just for making it easier to demonstrate the analysis but does not affect the generality of the results. The results also apply to the case of arbitrary collateral (for example, the borrowers may have several IP licenses or some tangible assets combined with a IP license), in which case the borrower can just choose to satisfy the minimum collateral requirement for maximizing its own payoffs, i.e., the borrower's incentive constraint).

Loan contract. With *ex ante* information about the values of A and βA , and the probability of success if the licensee-debtor behaves or not, the borrower and the lender can reach a loan contract, which specifies that, in the case of success, the borrower pays back the lender $U_l^S(A) = (1 + r)I$ whereby r is the agreed interest rate and conditioned on A , and the borrower keeps the residual revenue $U_e^S(A) = R - (1 + r)I$; in the case of failure, the secured lender enforces its security interests in the collateral and gets recovery from the liquidation value of the collateral $U_l^F(A) = \beta A$ and the borrower loses the collateral, i.e., $U_e^F(A) = -A$.

Constraints. The loan contract must be able to simultaneously satisfy the three following constraints.

(1) **The lender's zero-profit rationality constraint (RC_L)**. With the ex ante expectation of payoffs at the time when the project reveals the outcome, the lender sets the interest rate in the loan contract. For notational simplicity, it is assumed that there is no time preference (so the rate of expected return is taken to be 0) and lenders behave competitively in the markets. The competition for loan contracts in the financial market drives the expected profits of financial lenders to 0. With the borrower's promise of behaving (p_H), the lender's zero-profit condition requires that a risk-neutral lender will agree on an interest rate at which it can recoup its initial lending I and make zero-profit on average, i.e.,

$$U_l(A) = p_H(1+r)I + (1-p_H)\beta A - I = 0 \quad (RC_L)$$

$$\text{i.e.,} \quad (1+r)I = \frac{I-(1-p_H)\beta A}{p_H} \quad (1.1)$$

A risk-neutral borrower's utility from the borrowing and the investment can be written as follows,⁸⁰⁰

$$U_e(A) = p_H[R - (1+r)I] - (1-p_H)A$$

(2) **Borrower's Incentive Constraint (IC_e)**: the lender would provide the loan only if the borrower E is incentivized to behave, which requires that the borrower's utility from behaving is higher than the expected profit from misbehaving, i.e.,

$$p_H[R - (1+r)I] + (1-p_H)(-A) \geq p_L[R - (1+r)I] + (1-p_L)(-A) + B$$

$$\text{i.e.,} \quad \Delta p[R - (1+r)I + A] \geq B \quad (1.2)$$

The condition (1.2) implies that the increase in the borrower's utility (increased income plus increased probability of keeping the asset) associated with good behavior (the left side) exceeds the private benefit of misbehaving (the right side).

Substituting (1.1) into (1.2), we have

$$A \geq A^{min} = \frac{I-p_H(R-B/\Delta p)}{p_H+(1-p_H)\beta} \quad (IC_e)$$

⁸⁰⁰ The lender's zero-profit condition determines that $\beta A = \frac{I-(1+r)p_H I}{1-p_H} < I$, i.e., $\beta A - I < 0$. This means that the disposition of collateral is not enough for fully repaying the lender. This also means that upon default there is no remaining value for the borrower to keep, so $U_e^F(A) = -A$.

For a collateral $A < A^{min}$, the borrower's benefit associated with behaving is less than the private benefit of misbehaving. The borrower would choose to misbehave and the project would yield a low probability of success, in which case the lender would certainly yield a negative payoff.⁸⁰¹ The lender would not provide the loan in the first place. So, condition IC_e indicates that the collateral has to be valuable enough for controlling the borrower's misbehaving.

- (3) **Borrower's Rationality Constraint (RC_e):** The borrower would like to borrow and participate in the investment only if it can get non-negative utility from the investment, i.e.,

$$U_e(A) = p_H[R - (1 + r)I] - (1 - p_H)A \geq 0$$

By substituting (1.1), we have

$$A \leq A^{max} = \frac{p_H R - I}{(1 - p_H)(1 - \beta)} \quad (RC_e)$$

Condition RC_e indicates that, as using collateral is costly for the borrower, in the case of fixed collateral, the collateral cannot be too large in order to ensure that the borrower still gets positive utility from the investment, otherwise the borrower can be better off by simply forgoing the investment opportunity.

The results can be shown in Figure 5.3 as follows,

⁸⁰¹ If the borrower misbehaves, the risk-neutral lender's utility is negative, i.e., $U_l(A) = p_L(1 + r)I + (1 - p_L)\beta A - I = p_L \frac{I - (1 - p_H)\beta A}{p_H} + (1 - p_L)\beta A - I = \frac{p_L - p_H}{p_H}(I - \beta A)$. With $p_L - p_H < 0$ and $\beta A - I < 0$ (the lender's zero-profit condition), we have $U_l(A) < 0$.

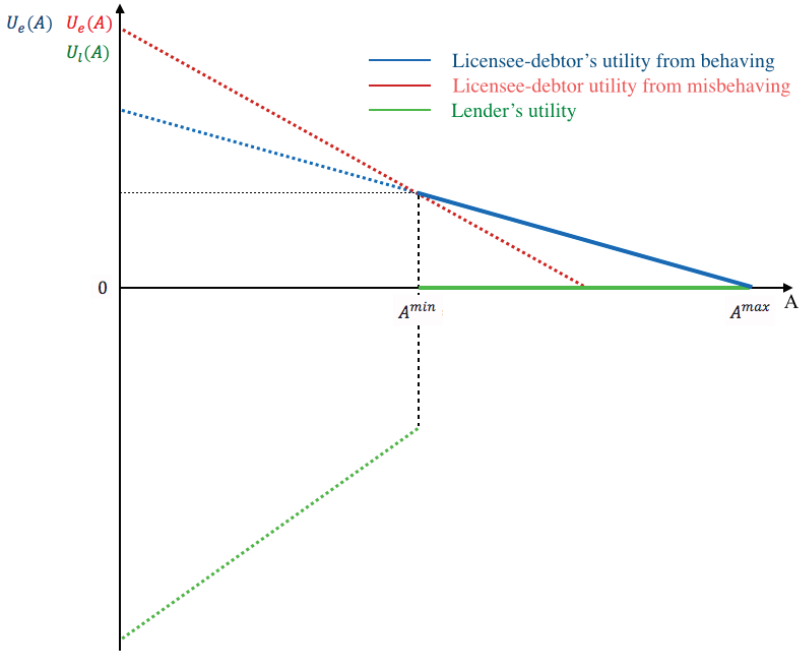


Figure 5.3 - collateral requirements in the basic debt finance moral hazard model

In summary, the debt finance can happen only if the value of collateral A falls within $A \in [A^{min}, A^{max}]$. If the project is funded, the borrower's utility from the borrowing and investment is

$$U_e(A) = p_H R - (1 - p_H)(1 - \beta)A - I \geq 0$$

The results show that, despite being associated with a social deadweight cost of $(1 - p_H)(1 - \beta)A$, the use of collateral is still socially beneficial, because it alleviates the credit-rationing problem and makes a wealth-enhancing investment occur.

5.4.2 Introducing the Third-Party – the Licensor

Whereas Tirole's basic model sets up a simple analytic framework that can help us understand the disciplinary role of collateral in secured transaction, the basic model needs to be modified for fitting into the problems of the IP license secured transaction. Compared to the basic model, our setting adds three more features.

First, a third party – the original licensor – gets involved in the lending relationship as well. In the new setting, the collateral is not a property over which the debtor has full ownership, but instead a property right upon an asset of a third party (i.e., the original licensor in our case). The licensor’s interests would be affected by the security relationship between the licensee-debtor and the secured creditor (Relationship 3.2 in Figure 5.1).

Second, a third-party cost is involved. From the discussion in Section 5.2.2, upon the IP licensee-debtor’s default, disposing of the encumbered license may bring extra costs in the way of damage, higher performance costs or risks to the original licensor, as the third party in the secured transaction. The concept of “third-party cost” $C(C \geq 0)$ is therefore introduced to uniformly represent these potential extra costs. The third-party cost is a crucial factor that distinguishes IP license-backed transactions from the other transactions secured by common tangible assets, such as machines and real estates. In the latter transactions, who gets the encumbered collateral in the disposition sale may be relevant but not crucial to the original owner, so the value of the third party cost C is usually small or negligible. On the contrary, in the case of an IP license-backed transaction, as assigning an IP license to a potential competitor of the original licensor may bring substantial costs to the original licensor, the value of C can be significant. The third-party cost C is also the reason that the original licensor wants to put the anti-assignment clause in the IP license agreement in the first place.

Third, as more parties get involved, the timeline of in this new setting is also changed. The timeline of decisions and involvements of parties is demonstrated in Figure 5.4 as follows,

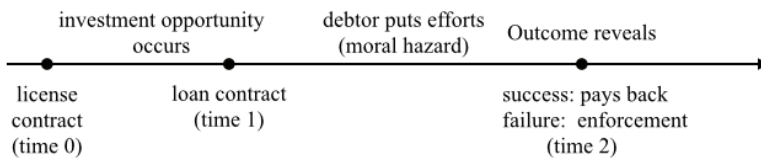


Figure 5.4: Timeline of the IP license secured transactions

There are three important timings in this new timeline.

- *Time 0: license agreement.* Time 0 is the time when the licensor O and the

licensee E negotiate for getting a license, with or without restrictive clauses in the license agreement.

- *Time 1: loan contract.* At time 1, the licensee E needs a fund of I for investing in a project. This is the time when the lender L gets involved. All the factors about the project and the post-lending moral hazard problem (p_H, R, p_L, B) are the same as in the basic model. In order to make a credible commitment on behaving, the licensee uses one of its valuable assets (or maybe the only valuable asset), i.e., the rights under an IP license, as collateral to secure the loan. The licensee values the license at A . Based on the information regarding the project, the IP license and ex ante expectation of outcomes at time 2, the licensee and the lender can negotiate for a loan contract, with an agreed interest r . Whether the licensee needs to get the licensor's consent for creating the security interests or not depends on the license agreement and the legal rules.⁸⁰²

- *Time 2: outcome/enforcement.* At time 2, the funded project will show the result, either success with a verifiable revenue of R or failure with 0 revenue. In the case of success, the licensee-borrower pays back the lender with the agreed interest rate; in the case of failure, if the security interests in the encumbered license can be enforced, the license will be disposed of at the foreclosure sale for a price of βA (with $0 \leq \beta < 1$) and the deposition of the license will bring a cost of C ($C \geq 0$) to the original IP licensor O . Whether the licensee needs to get the licensor's consent for enforcing the security interests or not depends on the license agreement and the relevant legal rules.⁸⁰³

The modified model is expected to show how the third-party cost to the original licensor can affect the whole transaction, and how the two different legal rules, the UNCITRAL rule and the UCC 9-408, can change the negotiation timing in this

⁸⁰² The licensee may face three situations. (1) If there is no restrictive clause in the license agreement, the licensee can freely create security interests in the license. In the case of an IP license with restrictive clauses, (2) if the legal rules enforce the contractual restrictions upon the creation of security interests in the license, then the licensor's consent is necessary; (3) if the legal rules do not enforce the contractual restrictions upon the creation of security interests in the license, then the licensor's consent is unnecessary.

⁸⁰³ There may be four different situations. (1) If there is no restrictive term in the license agreement, the licensee can freely make the disposition. In the cases with restrictive terms in the license agreement, (2) if the security interest is created with the licensor's consent, then the licensee can freely make the disposition as well; (3) if the legal rules allow the creation of security interests in license with the licensor's consent despite restrictive terms but still enforces the restrictive terms in the case of disposition, then the licensee/lender still needs consent from the licensor for the disposition; (4) if the legal rules totally invalidate the restrictive terms in both the cases of creation and enforcement of security interests, then there is no need for the licensor's consent at all.

timeline and affect the negotiations and value redistribution among parties. A comparison on the licensee's utilities and the collateral requirements under the two rules can reveal if the US legal change is beneficial.

5.4.3 UNCITRAL Approach: Negotiations at the Time of Creation

Under the UNCITRAL approach, the restrictive terms in a license agreement are **unconditionally binding**. If there are restrictive clauses in a license agreement, the licensee can create a security interest in the license only with express consent from the licensor. An unconsented security interest in the license is unenforceable in the case of failure. It means that the licensee-borrower would lose nothing for the poor performance, which is the same case as no collateral having been imposed, in which case the borrower would always be incentivized to misbehave for private benefits. So the lender would not provide the loan in the first place. Therefore, in this setting, the negotiation for the licensor's consent happens at the time of creating security interests in the license, i.e., time 1 in Figure 5.4.⁸⁰⁴ With the licensor's consent, licensee/debtor and the lender negotiate for the loan contract, at time 1 as well. The two negotiations are conditional on each other.

Then we see below how the negotiation takes place among the parties.

a. The negotiation between the licensee and the lender at time 1.

Under the UNCITRAL rule, an IP licensee can create a security interest in the license only with express consent from the licensor. Once the security interest is created with the licensor's consent, there is no need to get the licensor's consent in the enforcement of the security interest any more. So, in the case of success, the lender gets the original lending with agreed interest, i.e., $U_{l_1}^S(A) = (1 + r_1)I$ where r_1 is the interest rate agreed in the security agreement (note: the interest rate is conditional

⁸⁰⁴ Actually, there is another possibility that the licensee can negotiate for a license without restrictive clauses, by paying a higher license fee at time 0 when negotiating for the license. It is very easy to see that all the problems (the licensor's risk-averse and holdup) that we find below would still exist in the negotiation. First, at time 0, the uncertainty about the investment opportunity is even higher, so the social deadweight loss in the licensor's risk aversion is even larger. Second, at time 0, the licensor can threaten the licensee about not giving the license and therefore has an even higher bargaining power. The licensee would get an even smaller proportion of the total social surplus created by its effort. So the licensee would still prefer to get a restrictive license first and then have a negotiation for the licensor's consent when the investment opportunity actually shows up at time 1; at least the licensee would not worry about losing the license for its own use.

on the collateral A , so it is more suitable to be written as $r_1(A)$; we use r_1 for demonstration simplicity); in the case of failure, the lender directly enforces the agreed security interest, $U_{l_1}^F(A) = \beta A$.

The lender's zero-profit rationality constraint (RC_{l_1}): With the borrower's promise of behaving (p_H), the lender's zero-profit condition requires that a risk-neutral lender will agree on an interest rate r_1 at which it can recoup its initial lending I and make zero-profit on average, i.e.,

$$U_{l_1}(A) = p_H(1 + r_1)I + (1 - p_H)\beta A - I = 0$$

$$\text{i.e.,} \quad (1 + r_1)I = \frac{I - (1 - p_H)\beta A}{p_H} \quad (RC_{l_1})$$

The lending is conditional on the licensor's consent. Therefore, the licensee has to negotiate with the licensor for the latter's consent as well.

b. The negotiation between the licensee and the licensor at time 1.

In the negotiation for the licensor's consent, backward induction is required. Since the licensee-borrower has no initial cash and the failure of the investment yields 0, it can only negotiate with the licensor by offering to pay the licensor a price P_1 in the case of success (note: the price is conditional on the collateral, so it is more suitable to be written as $P_1(A)$; we use P_1 for demonstration simplicity).⁸⁰⁵ So, we have $U_{o_1}^S(A) = P_1$. If the licensor consents to the creation of security interest in the license, it means that the licensor also consents to the enforcement of security interest, and then it has to suffer the cost brought by the disposition of the license upon the project's failure, i.e., $U_{o_1}^F(A) = -C$. We can see how the negotiation would take place among the licensor and the licensee-borrower.

(a) If the licensor accepts the licensee's price $P_1(A)$ and consents to the creation of security interests in the license, the licensor's utility can be written as follows,

⁸⁰⁵ As it has been assumed that the licensee-borrower has no initial cash and has used its assets as collateral, we hereby do not discuss the possibility for the licensee/borrower to pay the licensor in advance a certain amount of money as deposit or compensation for failure. As the project's failure yields 0 and the licensee has used its assets as collateral to repay the lender, the licensee cannot offer the licensor anything in the case of failure.

$$U_{o_1}(A) = p_H P_1 - (1 - p_H)C - \Delta U_{o_1}(A, \varepsilon) \quad (2.1)$$

where ε is the licensor's level of risk-aversion and $\Delta U_{o_1}(A, \varepsilon)$ is the licensor's disutility of taking the risk, which can be understood as the difference between the licensor's expected payoff and its utility from the consent. For a risk-neutral licensor, $\varepsilon = 0$ and $\Delta U_{o_1}(A, \varepsilon) = 0$. For a risk-averse licensor, $\varepsilon > 0$, $\Delta U_{o_1}(A, \varepsilon) > 0$ and $\Delta U_{o_1}(A, \varepsilon)$ increases with the licensor's level of risk-aversion ε .

If the licensee/debtor gets the licensor's consent on the creation of security interests in the license, in the case of success, it will keep the revenue R and pay back the lender $(1 + r_1)I$ and pay the licensor the agreed price P_1 , i.e., $U_{e_1}^S(A) = R - (1 + r_1)I - P_1$; in the case of failure, it will lose the collateral, i.e., $U_{e_1}^F(A) = -A$. The licensee's utility from the lending can also be written as follows,

$$U_{e_1}(A) = p_H[R - (1 + r_1)I - P_1] - (1 - p_H)A \quad (2.2)$$

- (b) If the licensor refuses the creation of the security interests in the license, then the investment would not happen, in which case the licensor and the licensee both get nothing, i.e., $\overline{U_{o_1}(A)} = \overline{U_{e_1}(A)} = 0$.

The payoffs of the licensee and the licensor from the negotiation are now illustrated in the following table.

Licensor's decision	Licensee's decision	Investment result	Licensee's payoff	Licensor's payoff
Reject	--	--	0	0
Consent	Not invest	--	0	0
Consent	Invest	Succeed	$R - (1 + r_1)I - P_1$	P_1
		Fail	$-A$	$-C$
		Expected payoff from investment	$p_H[R - (1 + r_1)I - P_1] - (1 - p_H)A$ $= (1 - \lambda_1)\Delta NS_1(A)$	$p_H P_1 - (1 - p_H)C$ $- \Delta U_{o_1}(A, \varepsilon)$ $= \lambda_1 \Delta NS_1(A)$

The negotiation surplus is

$$\Delta NS_1(A) = U_{o_1}(A) + U_{e_1}(A) - (\overline{U_{o_1}(A)} + \overline{U_{e_1}(A)})$$

Substituting (RC_1) , (2.1) and (2.2), we have

$$\Delta NS_1(A) = p_H R - I - (1 - p_H)[(1 - \beta)A + C] - \Delta U_{o_1}(A, \varepsilon) \quad (2.3)$$

- **Negotiation Condition** (NC_1) . The negotiation is possible only with non-negative negotiation surplus, i.e.,

$$\Delta NS_1(A) = p_H R - I - (1 - p_H)[(1 - \beta)A + C] - \Delta U_{o_1}(A, \varepsilon) \geq 0$$

$$\text{i.e.,} \quad A \leq \frac{p_H R - I - (1 - p_H)C - \Delta U_{o_1}(A, \varepsilon)}{(1 - p_H)(1 - \beta)} \quad (NC_1)$$

During the negotiation for the licensee's consent, a hold-up problem may happen. The hold-up problem is central to the theory of incomplete contracts. For example, Hart (1988) shows how the difficulty in writing complete contracts and the resulting need to renegotiate, and how the hold-up in renegotiation can lead to underinvestment.⁸⁰⁶ Similarly here, as it is difficult to write a complete license contract about the licensee's need for finance in the future, the licensee has made a prior commitment on getting the licensor's consent for IP collateralization. The licensee and the licensor have to renegotiate for the licensor's consent when the need for IP collateralization comes. Knowing that the licensee is facing an investment opportunity, the licensor might try to threaten not to give its consent, in order to keep a proportion of the total negotiation surplus (referred as "hold-up" hereafter).

It is assumed that the licensor can keep λ_1 of the total negotiation surplus, with $0 \leq \lambda_1 \leq 1$, depending on the licensor's incentive to holdup and the licensor's bargaining power at the time of negotiation. If the licensor has no incentive to holdup, then $\lambda_1 = 0$; if the licensor wants to holdup, $0 < \lambda_1 \leq 1$. The higher the bargaining power the licensor has, the larger λ_1 is.

The licensor's utility (2.1) can also be written as follows,

$$U_{o_1}(A) = p_H P_1(A) - (1 - p_H)C - \Delta U_{o_1}(A, \varepsilon) = \lambda_1 \Delta NS_1(A) \quad (2.4)$$

Substituting (2.3), we have,

⁸⁰⁶ See Oliver Hart and John Moore, "Incomplete Contracts and Renegotiation," *Econometrica* 56, no. 4 (1988): 755–85. Although Hart and Moore (1988) argue about the possibility of hold-up can lead to underinvestment in relationship-specific investments and hence to inefficiency. The hold-up problem here is similar.

$$P_1 = \frac{\lambda_1\{p_H R - I - (1-p_H)[(1-\beta)A + C]\} + (1-p_H)C + \Delta U_{o_1}(A, \varepsilon)}{p_H} \quad (2.5)$$

The licensee/debtor's utility from the lending (2.2) can also be written as follows,

$$U_{e_1}(A) = p_H[R - (1 + r_1)I - P_1] - (1 - p_H)A = (1 - \lambda_1)\Delta NS_1(A) \quad (2.6)$$

which is subject to the two following constraints,

- **The licensee/borrower's incentive constraint (IC_{e_1}):** behaving yields a higher utility than misbehaving, i.e.,

$$p_H[R - (1 + r_1)I - P_1] - (1 - p_H)A \geq p_L[R - (1 + r_1)I - P_1] - (1 - p_L)A + B$$

i.e., $\Delta p[R - (1 + r_1)I - P_1 + A] \geq B \quad (2.7)$

Substituting (RC_{l_1}) and (2.5), we have,

$$A \geq A_1^{min} = \frac{[p_H R - I - (1-p_H)C](\lambda_1 - 1) + \Delta U_{o_1}(A, \varepsilon) + p_H B / \Delta p}{(1-p_H)[\beta + \lambda_1(1-\beta)] + p_H} \quad (IC_{e_1})$$

- **The licensee/borrower rationality constraint (RC_{e_1}):** the lending brings non-negative profits.⁸⁰⁷

$$U_{e_1}(A) = (1 - \lambda_1)\Delta NS_1(A) \geq 0$$

We can see that the borrower's rationality constraint is actually the same as the negotiation condition (NC_1), i.e.,

$$A \leq A_1^{max} = \frac{p_H R - I - (1-p_H)C - \Delta U_{o_1}(A, \varepsilon)}{(1-p_H)(1-\beta)} \quad (RC_{e_1})$$

So, for a license's value falling within $A \in [A_1^{min}, A_1^{max}]$, the licensee would like to use the license as collateral to fund the project and it can negotiate for the licensor's consent to the creation of a security interest in the license and get the project funded. With $NPV(A) = p_H R - I - (1 - p_H)[(1 - \beta)A + C]$, when the project is funded, the licensee's utility from the borrowing and investment is

⁸⁰⁷ The other way is to calculate $U_{e_1}(A) = p_H[R - (1 + r_1)I - P_1] - (1 - p_H)A \geq 0$. Substituting (2.1) and (2.6), it would have the same result.

$$\begin{aligned}
U_{e_1}(A) &= (1 - \lambda_1)\{p_H R - I - (1 - p_H)[(1 - \beta)A + C] - \Delta U_{o_1}(A, \varepsilon)\} \\
&= (1 - \lambda_1)[NPV(A) - \Delta U_{o_1}(A, \varepsilon)]
\end{aligned} \tag{2.8}$$

The licensor's utility from consenting to the licensee using the license as collateral is

$$U_{o_1}(A) = 1 - \lambda_1[NPV(A) - \Delta U_{o_1}(A, \varepsilon)] \tag{2.9}$$

In summary, under the UNCITRAL rule, the investment opportunity can be funded only when the value of the license falls within $A \in [A_1^{min}, A_1^{max}]$. When the project is funded, the licensee's utility from the borrowing and investment is $U_{e_1}(A) = (1 - \lambda_1)[NPV(A) - \Delta U_{o_1}(A, \varepsilon)]$ and the licensor's utility from consenting the licensee to use the license as collateral is $U_{o_1}(A) = \lambda_1[NPV(A) - \Delta U_{o_1}(A, \varepsilon)]$. We will examine the costs and benefits of the UNCITRAL rule via a comparison with the US rule later in Section 5.5.

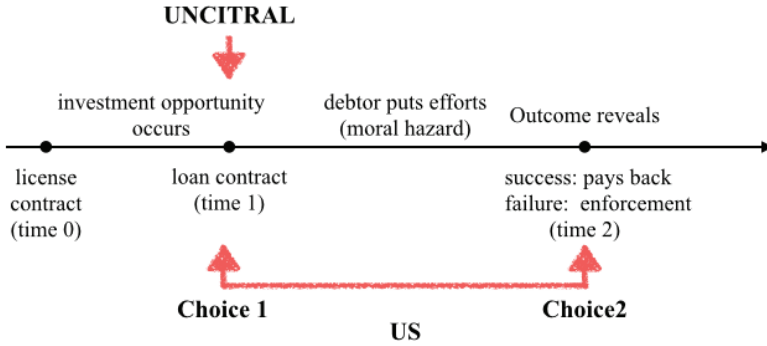
5.4.4 American Approach: An Additional Choice for Negotiation at the Time of Enforcement

Under the American approach, in the case with restrictive clauses in the license agreement, the licensee still can freely **create** security interests in his rights under a license without the licensor's consent. However, for trying to protect the licensor against being adversely affected by the secured transaction, the security interests can only be **enforced** with the licensor's consent. This approach is expected to help the licensee obtain more credit and strive for a proper balance among the interests of all parties involved (see discussion in Section 5.3.3).

In essence, the American approach provides the licensee with an additional choice. At time 1, the licensee faces an investment opportunity and has to make a choice between creating a security interest with or without the licensor's consent.

- Choice 1: creating a security interest in the license **with** the licensor's consent (at time 1) (as under the UNCITRAL approach).
- Choice 2: creating a security interest in the license **without** the licensor's consent

(at time 2), and then negotiate for the licensor's consent at the time of enforcing the security interests upon the project's failure (at time 2).



Choice 1 is the same as the UNCITRAL rule. We now examine how the parties would negotiate when choosing Choice 2.

a. The negotiation takes place between the licensor and the lender at time 2.

Choice 2 is possible only with the lender's acceptance for an unconsented security interest in the IP license. When a lender would like to accept an unconsented security interest and to lend money to the licensee-borrower at time 1, the lender must first *ex ante* estimate its payoffs with the unconsented security interest at time 2, when the project reveals its result, either success or failure.

- In the case of the project's success, the lender would get the payment specified in the lending contract, i.e., $U_{l_2}^S = (1 + r_2)I$, thereof r_2 is the interest rate agreed in the security agreement: no disposition of the license would occur. So the licensor does not get involved at all and gets no payoff, i.e., $U_{o_2}^S = 0$.

- Upon the project's failure, enforcing the security interests liquidates cash of βA and also brings a cost of $-C$ to the licensor. The licensor's consent is still needed for the enforcement. If a lender has accepted an unconsented security interest and has lent the money to the licensee, it would become the party that cares about the enforcement the most. If possible, the lender would like to negotiate with the licensor for the consent to enforcement by paying the licensor a price of P_2 (simplified expression

for $P_2(A)$), with $C \leq P_2 \leq \beta A$.⁸⁰⁸

Then we can see how the licensor and the lender would negotiate at time 2, upon the default.

- (a) If the licensor accepts the licensee's price $P_2(A)$ and consents to the enforcement, the licensor's utility is $U_{o_2}^F(A) = P_2 - C$; the lender's utility is $U_{l_2}^F(A) = \beta A - P_2$.
- (b) If the licensor refuses the enforcement, then the licensor and the lender both get nothing, i.e., $\overline{U_{o_2}^F(A)} = \overline{U_{l_2}^F(A)} = 0$.

The payoffs of the lender and the licensor from the negotiation are now illustrated in the following table.

Licensor's decision	Lender decision	Licensee's payoff	Licensor's payoff
Reject	--	0	0
Consent	Not enforce	0	0
Consent	Enforce	$\beta A - P_2$.	$P_2 - C$

The negotiation surplus is

$$\Delta NS_2(A) = (U_{o_2}^F + U_{l_2}^F) - (\overline{U_{o_2}^F} + \overline{U_{l_2}^F}) = \beta A - C \quad (3.1)$$

- **Negotiation Condition (NC_2)**. The negotiation would be possible only if with positive negotiation surplus,⁸⁰⁹ i.e.,

$$\Delta NS_2(A) = \beta A - C \geq 0$$

$$\text{i.e.,} \quad \beta A \geq C \quad (NC_2)$$

Similarly, during the negotiation, the licensor might holdup for keeping λ_2 of the

⁸⁰⁸ The lender would pay P_2 up to the disposition value of the license βA . Paying more than βA means that the lender would get negative payoff. The lender gets better off by simply not enforcing the security interest at all, in which case the lender gets zero. The licensor would not accept a price P_2 less than the third-party cost C .

⁸⁰⁹ If $\beta A < C$, the lender cannot make a credible threat on disposing of the collateral in the case of poor performance. The encumbered license cannot be disposed of. So, the licensee loses nothing in the project's failure. The situation is identical to the case where the licensee has not used the license as collateral at all. As explained before, without collateral, the borrower would not behave at all and the lender hence would not provide the loan in the first place.

total negotiation surplus as well, thereof $0 \leq \lambda_2 \leq 1$. The licensor's holdup also depends on the licensor's incentive to holdup and the licensor's bargaining power at the time of negotiation.

The licensor's utility can be written as

$$U_{o_2}^F(A) = P_2 - C = \lambda_2 \Delta NS_2 = \lambda_2(\beta A - C) \quad (3.2)$$

$$\text{i.e.,} \quad P_2 = \lambda_2(\beta A - C) + C \quad (3.3)$$

We can see that, at this negotiation, the licensor's risk preference does not matter anymore, because the licensor only gets involved in the case of enforcement, by the time the project has failed and the disposition would happen for sure. The licensor does not encounter any uncertainty or risk.

b. The negotiation between the licensee/debtor and the lender at time 1.

The lending decision happens at time 1. The lender has to decide if it would accept an unconsented security interest or not at time 1. The lender can anticipate that, in the case of success, it gets the original lending with agreed interest, i.e., $U_{l_2}^S(A) = (1 + r_2)I$; in the case of failure, it has to negotiate with the licensor for the enforcement, i.e., $U_{l_2}^S(A) = \beta A - P_2$.

- **The lender's rationality constraint (RC_{l_2}).** So, if a lender accepts the unconsented security interest, the lender would ask for an interest rate r_2 which satisfies its zero-profit rationality constraint as follows,

$$U_{l_2}(A) = p_H(1 + r_2)I + (1 - p_H)(\beta A - P_2) - I = 0$$

Substituting (3.3), we have,

$$(1 + r_2)I = \frac{I - (1 - p_H)(1 - \lambda_2)(\beta A - C)}{p_H} \quad (RC_{l_2})$$

With the interest rate r_2 , the licensee/debtor will keep the revenue R and pay back the lender $(1 + r_2)I$ in the case of success, i.e., $U_{e_2}^S(A) = R - (1 + r_2)I$; and will lose the collateral, i.e., $U_{e_2}^F(A) = -A$. The licensee's utility from the

lending can be written as follows,

$$U_{e_2}(A) = p_H[R - (1 + r_2)I] - (1 - p_H)A \quad (3.4)$$

which is subject to the two following constraints,

- **The licensee/borrower's incentive constraint (IC_{e_2}),**

$$p_H[R - (1 + r_2)I] - (1 - p_H)A \geq p_L[R - (1 + r_2)I] - (1 - p_L)A + B$$

$$\text{i.e.,} \quad \Delta p[R - (1 + r_2)I + A] \geq B \quad (3.5)$$

Substituting (RC_{l_2}), we have

$$A \geq A_2^{\min} = \frac{I - p_H(R - B/\Delta p) + (1 - p_H)(1 - \lambda_2)C}{(1 - p_H)(1 - \lambda_2)\beta + p_H} \quad (IC_{e_2})$$

- **The licensee/borrower's rationality constraint (RC_{e_2}),**

$$U_{e_2}(A) = p_H[R - (1 + r_2)I] - (1 - p_H)A \geq 0$$

Substituting (RC_{l_2}), we have

$$U_{e_2}(A) = p_H R - I + (1 - p_H)[(1 - \lambda_2)(\beta A - C) - A] \quad (3.6)$$

$$\text{i.e.,} \quad A \leq A_2^{\max} = \frac{p_H R - I - (1 - p_H)(1 - \lambda_2)C}{(1 - p_H)[1 - (1 - \lambda_2)\beta]} \quad (RC_{e_2})$$

So, in the case while the disposition value of the license is larger than the third-party cost, $\beta A \geq C$ (the negotiation condition at time 2), for a license falling within $A \in [A_2^{\min}, A_2^{\max}]$, a lender would like to accept a security interest in the license created without the licensor's consent and then negotiate for the licensor's consent for the enforcement upon the project's failure. The secured transaction can happen.

With $NPV(A) = p_H R - I - (1 - p_H)[(1 - \beta)A + C]$, when the project is funded, the licensee's utility from the borrowing and investment is

$$\begin{aligned} U_{e_2}(A) &= p_H R - I + (1 - p_H)[(1 - \lambda_2)(\beta A - C) - A] \\ &= NPV(A) - \lambda_2(1 - p_H)(\beta A - C) \end{aligned} \quad (3.7)$$

The licensor's utility from consenting to the enforcement of security interest in the license is

$$U_{o_2}(A) = \lambda_2(1 - p_H)(\beta A - C) \quad (3.8)$$

In summary, under the UCC 9-408 rule, the investment opportunity can be funded only when the value of the license falls within $A \in [A_2^{min}, A_2^{max}]$. When the project is funded, the licensee's utility from the borrowing and investment is $U_{e_1}(A) = NPV(A) - \lambda_2(1 - p_H)(\beta A - C)$ and the licensor's utility from consenting the licensee to use the license as collateral is $U_{o_2}(A) = \lambda_2(1 - p_H)(\beta A - C)$. We will examine the costs and benefits of the US rule via a comparison with the UNCITRAL rule later in Section 5.5.

5.5 Comparison for Different Licenses

As we discussed in Section 3.3, the approach adopted in UCC 9-408 comes from the successful practical experience of creating limited security interests in the Federal Communications Commission (FCC) broadcast licenses.

Several questions have never been clearly answered.

- Why the legal change works well for the FCC licenses?
- Can the successful change also work well for the IP licenses too?

The main differences between the FCC broadcast license and IP licenses are the **licensors' incentives and risk-preferences** during the negotiation.

The FCC broadcast license is a public license issued by a public authority, the FCC, which is a regulator with the mandate of regulating the broadcast airwaves for the public interest.⁸¹⁰ A public FCC license entitles the licensee to "a governmental privilege to engage in certain conduct granted pursuant to the police power".⁸¹¹ The FCC is not interested in generating profits from the licensing; so it has **no incentive to holdup** during the negotiation for consent for creating or enforcing the security interest in the FCC license. However, "it is concerned about who uses the limited

⁸¹⁰ *MLQ investors*, 146 F.3d at 748.

⁸¹¹ Brennan (2001) "Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version)," *supra note* 302 at 406.

broadcast frequencies.”⁸¹² Giving a license to unqualified licensees can bring substantive social costs. The FCC tends to be **very risk-averse** in the decision for giving consent in order to ensure no negative utility from the consent.

By contrast, IP license is a kind of private license issued by IP licensors. An IP license gives the licensee “a privilege to be free from suit for infringement of intellectual property rights that are granted to private parties under entirely different constitutional authority.”⁸¹³ The IP licensing system is designed to provide monetary incentives for innovation, by allowing IP owners to exploit its exclusivity and monopoly status to generate profits. A rational IP licensor, as a private profit-maximizer, has the **incentive to holdup** during the negotiation for consent for dragging some profit from the negotiation surplus. An IP licensor might be **risk-neutral or risk-averse**.

In the following part, we examine how the licensor’s incentive and risk-preference can influence the effects of legal rules. We firstly examine the effects of the legal changes to the case of FCC licenses. The examination can help us reveal the problem under the usual UNCITRAL rule and can explain why this legal change in the UCC 9-408 works well for the FCC license. Then we examine the effects of the legal changes to the case of IP cases, to see if the success in the FCC license can be extended to the case of IP licenses as well.

5.5.1 Public Licenses – the FCC licenses

For public licenses like the FCC license, the licensors are public authorities like the FCC. These public licensors have no incentive at all to holdup for getting any profits from the licensee-debtor’s borrowing and investment, so they do not bargain for sharing any proportion of the total negotiation surplus under both rules, i.e., $\lambda_{1.1} = \lambda_{2.1} = 0$. However, they are greatly concerned about suffering the third-party cost from the licensee’s use of license as collateral and want to ensure a non-negative payoff. They tend to be very risk-averse, i.e., $\Delta U_{o_{1.1}}(A, \varepsilon) > 0$. We can compare the licensee’s utilities and the collateral requirements under the two choices to see how the licensee would choose and if the legal change in the UCC 9-408 is beneficial.

5.5.1.1 UNCITRAL: Choice 1

With $\lambda_{1.1} = 0$ and $\Delta U_{o_{1.1}}(A, \varepsilon) > 0$, the conditions (RC_1) , (NC_1) , (2.5), (2.7),

⁸¹² *Ibid.*

⁸¹³ *Ibid.*

$(IC_{e_1}), (RC_{e_1}), (2.8)$ and (2.9) can be rewritten as follows,

$$(1 + r_{1.1})I = \frac{I - (1 - p_H)\beta A}{p_H} \quad (RC_{1.1})$$

$$A \leq \frac{p_H R - I - (1 - p_H)C - \Delta U_{o_{1.1}}(A, \varepsilon)}{(1 - p_H)(1 - \beta)} \quad (NC_{1.1})$$

$$P_{1.1}(A) = \frac{(1 - p_H)C + \Delta U_{o_{1.1}}(A, \varepsilon)}{p_H} \quad (2.5.1)$$

$$\Delta p \left[R - \frac{I - (1 - p_H)\beta A}{p_H} - \frac{(1 - p_H)C + \Delta U_{o_{1.1}}(A, \varepsilon)}{p_H} + A \right] \geq B \quad (2.7.1)$$

$$A \geq A_{1.1}^{min} = \frac{I - p_H(R - B/\Delta p) + (1 - p_H)C + \Delta U_{o_{1.1}}(A, \varepsilon)}{(1 - p_H)\beta + p_H} \quad (IC_{e_{1.1}})$$

$$A \leq A_{1.1}^{max} = \frac{p_H R - I - (1 - p_H)C - \Delta U_{o_{1.1}}(A, \varepsilon)}{(1 - p_H)(1 - \beta)} \quad (RC_{e_{1.1}})$$

$$\begin{aligned} U_{e_{1.1}}(A) &= p_H R - I - (1 - p_H)[(1 - \beta)A + C] - \Delta U_{o_{1.1}}(A, \varepsilon) \\ &= NPV(A) - \Delta U_{o_{1.1}}(A, \varepsilon) \end{aligned} \quad (2.8.1)$$

$$U_{o_{1.1}}(A) = 0 \quad (2.9.1)$$

The results show that, for public licenses like the FCC license, under the UNCITRAL rule, the investment opportunity can be funded only when the value of the license falls within $A \in \left[\frac{I - p_H(R - B/\Delta p) + (1 - p_H)C + \Delta U_{o_{1.1}}(A, \varepsilon)}{(1 - p_H)\beta + p_H}, \frac{p_H R - I - (1 - p_H)C - \Delta U_{o_{1.1}}(A, \varepsilon)}{(1 - p_H)(1 - \beta)} \right]$. The negotiations all happen at the time of time 1, when creating security interests in the IP license. The licensee can agree with the lender with an interest rate of $(1 + r_{1.1})I = \frac{I - (1 - p_H)\beta A}{p_H}$, and agree to pay the licensor with a price of $P_{1.1}(A) = \frac{(1 - p_H)C + \Delta U_{o_{1.1}}(A, \varepsilon)}{p_H}$ in the case of success. When the project is funded, the licensee's utility from the borrowing and investment is $U_{e_{1.1}}(A) = NPV(A) - \Delta U_{o_{1.1}}(A, \varepsilon)$ and the licensor's utility from consenting to the licensee using the license as collateral is $U_{o_{1.1}}(A) = 0$. From the social perspective, some social value of $\Delta U_{o_{1.1}}(A, \varepsilon)$, is wasted in the negotiation for the licensor's consent.

5.5.1.2 US Approach: additional Choice 2

With $\lambda_{2.1} = 0$, the conditions $(NC_2), (3.3), (RC_{1_2}), (3.5), (IC_{e_2}), (RC_{e_2}), (3.7)$ and

(3.8) can be rewritten as follows,

$$\beta A \geq C \quad (NC_{2.1})$$

$$P_{2.1} = C \quad (3.3.1)$$

$$(1 + r_{2.1})I = \frac{I - (1 - p_H)(\beta A - C)}{p_H} \quad (RC_{l_{2.1}})$$

$$\Delta p \left[R - \frac{I - (1 - p_H)(\beta A - C)}{p_H} + A \right] \geq B \quad (3.5.1)$$

$$A \geq A_{2.1}^{min} = \frac{I - p_H(R - B/\Delta p) + (1 - p_H)C}{(1 - p_H)\beta + p_H} \quad (IC_{e_{2.1}})$$

$$A \leq A_{2.1}^{max} = \frac{p_H R - I - (1 - p_H)C}{(1 - p_H)(1 - \beta)} \quad (RC_{e_{2.1}})$$

$$U_{e_{2.1}}(A) = p_H R - I + (1 - p_H)[(\beta - 1)A - C] = NPV(A) \quad (3.8.1)$$

$$U_{o_{2.1}}(A) = 0 \quad (3.9.1)$$

The results show that, for public licenses like the FCC license, only when $\beta A \geq C$, is the additional Choice 2 under the UCC 9-408 rule available. Then, the investment opportunity can be funded when the value of the license falls within $A \in \left[\frac{I - p_H(R - B/\Delta p) + (1 - p_H)C}{(1 - p_H)\beta + p_H}, \frac{p_H R - I - (1 - p_H)C}{(1 - p_H)(1 - \beta)} \right]$. The licensee will negotiate with the lender at time 1 to agree with an interest rate of $(1 + r_{2.1})I = \frac{I - (1 - p_H)(\beta A - C)}{p_H}$. Then the creditor will offer to pay the licensor a price of $P_{2.1} = C$ at the enforcement (time 2) for the licensor's consent. When the project is funded, the licensee's utility from the borrowing and investment is $U_{e_{2.1}}(A) = NPV(A)$ and the licensor's utility from consenting to the licensee using the license as collateral is $U_{o_{2.1}}(A) = 0$. From the social perspective, no social value is wasted in the negotiation for the licensor's consent.

5.5.1.3 Comparison between the two choices

The comparison of the results under the two choices can also be illustrated in Figure 5.5 as follows,

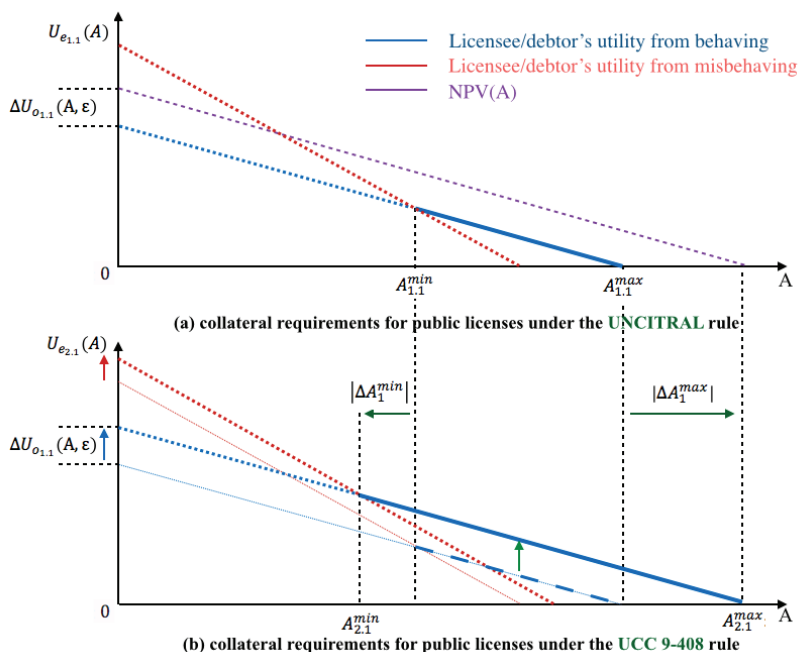


Figure 5.5 Comparison for public licenses under the UNCITRAL rule and the UCC 9-408 rule

A comparison between the results under the two choices can provide several important implications:

(1) The licensor's risk-preference matters in Choice 1, but not in Choice 2.

Under Choice 1, the licensor's risk preference is a main determinant in the licensee's utility from the investment, $U_{e_{1.1}}(A)$, and in the requirements on the collateral value of the license, $A_{1.1}^{min}$ and $A_{1.1}^{max}$. This is because the licensor's consent to the creation of security interests in the license is given prior to the investment. The consent implies that the licensor also agrees to bear the cost of C in the project's failure, which happens with a probability of $(1 - p_H)$ with the licensee's behaving. The licensor's risk preference therefore matters in its consent decision. As a typical public authority that is likely to be very risk-averse, the licensor's disutility of taking the risk, $\Delta U_{o_{1.1}}(A, \varepsilon)$, can be significant.

By contrast, under Choice 2, the licensor's risk preference is irrelevant. This is

because the licensor gets involved only at the time of enforcement, by the time the investment has taken place and the project has already failed. If the licensor consents to the enforcement of the security interest in the license, the disposition of the encumbered license would happen for sure. As the licensor takes no risk in the consent decision, the licensor's risk preference does not matter at all.

- (2) With $U_{e_{1.1}}(A) = NPV(A) - \Delta U_{o_{1.1}}(A, \varepsilon)$ and $U_{e_{2.1}}(A) = NPV(A)$, we have $U_{e_{1.1}}(A) < U_{e_{2.1}}(A)$, i.e., **the licensee has a higher utility under Choice 2.**

The consent to the creation of security interest in the license implies that the licensor also agrees to bear the cost of C in the project's failure. In other words, the licensor is actually sharing the risk of failure with the licensee. Sharing risk from a risk-neutral licensee with a risk-averse licensor is associated with social deadweight loss, in the form of the risk-averse licensor's disutility of taking the risk, $\Delta U_{o_{1.1}}(A, \varepsilon)$. Under Choice 1, a part of the social value created by the licensee's effort, $\Delta U_{o_{1.1}}(A, \varepsilon)$, is wasted in the risk-sharing with the risk-averse licensor.

By contrast, under Choice 2, as the licensor does not take risk, no social value created by the licensee's efforts in the investment is wasted. The licensee can fully internalize the entire social surplus of its efforts. For the same license and investment project, the licensee has a higher utility under Choice 2. The difference is $|\Delta U_{e_1}| = \Delta U_{o_{1.1}}(A, \varepsilon)$. The more risk-averse the licensor is, the larger the difference would be. If the licensor is very risk-averse, the difference can be significant.

- (3) With $A_{1.1}^{min} = \frac{l-p_H(R-B/\Delta p)+(1-p_H)C+\Delta U_{o_{1.1}}(A,\varepsilon)}{(1-p_H)\beta+p_H}$ and $A_{2.1}^{min} = \frac{l-p_H(R-B/\Delta p)+(1-p_H)C}{(1-p_H)\beta+p_H}$, we have $A_{1.1}^{min} > A_{2.1}^{min}$, i.e., **the licensee faces a lower incentive constraint (minimal collateral requirement) under Choice 2.**

Under Choice 2, the full internalization of all the profits increases the licensee's benefit of behaving, which consequently increases the licensee's incentive to behave. Therefore, less collateral is needed for the licensee to make a credible commitment on behaving under Choice 2. For the same license and investment project, if the license's value falls within $A \in [A_{2.1}^{min}, A_{1.1}^{min}]$, the license would not be valuable enough under Choice 1 but would become sufficient under Choice 2.

The expended scope is $|\Delta A_1^{min}| = \frac{\Delta U_{o_{1,1}}(A,\varepsilon)}{(1-p_H)\beta+p_H}$. The more risk-averse the licensor is, the larger the expended scope would be. In the case of a very risk-averse licensor, Choice 2 can greatly reduce the minimal collateral requirement.

- (3) With $A_{1,1}^{max} = \frac{p_H R - I - (1-p_H)C - \Delta U_{o_{1,1}}(A,\varepsilon)}{(1-p_H)(1-\beta)}$ and $A_{2,1}^{max} = \frac{p_H R - I - (1-p_H)C}{(1-p_H)(1-\beta)}$, we have $A_{1,1}^{max} < A_{2,1}^{max}$, i.e., **the licensee faces a higher rationality constraint (maximum collateral requirement) under Choice 2.**

As the licensee has a higher utility from the investment under Choice 2, the cost of using collateral is comparatively lower. For the same license and investment project, if the license's value falls within $A \in [A_{1,1}^{max}, A_{2,1}^{max}]$, the license would bring to the licensee negative utility under Choice 1 but would result in positive utility under Choice 2. The expended scope is $|\Delta A_1^{max}| = \frac{\Delta U_{o_{1,1}}(A,\varepsilon)}{(1-p_H)(1-\beta)}$. The more risk-averse the licensor is, the larger the expended scope would be. In the case of a very risk-averse licensor, Choice 2 can greatly raise the maximum collateral requirement.

- (4) In total, for public licenses like the FCC license, **the US rule strictly dominates the UNCITRAL rule.**

The US rule provides Choice 2 as an additional option. If both choices are available, Choice 2 strictly dominates Choice 1. Choice 2 not only increases the licensee's utility from the investment but also expands the scope of qualified licenses (lowering the minimum requirement and increasing the maximum requirement). The licensee therefore prefers to get the licensor's consent at the time of enforcement. The more risk-averse the licensor is, the more Choice 2 would be preferred. In this case, the US rule is preferable to the UNCITRAL rule.

Meanwhile, it is worth noting that Choice 2 is available only if the disposition value of the license is larger than the third-party cost, i.e., $\beta A \geq C$ (negotiation condition at time 2). In the case of $\beta A < C$, a negotiation with the licensor at the time of enforcement is impossible, so the lender would not accept a security interest created without the licensor's consent. If Choice 1 is still possible, the licensee would still choose Choice 1. In this case, the US rule achieves the same effect as the UNCITRAL rule.

In summary, as the licensors of public licenses have no incentive to block or holdup the use of license as collateral, **the risk-sharing with the licensor** is the real reason that causes the under-investment problem under the UNCITRAL rule. As public authorities tend to be very risk-averse, asking for their consent at the time of creating security interests in the licenses is associated with high social deadweight loss. The social loss lowers the licensee's utility from the investment, and consequently increases the minimum collateral requirement and restricts the maximum collateral. The licensor's risk-aversion narrows down the scope of licenses that are qualified as collateral and hence increases credit rationing. Some wealth-enhancing projects might be forgone.

Then the US rule provides the licensee with the **additional** choice of getting the licensor's consent at the time of enforcement (with the high priority order established by the time of creation). The additional choice allows the licensee to avoid the social deadweight loss and also the under-investment problem caused by the licensor's risk-aversion. The full internalization of the entire social surplus created by its efforts in the investment lowers the licensee's incentive constraint and increases its rationality constraint. It expands the scope of licenses that can be used as collateral (in the case where the disposition value of the license is larger than the third-party cost on the licensor). The under-investment problem under the UNCITRAL rule is solved. More wealth-enhancing projects therefore can be funded. The more risk-averse the licensor is, the more significant the advantages of the US approach would be. This model explains why the legal change works well in the case of the FCC license.

5.5.2 Private Licenses - IP Licenses

Then we need to see if the success for the FCC license can be expanded to IP licenses. Unlike public licensors, the rational private licensors are utility-maximizers. As the anti-assignment clause makes the creation or enforcement of security interest in the license conditional on the licensor's consent, a private licensor always has incentive to holdup for dragging some negotiation surplus during the negotiation, in order to maximize its own utility. However, the two rules grant the IP licensor **different bargaining powers**. We show below how the licensor's incentive to holdup can affect the results.

5.5.2.1 UNCITRAL: Choice 1

Under the UNCITRAL rule (Choice 1), the negotiation happens prior to the

investment. In this **pre-investment negotiation**, if the licensor wants to holdup, it is reasonable to assume that both the licensor and the licensee-borrower have equal bargaining powers; so we have $\lambda_{1,2} = 1/2$. The IP licensor can be risk-neutral or risk averse, i.e., $\Delta U_{o_{1,2}}(A, \varepsilon) \geq 0$.

With $\lambda_{1,2} = 1/2$, the conditions (RC_{l_1}) , (NC_1) , (2.5), (2.7), (IC_{e_1}) , (RC_{e_1}) , (2.8) and (2.9) can be rewritten as follows, can be rewritten as follows,

$$(1 + r_{1,2})I = \frac{I-(1-p_H)\beta A}{p_H} \quad (RC_{l_{1,2}})$$

$$A \leq \frac{p_H R - I - (1-p_H)C - \Delta U_{o_{1,2}}(A, \varepsilon)}{(1-p_H)(1-\beta)} \quad (NC_{1,2})$$

$$P_{1,2} = \frac{p_H R - I - (1-p_H)(1-\beta)A + (1-p_H)C + \Delta U_{o_{1,2}}(A, \varepsilon)}{2p_H} \quad (2.5.2)$$

$$\Delta p \left[R - \frac{I-(1-p_H)\beta A}{p_H} - \frac{p_H R - I - (1-p_H)(1-\beta)A + (1-p_H)C + \Delta U_{o_{1,2}}(A, \varepsilon)}{2p_H} + A \right] \geq B \quad (2.7.2)$$

$$A \geq A_{1,2}^{min} = \frac{I - p_H(R - 2B/\Delta p) + (1-p_H)C + \Delta U_{o_{1,2}}(A, \varepsilon)}{p_H + (1-p_H)\beta + 1} \quad (IC_{e_{1,2}})$$

$$A \leq A_{1,2}^{max} = \frac{p_H R - I - (1-p_H)C - \Delta U_{o_{1,2}}(A, \varepsilon)}{(1-p_H)(1-\beta)} \quad (RC_{e_{1,2}})$$

$$\begin{aligned} U_{e_{1,2}}(A) &= \frac{1}{2} \{ p_H R - I - (1-p_H)[(1-\beta)A + C] - \Delta U_{o_{1,2}}(A, \varepsilon) \} \\ &= \frac{1}{2} [NPV(A) - \Delta U_{o_{1,2}}(A, \varepsilon)] \end{aligned} \quad (2.8.2)$$

$$U_{o_{1,2}}(A) = \frac{1}{2} [NPV(A) - \Delta U_{o_{1,2}}(A, \varepsilon)] \quad (2.9.2)$$

The results show that, for private licenses like the IP license, under the UNCITRAL rule, the investment opportunity can be funded only when the value of the license falls within

$$A \in \left[\frac{I - p_H(R - 2B/\Delta p) + (1-p_H)C + \Delta U_{o_{1,2}}(A, \varepsilon)}{p_H + (1-p_H)\beta + 1}, \frac{p_H R - I - (1-p_H)C - \Delta U_{o_{1,2}}(A, \varepsilon)}{(1-p_H)(1-\beta)} \right].$$

The negotiations all happen at the time of time 1, when creating security interests in the IP license. The licensee can agree with the lender on an interest rate of $(1 + r_{1,2})I = \frac{I-(1-p_H)\beta A}{p_H}$; and agree to pay the licensor a price of

$$P_{1.2} = \frac{p_H R - I - (1-p_H)(1-\beta)A + (1-p_H)C + \Delta U_{o_{1.2}}(A, \varepsilon)}{2p_H}$$
 in the case of success. When the project is funded, the licensee's utility from the borrowing and investment is $U_{e_{1.2}}(A) = \frac{1}{2} [NPV(A) - \Delta U_{o_{1.2}}(A, \varepsilon)]$ and the licensor's utility from consenting to the licensee using the license as collateral is $U_{o_{1.2}}(A) = \frac{1}{2} [NPV(A) - \Delta U_{o_{1.2}}(A, \varepsilon)]$. From the social perspective, some social value of $\Delta U_{o_{1.2}}(A, \varepsilon)$, is wasted in the negotiation for the licensor's consent.

A simple comparison with the results found in Section 5.5.1.1 can show us, under the UNCITRAL rule (Choice 1), for the same license and licensor (i.e., $\Delta U_{o_{1.1}}(A, \varepsilon) \approx \Delta U_{o_{1.2}}(A, \varepsilon)$),⁸¹⁴ how the licensor's incentive to hold-up can affect the licensee's borrowing decisions. The comparison can also be illustrated in Figure 5.6 below,

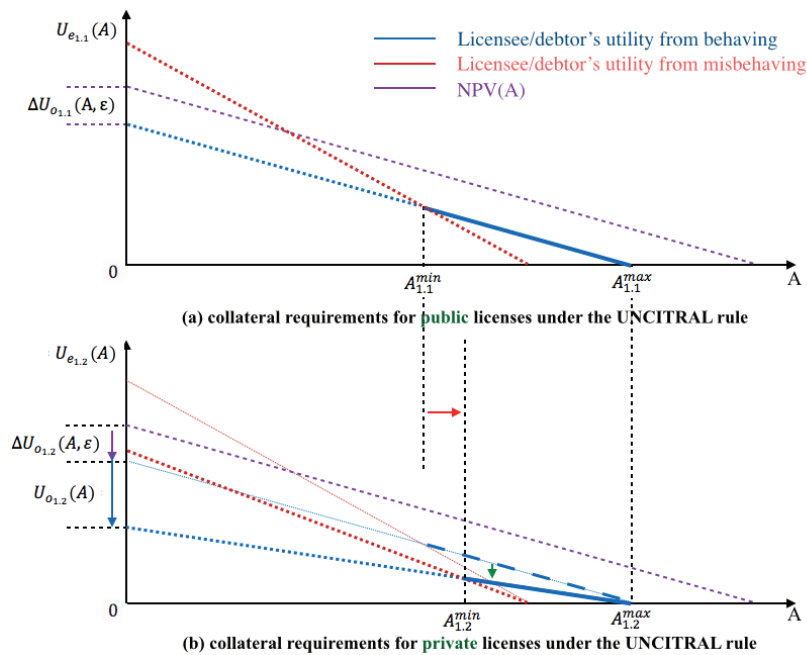


Figure 5.6 Comparison for public licenses and private licenses under the UNCITRAL rule

⁸¹⁴ Precisely, $\Delta U_{o_{1.1}}(A, \varepsilon) > \Delta U_{o_{1.2}}(A, \varepsilon)$, since $P_{1.1}(A) < P_{1.2}(A)$.

- (1) With $U_{e_{1.1}}(A) = NPV(A) - \Delta U_{o_{1.1}}(A, \varepsilon)$ and $U_{e_{1.2}}(A) = \frac{1}{2}[NPV(A) - \Delta U_{o_{1.2}}(A, \varepsilon)]$, we have $U_{e_{1.1}}(A) > U_{e_{1.2}}(A)$, i.e., **the licensee-debtor gets a lower utility from the investment with the licensor's holdup.**

If the licensor has no incentive to holdup (as like a public licensor, such as a FCC licensor), it would make zero-profit on average, i.e., $U_{o_{1.1}}(A) = 0$. All social surplus created by the borrowing and investment are fully captured by the licensee, i.e., $U_{e_{1.1}}(A) = NPV(A) - \Delta U_{o_{1.1}}(A, \varepsilon)$. By contrast, if the licensor has an incentive to holdup (as a private licensor, such as an IP licensor), then the licensee has to share half of the surplus with the licensor in order to get the licensor's consent, i.e., $U_{e_{1.2}}(A) = U_{o_{1.2}}(A) = \frac{1}{2}\{NPV(A) - \Delta U_{o_{1.2}}(A, \varepsilon)\}$. With $U_{e_{1.2}}(A) \approx \frac{1}{2}U_{e_{1.1}}(A)$, it implies that, with the licensor's holdup, the licensee-debtor can only get half of what it can get without the licensor's holdup.

- (2) With $A_{1.1}^{min} = \frac{I-p_H(R-B/\Delta p)+(1-p_H)C+\Delta U_{o_{1.1}}(A,\varepsilon)}{(1-p_H)\beta+p_H}$ and $A_{1.2}^{min} = \frac{I-p_H(R-2B/\Delta p)+(1-p_H)C+\Delta U_{o_{1.2}}(A,\varepsilon)}{p_H+(1-p_H)\beta+1}$, we have $A_{1.1}^{min} < A_{1.2}^{min}$,⁸¹⁵ i.e., **a licensee faces a higher minimal collateral requirement in the case of a private license.**

In the case with the licensor's holdup, in order to grasp half of the licensee's profit from the borrowing and investment, the licensor would ask for a higher price in the case of success, $P_{1.2} > P_{1.1}$. The promise of paying a higher price $P_{1.2}$ to the licensor in the case of success reduces the licensee's benefits of behaving, which consequently lowers the licensee's incentive to behave. Then the lender has to ask for more collateral for controlling the same post-lending misbehaving. The licensee therefore has to face a higher minimal collateral requirement for the creation of security interest with the licensor's holdup. For the same license, same project and the same third-party cost to the licensor, if the license's value is $A \in [A_{1.1}^{min}, A_{1.2}^{min}]$, the project can be funded without the licensor's holdup and has to

⁸¹⁵ The simpler way to get the comparison result is to directly compare the left sides of conditions (2.7.1) and (2.7.2). For the same collateral A , we have $(1+r_{1.1})I = (1+r_{1.2})I$ and $P_{1.1} < P_{1.2}$. It means we always have $\Delta p[R - (1+r_{1.1})I - P_{1.1} + A] > \Delta p[R - (1+r_{1.2})I - P_{1.2} + A]$. The minimum collateral $A_{1.1}^{min}$ that satisfies the condition conditions (2.8.1) would not be able to satisfy condition (2.7.2), i.e., $\Delta p[R - (1+r_{1.1}(A_{1.1}^{min}))I - P_{1.1}(A_{1.1}^{min}) + A_{1.1}^{min}] = B > \Delta p[R - (1+r_{1.2}(A_{1.1}^{min}))I - P_{1.2}(A_{1.1}^{min}) + A_{1.1}^{min}]$. As a result, the minimum collateral $A_{1.2}^{min}$ that satisfies the condition (2.7.2) must be larger than $A_{1.1}^{min}$, so we have $A_{1.1}^{min} < A_{1.2}^{min}$.

be forgone with the licensor's holdup.

- (3) With $A_{1.1}^{max} = \frac{p_H R - I - (1 - p_H)C - \Delta U_{o_{1.1}}(A, \varepsilon)}{(1 - p_H)(1 - \beta)}$ and $A_{1.2}^{max} = \frac{p_H R - I - (1 - p_H)C - \Delta U_{o_{1.2}}(A, \varepsilon)}{(1 - p_H)(1 - \beta)}$, we have $A_{1.1}^{max} = A_{1.2}^{max}$, i.e., **the licensee faces the same maximum collateral requirement for both public licenses and private licenses.**

With the licensor's holdup, the licensee always gets half of the total social surplus. The licensee actually faces the same participation constraint in both cases.⁸¹⁶ So the private licensor's holdup does not affect the licensee's incentive to participate or the maximum collateral constraint.

In summary, under the UNCITRAL rules, all the problems for creating security interests in the case of public licenses **do** also exist for the private licenses. However, with the private licensor's incentive to holdup, the licensee can keep only half of the entire social surplus produced by its own efforts in the investment project. Sharing profits with the licensor lowers the licensee's utility from the investment, and consequently increases the minimum collateral requirement further. In total, the licensor's holdup **further narrows down** the scope of qualified licenses. Under the UNCITRAL rules, the under-investment problem for private licenses is even **more serious** than that we found for public licenses.

5.5.2.2 US Approach: additional Choice 2

While the US rule can solve the problem for public licenses under the UNCITRAL rule, does it also work for private licenses?

Under the additional Choice 2 offered by the US rule, the licensor's consent is still needed for the enforcement of security interest in the license. The negotiation happens at time 2, after the investment has been undertaken. If the private licensor's capability of holdup at the time of enforcement can be restricted, then all the conditions and the licensee's decisions would be the same as the licensees of public licenses (Section 5.5.1.2). The comparison can be illustrated in Figure 5.7 below (just a comparison between Figure 5.6 b with Figure 5.5 b).

⁸¹⁶ Without the licensor's holdup, the licensee's participation constraint is $U_{e_{1.1}}(A) = NPV(A) - \Delta U_{o_{1.1}}(A, \varepsilon) \geq 0$. With the licensor's holdup, the licensee's participation constraint is $U_{e_{1.2}}(A) = \frac{1}{2}[NPV(A) - \Delta U_{o_{1.2}}(A, \varepsilon)] \geq 0$. In essence, the licensor has the same participation constraint in both cases.

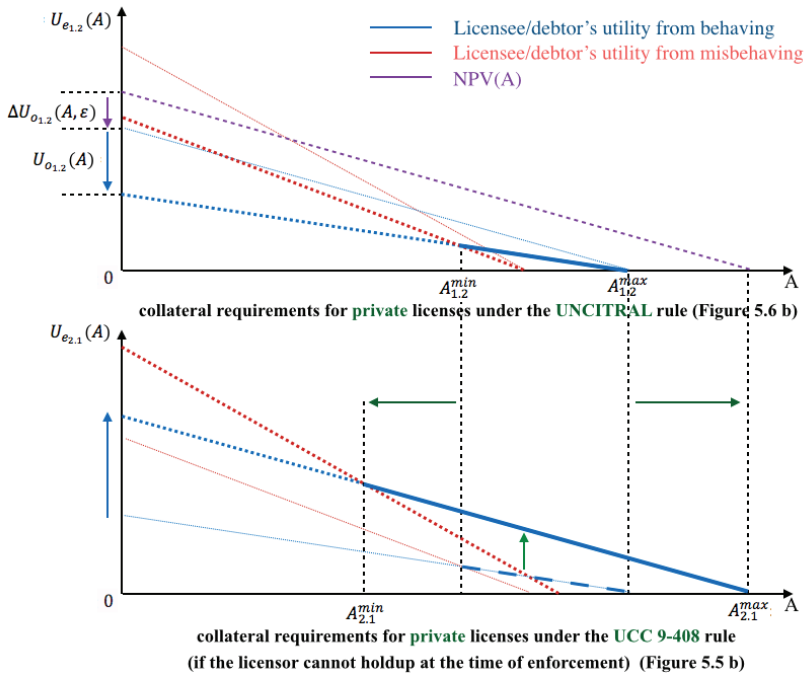


Figure 5.7 If the private licensor's holdup can be restricted under the UCC 9-408

If the private licensor's capability of holdup at the time of enforcement can be restricted, then the UCC 9-408 can greatly increase the licensee's utility from the borrowing and investment and expand the scope of licenses that can be used as collateral. Compared to the improvement shown in Figure 5.5, the legal change can alleviate the underinvestment to a larger extent (since the underinvestment problem is more serious for the private licenses under the UNCITRAL rule).

However, if the licensor's capability of hold-up cannot be restricted, then the UCC 9-408 has just changed the licensor's time of hold-up, from the time of creation (time 1) to the time of enforcement (time 2). By the time of making the negotiation at time 2, the investment has taken place. In this **post-investment negotiation**, as the lender has already lent the money at time 1, the licensor knows that the lender would always prefer to accept any positive payoff rather than nothing, which would occur if the lender refuses. The licensor hence has all the bargaining power, so we have $\lambda_{2,2} = 1$.

With the licensor holds-up at the time of enforcing the security interest in the license, i.e., $i = 1$, the conditions (NC_2) , (3.3), (RC_{1_2}) , (3.5), (IC_{e_2}) , (RC_{e_2}) , (3.7) and

(3.8) can be rewritten as follows,

$$\beta A \geq C \quad (NC_{2.2})$$

$$P_{2.2} = \beta A \quad (3.3.2)$$

$$(1 + r_{2.2})I = \frac{I}{p_H} \quad (RC_{l_{2.2}})$$

$$\Delta p \left[R - \frac{I}{p_H} + A \right] \geq B \quad (3.5.2)$$

$$A \geq A_{2.2}^{min} = \frac{I - p_H(R - B/\Delta p)}{p_H} \quad (IC_{e_{2.2}})$$

$$A \leq A_{2.2}^{max} = \frac{p_H R - I}{1 - p_H} \quad (RC_{e_{2.2}})$$

$$U_{e_{2.2}}(A) = p_H R - I - (1 - p_H)A = NPV(A) - (1 - p_H)(\beta A - C) \quad (3.7.2)$$

$$U_{o_{2.2}}(A) = (1 - p_H)(\beta A - C) \quad (3.8.2)$$

The results show that, for private licenses like the IP license, only when $\beta A \geq C$, the additional Choice 2 under the UCC 9-408 rule is available. Then, the investment opportunity can be funded when the value of the license falls within $A \in \left[\frac{I - p_H(R - B/\Delta p)}{p_H}, \frac{p_H R - I}{1 - p_H} \right]$. The licensee will negotiate with the lender at the time 1 to agree with an interest rate of $(1 + r_{2.2})I = \frac{I}{p_H}$. Then the creditor will offer to pay the licensor a price of $P_{2.2} = \beta A$ at the enforcement (time 2) for the licensor's consent. When the project is funded, the licensee's utility from the borrowing and investment is $U_{e_{2.1}}(\square) = NPV(A) - (1 - p_H)(\beta A - C)$ and the licensor's utility from consenting the licensee to use the license as collateral is $U_{o_{2.1}}(A) = (1 - p_H)(\beta A - C)$. From the social perspective, no social value is wasted in the negotiation for the licensor's consent.

5.5.2.3 Comparison between the two choices

Then the comparison of the results under the two choices can be illustrated in Figure 5.8 as follows.

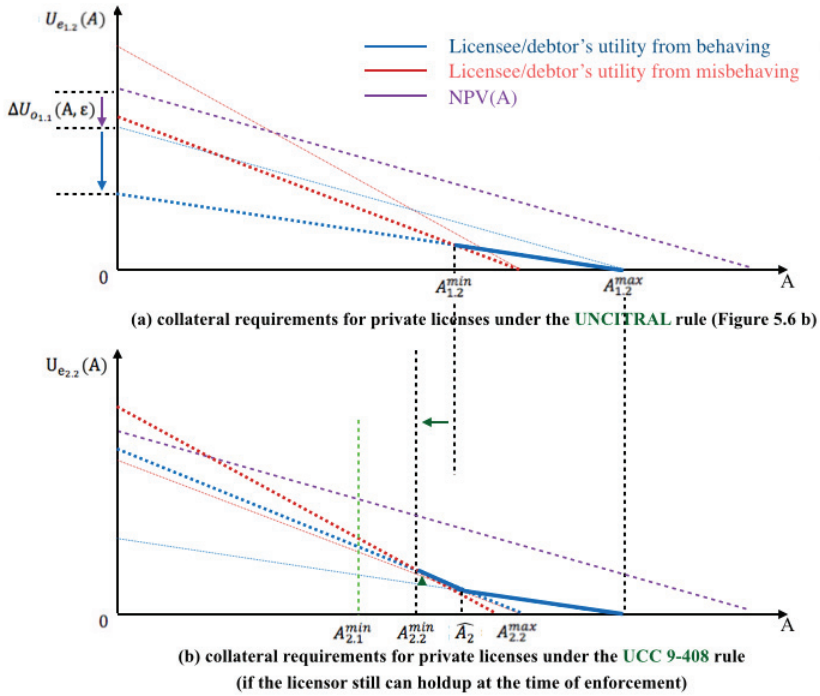


Figure 5.8 Comparison for private licenses under the UNCITRAL rule and the UCC 9-408 rule

(1) With $(1 + r_{1,2})I = \frac{I - (1 - p_H)\beta A}{p_H}$ and $(1 + r_{2,2})I = \frac{I}{p_H}$, we have $(1 + r_{1,2})I < (1 + r_{2,2})I$, i.e., **the license has to pay a higher interest rate to the lender in the case of success under Choice 2.**

The change of holdup time increases the licensor's bargaining power from $\lambda_{1,2} = 1/2$ to $\lambda_{2,2} = 1$. The strong bargaining power allows the licensor to grasp all the residual value of disposing of the encumbered license, i.e., $U_{0,2}^F(A) = \beta A - C$. The licensor's holdup leaves the lender with zero payoff at the enforcement (time 2), $U_{l,2,2}^F(A) = 0$. The competitive lender has to ask for a higher interest rate in the case of success at the time of making the lending decision (time 1), in order to ensure a zero profit on average.

(2) With
$$U_{e_{1.2}}(A) = \frac{1}{2}\{p_H R - I - (1 - p_H)[(1 - \beta)A + C] - \Delta U_{o_{1.2}}(A, \varepsilon)\} = \frac{1}{2}[NPV(A) - \Delta U_{o_{1.2}}(A, \varepsilon)]$$
 and
$$U_{e_{2.2}}(A) = p_H R - I - (1 - p_H)A = NPV(A) - (1 - p_H)(\beta A - C),$$
 Choice 2 gives the licensee a higher utility only for
$$A \leq \widehat{A}_2 = \frac{p_H R - I + (1 - p_H)C + \Delta U_{o_{2.1}}(A, \varepsilon)}{(1 - p_H)(1 + \beta)}.$$

As the private licensor would still holdup at the time of enforcement (with an even stronger bargaining power), Choice 2 does not always give the licensee a higher utility any more. For $A \in (\widehat{A}_2, A_{2.2}^{max}]$, $U_{e_{1.2}}(A) > U_{e_{2.2}}(A)$; so even when Choice 2 is possible, the licensee would still choose Choice 1 (creating a security interest with the licensor's consent at time 1) for a higher utility.

(3) With
$$A_{1.2}^{min} = \frac{I - p_H(R - 2B/\Delta p) + (1 - p_H)C + \Delta U_{o_{1.2}}(A, \varepsilon)}{p_H + (1 - p_H)\beta + 1}$$
 and
$$A_{2.2}^{min} = \frac{I - p_H(R - B/\Delta p)}{p_H},$$
 we have $A_{1.2}^{min} > A_{2.2}^{min}$,⁸¹⁷ i.e., **the licensee faces a lower incentive constrict (minimal collateral requirement) under Choice 2.**

For $A \leq \widehat{A}_2$, Choice 2 gives the licensee greater utility. It increases the benefit of the licensee from behaving, which consequently increases the licensee's incentive to behave. For this reason, less collateral is needed by the lender to control the post-lending moral hazard problem, i.e., $A_{1.2}^{min} > A_{2.2}^{min}$. The licensee therefore faces a lower minimal collateral requirement for getting the loan. The licenses falling within $A \in [A_{2.2}^{min}, A_{1.2}^{min}]$, which were not valuable enough to be used as collateral under Choice 1, would become sufficient under Choice 2.

⁸¹⁷ Similarly, for a simpler way, we can also directly compare the left sides of conditions (2.7.2) and (3.5.2). For the same collateral A , we have $(1 + r_{1.2})I + P_{1.2} - (1 + r_{2.2})I = \frac{p_H R - I - (1 - p_H)[(1 + \beta)A - C] + \Delta U_{o_{2.1}}(A, \varepsilon)}{2p_H}$. With $A \leq \widehat{A}_2 = \frac{p_H R - I + (1 - p_H)C + \Delta U_{o_{2.1}}(A, \varepsilon)}{(1 - p_H)(1 + \beta)}$ (the condition for Choice 2 brings a higher utility to the licensee/debtor), we have $(1 + r_{1.2})I + P_{1.2} - (1 + r_{2.2})I > 0$, i.e., $(1 + r_{1.2})I + P_{1.2} > (1 + r_{2.2})I$. Then $\Delta p[R - (1 + r_{1.2}(A_{1.2}^{min}))I - P_{1.2}(A_{1.2}^{min}) + A_{1.2}^{min}] = B < \Delta p[R - (1 + r_{2.2}(A_{1.2}^{min}))I + A_{1.2}^{min}]$, which means that the minimum collateral $A_{1.2}^{min}$ that satisfies the conditions (2.7.2) would be more than enough to satisfy condition (3.5.2). So, the minimum collateral $A_{2.2}^{min}$ that satisfies the condition (3.5.2) must be smaller, i.e., $A_{1.2}^{min} > A_{2.2}^{min}$.

But with $A_{2.1}^{min} = \frac{I-p_H(R-B/\Delta p)+(1-p_H)C}{(1-p_H)\beta+p_H}$, we can see that $A_{2.1}^{min} < A_{2.2}^{min}$,⁸¹⁸ i.e.,

the expansion of minimal collateral requirement is less than for public licenses.

(4) In the end, **the US rule improves the UNCITRAL rule to a very limited extent.**

Only for $A \in [A_{2.2}^{min}, \widehat{A}_2]$ and with $\beta A \geq C$ (the negotiation condition for Choice 2), Choice 2 is preferred. When Choice 2 is chosen, it can lower the minimal collateral requirement and increase the licensee's utility (but the improvement is less than that for public licenses).

For all the other cases, if Choice 1 is available, the licensee would still choose Choice 1 for the same utility and subject to the same constraints as under the UNCITRAL rule (Section 5.5.2.1).

In summary, in the case of private licenses, only if the licensor's capability of holdup at the time of enforcement **can** be restricted, then the UCC 9-408 can greatly alleviate the under-investment problem under the UNCITRAL rule (Figure 5.7). Otherwise, the UCC 9-408 just changes the licensor's time of holdup, from the time of creation of security interest in the IP license (prior to the investment) to the time of enforcement (after the investment has been made and has failed). And holdup at the time of enforcement actually gives the licensor a greater bargaining power. In the end, the advantages of the UCC 9-408 are limited (Figure 5.8). The under-investment problems we found under the UNCITRAL rule for private licenses (Section 5.5.2.1) still exist in most of the cases.

5.5.3 Implications and Limitations

The restrictive clauses are inserted in the license agreement with the purpose of protecting the licensor against the potential detrimental effects of the security interests in an IP license. Clearly, the US law has noticed the under-investment problem under

⁸¹⁸ We can directly compare the left sides of conditions (3.5.1) and (3.5.2). With $(1+r_{2.1})I = \frac{I-(1-p_H)(\beta A-C)}{p_H}$ and $(1+r_{2.2})I = \frac{I}{p_H}$, for the same collateral A, we have $(1+r_{2.1})I < (1+r_{2.2})I$. It means we always have $\Delta p[R - (1+r_{2.1})I + A] > \Delta p[R - (1+r_{2.2})I + A]$. The minimum collateral $A_{2.1}^{min}$ that satisfies the condition conditions (3.5.1) would not be able to satisfy condition (3.5.2), i.e., $\Delta p[R - (1+r_{2.1}(A_{2.1}^{min}))I + A_{2.1}^{min}] = B > \Delta p[R - (1+r_{1.2}(A_{2.1}^{min}))I + A_{2.1}^{min}]$. As a result, the minimum collateral $A_{2.2}^{min}$ that satisfies the condition (3.5.2) must be larger, i.e., $A_{2.1}^{min} < A_{2.2}^{min}$.

the UNCITRAL rule and tries to alleviate the problem. It includes the UCC 9-408 to provide the licensee-borrower and the lender with an additional choice of getting the licensor's consent only at the time of enforcement.

The simple model analysis reveals that, in the case of public licenses like the FCC broadcast license, as the public licensor has no incentive to holdup, the real reason behind the under-investment problem under the UNCITRAL rule is the social deadweight loss caused by the **risk-sharing with the licensor**. A licensor's consent at the time of creating a security interest in licenses is associated with risk. Having a risk-neutral IP licensee-borrower share risk with a risk-averse licensor gives rise to social deadweight loss, which would be eventually undertaken by the licensee/debtor and negatively affects the licensee/debtor's incentive and participation constraints (minimum and maximum collateral requirements).

For the public licenses, the legal change in the UCC 9-408 works well, because the additional choice postpones the negotiation to the time of enforcement, at which time the licensor does not take any risk in its decision, because by the time the default has happened and the disposition would certainly happen if the licensor consents. The change in the time of negotiation allows the licensee to avoid the social deadweight loss in the risk-sharing (subject to the negotiation condition, i.e., the disposition value is larger than the third-party cost). Avoiding the social deadweight loss enables the licensee to internalize the entire social surplus created by its efforts in the investment. The full internalization increases the licensee's utility from the investment and consequently lowers the licensee's incentive to misbehave. In the end, such a change lowers the collateral requirements. More licenses can be qualified to support welfare-enhancing investments.

In the case of private licenses, the under-investment problem under the UNCITRAL rule is more serious, caused not only by the social deadweight loss in the risk-sharing with the licensor, but also by the private licensor's holdup during the negotiation. Unconditionally enforcing the restrictive terms as under the UNCITRAL approach allows the licensor to holdup at the negotiation for the consent to the creation of security interests in licenses, in order to drag profits from the licensee. On top of bearing the social deadweight loss in the risk-sharing, the licensee also has to share the profits from the investment with the licensor. The **profit-sharing** further reduces the licensee's utility from its efforts in the investment and consequently raises the minimum collateral requirement even more.

The additional choice of negotiating at the time of enforcement provided by the UCC 9-408 can greatly alleviate the under-investment **only if** it is possible to impose restrictions on the private licensor's ability of holdup at the time of enforcement. Otherwise, then compared to the UNCITRAL rule, the UCC 9-408 just changes the licensor's holdup time, from the time of creation to the time of enforcement. In the latter time, the licensor would actually have even stronger bargaining power to holdup. In the end, the underinvestment problem identified under the UNCITRAL rule for private licenses still exists in the most cases. The UCC 9-408 can improve the UNCITRAL's rule to a very limited extent.

However, restricting the private licensor's ability of holdup at the time of enforcement means that the licensor can be fully compensated with the third-party cost C but cannot ask for any more than that. In essence, imposing this restriction is the equivalent of initially assigning the "property right to use licensee's rights under the IP license as collateral" to the licensee and employing a *semi* "damage/liability rule" to require the licensee/lender to compensate for the third-party cost imposed on the licensor in the disposition sale of the encumbered license (note: the difference is that, under the UCC 9-408, the compensation has to happen prior to the enforcement/damage, not after the damage has happened as in an actual damage rule).⁸¹⁹ Applying the semi damage rule basically implies that as long as the licensee or the lender can compensate the licensor for the third-party cost in the disposition sale, the licensor cannot reject at all and has to consent to the enforcement. The effect would be the same as forcing the licensor to give a compulsory license to the assignee that gets the license in the disposition sale, as long as the licensor does not suffer any harm. In other words, the licensor only has the right to seek monetary compensation for damages but no more than that.

Imposing the semi "damage rule" to the case of IP licenses would be extremely difficult, because it is against the basic principle of IP laws. One of the basic principles of the IP laws is that IP laws generally do not intervene with the licensor's decision on granting rights of use to whom and to what extent at all. IP laws do not prevent the licensors from exploiting their legitimate exclusivity and monopoly status to ask for a higher price for profits, which are designed to incentivize the licensors to innovate. The US comes down very hard on any country that attempts to use a

⁸¹⁹ Similar to "Rule 2" in Guido Calabresi and A Douglas Melamed, "Property Rules, Liability Rules, and Inalienability: One View of the Cathedral," *Harvard Law Review* 85, no. 6 (1972): 1089–1128. See also *infra* note 825.

compulsory license, even for life saving generic medicines.⁸²⁰ With this basic principle, licensors are free to ask for a higher price to get profits, instead of just asking for compensation to cover the cost. For this reason, no matter whether in theory or in practice, proposing the semi damage rule would be extremely difficult or impossible.

The model analysis in this chapter has intentionally adopted some simplified assumptions, which may be unrealistic but not necessarily to be simplistic. These simplified assumptions allow our analysis to isolate a particular phenomenon and to focus on identifying the specific problems that we are aiming to address in each of the different real-world legal rules. Nevertheless, the factors that are excluded from the model may impose some limitations as to the application of the analysis results.

First, this model focuses on the post-lending moral hazard problem only, without taking into account the pre-lending adverse selection problem (See Section 2.4). It takes into account the information problem as to the licensee/debtor's efforts in the project after getting the loan. It is assumed that there is no information asymmetry as to the project and the collateral beforehand. The features of the project (probability of success, with or without effort, the revenue of success), the licensee's valuation of the license, the disposition value of the license (the licensor's valuation of the license) and the potential third-party cost for the licensor are assumed to be known (or can be correctly estimated) at the time of creating or enforcing the security interests in license. So, it is not clear how the different rules would change the parties' incentives in revealing and hiding information. (Note: although it is also assumed that there is no transaction cost in the negotiation, it is easy to show that taking into account of transaction cost would make UCC 9-408 even more preferred, because, as more information would be available as the time passes, negotiation cost at the time of enforcement would be lower than at the time of creation).

Second, this post-lending moral hazard model focuses on the licensee/debtor's

⁸²⁰ See Stiglitz (2008) "Economic Foundations of Intellectual Property Rights," *supra* note 37 at 1717. However, since *eBay v Merck Exchange*, 547 U.S. 388 (2006), ended the US Federal Circuit's practice of automatically granting permanent injunctions for patent infringement, it has been expected by some scholar that the courts might have been given more discretion to consider patent use and the public interest when ruling on permanent injunctions. The patentees' (at least for non-practicing patentees) capacity of unreasonable holdup is reduced. It is expected that that federal courts are more likely to award "moderately compulsory licenses" for "non-practicing patentees". The "approximate royalties" under the moderately licenses are potentially lower than that which might have been negotiated had the court issued an injunction. See Venkatesan (2009), "Compulsory Licensing of Nonpracticing Patentees After *eBay v. MercExchange*," *supra* note 45.

commitment on efforts only. In a post-lending relationship, a debtor may face more moral hazard problems, such as reacting to changed risk, newly appeared investment opportunities or new information. This model cannot test how the licensee would react to newly revealed risks or other opportunities under different legal rules.

Third, for analytic simplicity and for focusing on the effects of legal rules on the negotiation, it is implicitly assumed in this model that the royalty scheme is in the form of a fixed fee paid all by once at the beginning; so the lending decision does not affect the original licensor's capability to collect license payments, and we only need to consider the additional cost bought by the foreclosure disposition to the licensor. However, there are also some other schemes, such as royalties or down payment plus a running royalty, which are actually used more commonly in practice.⁸²¹ Brennan (2001) argues that allowing a licensee freely to use its right to sub-license or right to exploitation as collateral may adversely affect the original licensor's capability to collect royalties, because it may make the royalties payable to licensors junior to some security interests created by the licensee.⁸²² This study has not examined this legal issue to see if this argument stands. Whether the change of royalty schemes would change the analysis results or not is unclear.

Fourth, at this stage, we haven't collected any empirical evidence to test whether the model accurately predicts behavior in reality. The empirical study is left for further study to explore.

Taking into account all these factors and clearing out these questions requires further legal analysis and more sophisticated model setting. A complete answer to these questions is beyond the scope of the chapter and is the subject of continuing research, but this study provides an analytical framework to start from. This study reminds us of the need for more formal analysis to see how the law can affect the negotiation and what law and economics analysis can contribute.

5.6 Conclusion

This study is the first attempt to try to use the formal law and economics analysis

⁸²¹ See Nalin Kulatilaka and Lihui Lin, "Impact of Licensing on Investment and Financing of Technology Development," *Management Science* 52, no. 12 (2006): 1824 – 1837 (showing that firms' investment and licensing strategies depend critically on the firms' financial constraints and the expected market conditions).

⁸²² Brennan (2001) "Financing Intellectual Property under Revised Article 9: National and International Conflicts (Electronic Version)," *supra note* 302 at 397-413.

approach to examine the problem of enforcing contractual restrictions in the case of secured transaction, especially for the licensee's use of its rights under IP license as collateral. It adopts a simple debt finance moral hazard model to examine the collateral's disciplinary role in the secured transaction. This model provides an analytical framework to examine how different legal rules could change the negotiation time, have an impact on the different parties' bargaining powers at the negotiation, and eventually on the collateral requirement and investment decision. The comparative analysis shows that the under-investment problem comes from sharing risks and profits with the licensor for the licensor's consent. Although the UCC 9-408 is designed to enhance the ability of licensees to obtain credit, this study reveals that it works well in the case of public licenses like the FCC broadcast license where the public licensors have no incentive to holdup, but it does not improve much in the case of private licenses like the IP licenses where the private licensor has an incentive to holdup. The UCC 9-408 just changes the IP licensor's time of holdup. The under-investment problem under the UNCITRAL rule still exists in the most cases. At this stage, this analysis just reveals the problems caused by the licensor's holdup under the UNCITRAL rule and the UCC-9 rule. However, because of the compelling countervailing reasons for the inability to restrict the IP licensors' right to hold-up in the IP law, this chapter cannot provide a first-best solution.⁸²³ The solution might be proposed with further studies.

The results found in this analysis restate one main point that the whole thesis tries to reach, i.e., we cannot simply copy the rules that work well for ordinary assets to the context of IP. The rules for IP collateralization should take into account the characteristics of the legal system for IP.

In addition, this model analysis also has an interesting finding related to the eminent *Coase Theorem*, which holds that, where market transaction costs are zero and costless bargaining is possible (including perfect information), the law's initial assignments of property rights and liability of external harms is irrelevant to efficiency, because voluntary negotiations and bargains between the parties will rectify any initial assignment and move the property rights to hands that value it the most in the end.⁸²⁴ However, our analysis shows that, this theorem may work in an isolated transaction between two parties. In our model with three parties (namely, the

⁸²³ This study has not examined the other alternative legal Rules dealing with damages mentioned in *infra note* 825. The whole modeling should be accordingly changed to test the other rules. The further examination might be conducted in future studies.

⁸²⁴ See the literature on Coase Theorem in *supra note* 14.

licensor, the licensee and the lender) and a chain of transactions, even with zero transaction costs (as assumed in our model setting), the initial assignments of property rights and liability of external harms actually do matter.

The *UNCITRAL* rule is actually the equivalent of initially assigning “the property right to use licensee’s rights under the IP license as collateral” to the licensor and giving the licensor the right to impose self-injunction (injunction/property rule).⁸²⁵ So a licensor’s consent must be required for the licensee’s use of its rights under the IP license as collateral. We have shown that, even without transaction cost, the licensor’s holdup at the negotiation for consent (between the licensor and the licensee) can actually change the licensee’s incentive in the following borrowing decision (between the licensee and the lender), and consequently have an impact on the social efficient level. By contrast, the UCC 9-408 is actually similar (not equivalent) to initially allocating the “property right of using the license as collateral” to the licensee and the licensor is awarded with the right to require the licensee/lender to compensate for the cost imposed on the licensor (damages/liability rule) (note: the difference is that, under the UCC 9-408, the compensation has to happen prior to the enforcement/damage, not after the damage has happened as in an actual damage rule). And we also show that, this change from the injunction/property rule to the “semi” damages/liability rule can improve the efficiency level of the following borrowing decision, especially in the case of public licenses like the FCC license (for IP license,

⁸²⁵ Guido Calabresi and A Douglas Melamed, “Property Rules, Liability Rules, and Inalienability: One View of the Cathedral,” *Harvard Law Review* 85, no. 6 (1972): 1089–1128 (expliciting 4 rules. “Rule 1 (the injunction/property rule)”, namely, initially assigning the property right to the victim and allows the victim to issue an injunction against the injurer; and the injurer has to pay the victim to get the right/permission to damages. “Rule 2 (damages/liability rule)”, namely, initially assigning the property right to the victim and allows the injurer to harm but the injurer has to compensate the victim for the damages; the injurer is given only with the right to be awarded damages. “Rule 3”, namely, initially assigning the right to harm to the injurer and give the victim with no right to be awarded with damages. “Rule 4”, namely, initially assigning the right to harm to the injurer and then the victim has to pay the injurer the compensation in order to enjoin the injurer from taking further damage). See further discussion on the four rules in Michael I. Krauss, “Property Rules vs. Liability Rules,” in *Encyclopedia of Law and Economics, Volume II. Civil Law and Economic*, ed. Boudewijn Bouckaert and Gerrit De Geest (Cheltenham: Edward Elgar, 2000), 782–794. James E. Krier and Stewart J. Schwab, “Property Rules and Liability Rules: The Cathedral in Another Light,” *New York University Law Review* 70, no. 2 (1995): 440–483 (proposing a “Rule 5”, namely, when it is difficult to obtain and process information in order to assess damages, there should be a “best-chooser principle”, i.e., when liability rules are used, the party who is the best chooser should be confronted with the decision whether or not to force a sale upon the other party). In our setting, the *UNCITRAL* rule is the equivalent of initially assigning the “the property right to use licensee’s rights under the IP license as collateral” to the licensor (the victim) and the licensee (the injurer) has to negotiate with and pay for the licensor to get the right/permission to enjoy the right to use licensee’s rights under the IP license as collateral.

this semi damages rule solution cannot be employed in reality because of the reluctance from the IP laws).

In other words, we have shown that, from the social perspective, the initial entitlement does matter when we consider the fact that the social activities are a chain of different decisions. The initial entitlement can affect the ex post distribution of social surplus in the first transaction, which can subsequently change the negotiations in the following transactions and eventually have an impact on the total efficiency level, even when parties can costless bargain around legal rules. This study might shed some light for further studies to examine the validation of the *Coase Theorem* in the case with involvement of a chain of decisions among more than two parties.

Chapter 6 Conclusions

6.1 Summary of the Main Findings

When the idea of promoting the use of IP as collateral in debt finance as a solution to the R&D external finance problem comes into mind, the most natural concerns and practical difficulties are about the commercial and legal risks, and the resulting high transaction costs. With the overall purpose of exploring the main research question, i.e., “what is the preferred legal framework to optimize the use of IP as collateral in debt finance, in order to solve the problems in funding R&D activities and to foster innovation?”, this dissertation adopts a law and economics analysis into an in-depth examination on the impacts of these risks and transaction costs from different aspects.

It starts from examining an unexplored question in the existing literature, i.e., why should we advocate IP collateralization in the first place? The literature review reveals that the main reasons for the difficulty of SMEs in funding their R&D activities are the informational asymmetries in the funding relationships, which generally exist in all kinds of external finance, but are amplified in the case of funding R&D investments by the high degree of uncertainty regarding the outputs of R&D projects and by the difficulty in exchanging information between innovators and external investors. The amplified informational asymmetries cause a serious adverse selection problem in the *ex ante* funding relationship and a moral hazard problem in the *ex post* funding relationship. The two problems together greatly increase the cost of external finance, especially for young high-tech SMEs. Compared with other financing alternatives for new high-tech SMEs, such as angel finance and venture capital, debt finance has the advantage of being with a much greater credit supply market, without ownership dilution, and more suitable for technology-intensive firms with medium-growth & medium-risk R&D projects, especially in the countries with deeply rooted bank-based financial systems.

The other literature and efforts consider the repayment function of collateral only and try to find ways to make IP have the same characteristics as ordinary tangible assets. They are therefore mostly concerned about the difficulty in accurately evaluating IP and about the uncertainty in the liquidation value of IP caused by the limited redeployability of IP at the forced-disposition. However, our literature review reveals that the real difficulty in enhancing the market confidence in IP is from the wrong “perceived” risks. The market intervention shall be established on correct

understanding of the real social benefits of promoting IP collateralization. Therefore, this dissertation goes back to the basic economic theories of security interests and re-examines the roles of collateral in secured transactions. The re-examination reveals that the real reasons making secured transactions socially beneficial are, not the repayment function of collateral (which is actually costly), but the signalling role of collateral in solving the pre-lending adverse selection problem, and its self-disciplinary role in solving the post-lending moral hazard problem.

In this regard, some characteristics of IP actually make it good collateral. First, IP is highly informative about the quality, potential and confidence of the borrowers, more costly for low-quality borrowers to provide, and can be easily observed and verified by the potential lenders. Therefore providing IP as collateral is sending an effective *good-quality signal* to reduce the ex ante information asymmetries and helps financial institutions select borrowers with better R&D projects, higher technological management capability as well as greater commitment to perform. Second, the uncertainty in the liquidation value of IP and its limited redeployability at the forced-disposition result in a large difference in the valuation of the encumbered IP between the borrower and the lender. The large valuation difference actually makes IP a good collateral (or more like a hostage), because it can play a substantial self-disciplinary role to ensure the borrower's voluntary compliance with the terms of the loan contract and also removes the lender's incentive for initiating inefficient liquidation. The better selection and alignment of incentives together can lower the overall risk of defaulting in the first place, reduce information cost and monitoring cost, and eventually help debtors get more *advantageous* terms. More welfare-enhancing transactions would be financed with the lower cost of debt finance.

By looking into the advantages brought by some special characteristics of IP, instead of just focusing on trying to treat IP as if they are ordinary tangible assets, our exploration gives better explanations to some phenomena in practice, such as why some lenders would like to accept some IP which are only valuable for the debtors as collateral and why some lenders care about IP, especially the crucial IP, even more than other tangible assets of the debtors. It also offers new insights on the collateral selection criteria for IP, and provides plausible reasons to advocate and promote IP collateralization.

Then, this dissertation moves on to discuss how we should design surrounding laws to support IP collateralization. By discussing some main conflicts in the legal rules for IP collateralization, it establishes a conceptual assessment framework. The assessment

criteria allow us to have a comprehensive and detailed comparative study of the general legal frameworks for IP in China, the US, and under the UNCITRAL Supplement. This might be the first study having a comprehensive critical discussion on the legal framework for IP collateralization in China.

Apart from these detailed suggestions on specific issues for China (in Section 4.6), the comparative study has three main findings.

First, the legal framework of IP collateralization directly determines the legal certainty of the transaction result, contracting time, and the incentives of relevant parties, which would be reflected as the transaction costs. In China, the great legal uncertainties come from incoordination among fragmented legal documents and the lack of a unitary guidance. As a result, in order to reduce the transaction cost brought by legal uncertainties, the first structural reform on the general legal framework in China should be to reduce the fragmentation with a unitary legal framework for IP collateralization and making rules more compatible and coherent with each other.

Second, the legal framework of IP collateralization also helps in controlling the commercial risks. There are two ways of risk control, i.e., pre-control and post-control. Both of the *UNCITRAL's Supplement* and the UCC-9 of the US have chosen the post-control mechanism. They do not interfere with the parties' autonomy on negotiating over contract terms but offer cost-efficient registry schemes and establish a group of sophisticated rules for the priority order and enforcement remedies, to ensure that security interests can function effectively as a kind of "backup mechanism" upon the debtor's default. By contrast, the Chinese legal regime has chosen the pre-control mechanism. With the fundamental mistrust of the risk management capabilities of transacting parties and a strong paternalistic bias, the Chinese law establishes an overly troublesome and prohibitive legal framework for IP collateralization. The highly restricted scope of IP eligible for being used as collateral, the abundant statutory restrictions on the autonomy of parties over the terms of the pledge contract and the burdensome document-based registry scheme with substantial scrutiny, may reduce some risks of fraud, but at the disproportionate expense of wasting the great wealth inherent in IP. The risks can be reduced in other much cheaper and less wasteful ways as well. Meanwhile, Chinese law does not pay attention to post-control at all. The vague rules on priority and enforcement remedies do not provide sufficient protection to all parties. The wrong way of risk control heavily increases the transaction cost and results in the obvious under-utilization of IP collateralization in China.

Third, this comparative study also shows that the *Supplement's* way of simply prioritizing IP law may not be the solution to the conflicts in IP law and secured transaction law. This comparative study provides an opportunity to examine the possible effects of the *Supplement* on IP collateralization in a national context. It shows that the general security laws in China and the US, namely, the *Property Law* and the *UCC-9*, are actually quite consistent with the recommendations given in the *UNCITRAL's Guide* (and the *Supplement*) on secured transaction law in almost all aspects. However, most of the problems identified above in China actually come from the IP-specific rules. Although the *Supplement* helps us to identify the problems in the current Chinese law, it cannot give many recommendations that can be directly used to make the legal changes, because it avoids a deeper exploration into IP laws. This finding shows that, while most legal efforts are on adapting the secured transaction law in order to encompass the needs for IP collateralization or other financial exploitations of IP, more effort needs to be done in IP laws to facilitate IP collateralization well.

Therefore, the last part of this dissertation looks into a more specific issue to demonstrate the need for more efforts in IP law. This study is the first attempt employing a formal economic analysis of law to examine the problems of enforcing contractual restrictions on assignability in the case of secured transaction, especially for the licensee's use of its rights under IP license as collateral. The employment of a simple debt finance moral hazard model provides an analytical framework to examine how different legal rules could change the negotiation time, have an impact on the different parties' bargaining powers at the negotiation, and eventually on the collateral requirement and investment decision.

These contractual restrictions on assignability in IP licenses give a licensor the final power to consent or block licensee's investment decision, in order to protect the licensor from enduring the potentially detrimental effects of the licensee's use of rights in the license as collateral. The IP laws and the secured transaction legal regime reflect very different perspectives on these contractual restrictions. The *UNCITRAL's* approach simply prioritizes the objective of IP law, by unconditionally enforcing the contractual restrictions in IP license, in order to ensure the licensor's full control over the license. Our formal analysis shows that this approach makes the borrower's investment totally conditional on the licensor's consent, in which case the licensor's risk-preference and incentive to holdup make the borrower unable to fully internalize all profits from the investment, so there is an under-investment problem. The *UCC*

9-408 approach tries to balance the objectives of secured transaction law and IP law, by invalidating the contractual restrictions at the time of creation but still keeping them valid at the time of enforcement upon the debtor's default. Our formal analysis shows that the change of negotiation time from the time of creation to the time of enforcement can solve the problem brought by the licensor's risk-preference at the time of creation. The approach therefore works well in the case of public licenses like the FCC broadcast license where the public licensors have no incentive to holdup, but it does not improve much in the case of private licenses like the IP licenses where the private licensors have an incentive to holdup. As the UCC 9-408 just changes the IP licensor's time of holdup without restricting the licensor's power to holdup at the time of enforcement, the under-investment still exists.

For the compelling countervailing reasons for inability in restricting the IP licensors' right to holdup in the IP law, this study does not provide a first-best solution for the under-investment problem but it is an excellent example demonstrating the problems of simply prioritizing the objectives of IP law.

6.2 Main Policy Implications

This dissertation has shown what a law and economics analysis can contribute in discussing practical issues, from reviewing economic rationales underlying secured transaction law and IP law to provide plausible explanations for justifying legal or policy supports, to setting evaluation criteria to examine the effectiveness of the general legal framework, and then to adopting a formal debt finance model to make comparative analysis on the impacts of different legal rules upon a specific legal issue. Law and economics analysis can help us to have better understand the conflicts between IP law and secured transaction law. The dissertation derives some main policy implications as follows.

First, in the efforts promoting IP collateralization, policy makers or legislators should advocate the advantages brought by some special characteristics of IP. They shall emphasize how the signaling role of IP in the ex ante selection process and the disciplinary role of IP in the ex post lending relationship can help the lenders to reduce the overall default probability in the first place. These efforts may give lenders more incentive to accept IP as collateral and help to expand their selection criteria for IP.

Second, China needs a structural reform on the legal framework for IP collateralization. It should reduce the fragmentation among different legal documents and make rules more compatible and coherent with each other in order to reduce the transaction cost brought by legal uncertainties. The policy makers and legislators should correct their paternalistic bias and mistrust on the risk management capabilities of market practitioners. They should transform the overly troublesome and prohibitive pre-control system into a more sophisticated post-control system. There is an urgent need to extend the scope of IP eligible for collateralization beyond ownership, to remove these legal prohibitions on the creation of security interests in future IP, to provide the contracting parties with greater autonomy in negotiating contract terms, to allow parties to make appropriate identifiable description of the IP to be encumbered and negotiate over matters like multi-pledge or re-pledge, to make it possible to use future IP as collateral, to encourage parties to make proper arrangements on subsequent exploitation of encumbered IP during the loan term, to establish a unitary general security interests registry and to largely simplify the registry scheme. After having removed all these obstructive prohibitions, the Chinese law also calls for the introduction of more sophisticated priority rules and effective enforcement remedies in order to provide lenders with sufficient protections and to reduce uncertainties.

Third, the coordination of the secured transaction law and IP law is much more complicated than solving the superficial practical difficulties or clarifying inconsistencies in the text. The comparative analysis on the enforceability of contractual restrictions on assignability in IP licenses shows the impacts of different legal rules on the licensee's funding capability and investment decisions. The divergence in the economic objectives and rationales under the two different legal protection systems and different ways of exploitation determine the need for a more specific law and economic analysis into the consequences of legal rules for the interests of the parties involved and all others who benefit from the creation and dissemination of IP.

6.3 Limits and Future Research

The efforts in the dissertation focus more on exploring the problems rather than giving specific solutions. For instance, Chapter 2 suggests emphasizing the signaling and disciplinary roles of IP in debt finance, but without proposing how exactly to do them. Similarly, in Chapter 4, the dissertation identifies problems in Chinese rules, but could not provide more direct and specific solutions, because further study is still

needed to determine the best solution, exactly as Chapter 5 has done. However, even in Chapter 5, by examining and comparing the different solutions, we identified the reasons causing the problems, but we could not propose the first-best solutions. Clarifying these problems to give clear and specific solutions requires further legal analysis and more sophisticated model setting.

The whole dissertation is based on literature reviews and theoretical analysis. It is necessary to have further empirical study to test whether the theoretical discussions accurately reflect and predict market behavior in reality. For example, we need to test if the market would have positive reactions to the suggestions proposed in Chapter 2 on emphasizing the signaling and disciplinary roles of IP in debt finance. Similarly, the preliminary model used in Chapter 5 has intentionally adopted some simplified assumptions, which allow us to provide new insights into the examination of legal issues. The factors that are excluded from the model may impose some limitations as to the application of the analysis results. Further empirical study is still needed to test the validity of the propositions discussed in Chapter 5 in reality.

For future studies, there are several final remarks which this dissertation is trying to address on finding suitable legal rules and policies for facilitating IP collateralization as an alternative solution to the R&D external finance problem. First, we should not try to assume that IP has the same characteristics as ordinary assets nor simply assume that the legal rules working well for ordinary assets would also work for IP. We should take into account the possible effects of IP's special characteristics on the fundamental theories of secured transactions law, and maybe even on property law and contract law. Second, simply prioritizing the objectives of IP law may not be the best solution to solve the conflicts between IP law and secured transaction law. Maybe we should also re-examine the boundaries of IP protection⁸²⁶ and rethink if the current legal regime for IP is still suitable for more advanced exploitation of all the potential social and economic value in IP.

⁸²⁶ See similar discussion in Rochelle Cooper Dreyfuss, Diane Leenheer Zimmerman, and Harry First, eds., *Expanding the Boundaries of Intellectual Property: Innovation Policy for the Knowledge Society* (Oxford University Press, 2001) (questioning how much control innovators should be given over their works).

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English Summary

When the idea of promoting the use of IP as collateral in debt finance as a solution to the R&D external finance problem comes into mind, the most intuitive concerns and practical difficulties are about the commercial and legal risks, and the resulting high transaction costs. With the overall purpose of exploring the main research question, i.e., “what is the preferred legal framework to optimize the use of IP as collateral in debt finance, in order to solve the problems in funding R&D activities and to foster innovation?”, this dissertation adopts a law and economic analysis into the in-depth examination on the impacts of these risks and transaction costs from different aspects.

Firstly, for further exploring the economic reasons for promoting IP collateralization, it goes back to the basic theories of debt finance and recalls the role of collateral in solving the informational asymmetry problems between debtors and creditors. It shows that some characteristics of IP actually make them good collateral. The signaling role of IP in the ex ante selection process and the disciplinary role of IP in the ex post lending relationship can help the lenders to reduce the overall default probability in the first place. This finding offers new insights concerning the collateral selection criteria for IP, and provides plausible reasons to advocate further research on IP collateralization.

Then, this dissertation moves on discussing how we should design surrounding laws to support IP collateralization. It re-examines the main law and economic theories regarding secured transaction law in the context of IP collateralization, and shows how the legal framework governing IP collateralization directly determines the transaction costs, contracting time, certainty of the transaction result and the incentives of relevant parties. By discussing some potential conflicts in the legal rules for IP collateralization, it establishes a conceptual assessment framework. The assessment criteria allow us to have a comparative study on the general legal frameworks for IP in China, the US, and the international efforts done by the UNCITRAL. The comparative examination shows the difficulties in coordinating secured law and IP law and sheds light on our understanding of how to build up an efficient legal regime for IP collateralization, especially for China. This might be the first study having a comprehensive critical discussion on the legal framework for IP collateralization in China.

After the discussion of the general legal framework, the dissertation addresses a specific legal issue in practice to illustrate and further explore the divergences

between IP law and secured transaction law. It looks into the enforceability of anti-assignment or anti-attachment clauses in the IP licenses in the case of IP collateralization. It is an excellent way of illustrating why the divergence in the economic objectives and rationales under the two different legal protection systems and different ways of exploitation determine the need for a more specific law and economic analysis into the consequences of legal rules. The comparative analysis shows how different legal rules can change the time of negotiation and the bargaining powers among parties, consequently change the equilibrium of the lending decision, and eventually have impacts on investment decisions. It demonstrates why we cannot simply assume that the legal rules working well for ordinary assets would also work for IP, and why simply prioritizing the objectives of IP law may not be the best solution to solve the conflicts between IP law and secured transaction law.

The study calls for a re-examination on the boundaries of IP protection and an evaluation about whether the current legal regime for IP is still suitable for more advanced exploitations of all potential social and economic value in IP.

Nederlandse samenvatting

Het idee om het gebruik van IE (Intellectuele Eigendom) als zekerheid in de schuldfinanciering te stimuleren als oplossing voor de problemen rond externe financiering van R&D leidt tot verscheidene vragen. De meest voor de hand liggende vragen en praktische problemen hebben betrekking op de daaraan verbonden economische en juridische risico's en de daaruit voortvloeiende hoge transactiekosten. Dit proefschrift poogt de volgende algemene onderzoeksvraag te beantwoorden: wat is het meest aangewezen juridische kader voor een optimaal gebruik van IE als zekerheid bij schuldfinanciering, om de problemen rond de financiering van R&D-activiteiten op te lossen en innovatie te stimuleren? Daartoe wordt in dit proefschrift een juridische en economische analyse uitgevoerd naar de gevolgen van deze risico's en transactiekosten vanuit verschillende gezichtspunten.

Ten eerste kijken we naar de basistheorieën van schuldfinanciering en de rol van zekerheden bij het oplossen van de problemen rond de informatieasymmetrie tussen debiteuren en crediteuren. Dit kan mogelijkheden blootleggen om het gebruik van IE als zekerheid verder te stimuleren. Hierbij wordt duidelijk dat IE door bepaalde eigenschappen zeer geschikt is voor gebruik als zekerheid. De signalerende rol van IE in het ex-ante selectieproces en de disciplinerende rol van IE in de ex-post kredietrelatie kan de financiers allereerst helpen het risico van wanbetaling te beperken. Deze bevinding biedt nieuwe inzichten voor wat betreft de selectiecriteria voor IE als zekerheid en het biedt goede redenen om verder onderzoek te doen naar het gebruik van IE als zekerheid.

Vervolgens wordt in dit proefschrift besproken hoe de wetgeving moet worden ingericht ter ondersteuning van IE-securitisatie. De belangrijkste wetgeving en de economische theorieën met betrekking tot de IE-securitisatie worden onderzocht. Daarbij kan worden vastgesteld hoe het juridische kader van IE-securitisatie rechtstreeks bepalend is voor de transactiekosten, de afsluitingsduur, de zekerheid van het transactieresultaat en de prikkels voor de betrokken actoren. Door bespreking van een aantal potentiële contradicties/spanningsvelden in de wettelijke regels rond IE-securitisatie wordt een conceptueel beoordelingskader gedefinieerd. De beoordelingscriteria stellen ons in staat om een vergelijkend onderzoek uit te voeren naar de algemene juridische kaders voor IE in China en in de VS en de internationale inspanningen van UNCITRAL. Het vergelijkend onderzoek laat de problemen zien rond het op elkaar afstemmen van de wetgeving rond securitisatie en IE-wetgeving, en geeft een duidelijk beeld van hoe een efficiënt juridisch regime voor

IE-securitisatie kan worden vormgegeven, met name voor China. Dit is wellicht het eerste onderzoek waarin een omvattende kritische bespreking wordt geboden van het juridische kader voor IE-securitisatie in China.

Na de bespreking van het algemene juridische kader, behandelt het proefschrift een specifieke praktische juridische problematiek, ter illustratie en om de verschillen tussen IE-wetgeving en de wetgeving rond securitisatie verder te onderzoeken. Er wordt ingegaan op de afdwingbaarheid van clausules ter voorkoming van overdracht en beslag in IE-licenties in geval van IE-securitisatie. Dit is een uitstekende manier om de verschillen te laten zien in de economische doelstellingen en motiveringen in de beide uiteenlopende juridische beschermingssystemen, en de verschillende manieren waarop ze worden benut maken duidelijk dat er behoefte is aan meer specifieke wetgeving en economische analyse van de gevolgen van juridische regelgeving. De vergelijkende analyse laat zien hoe verschillende juridische regels de duur van de onderhandelingen en de onderhandelingspositie van partijen kunnen beïnvloeden, waardoor het evenwicht van het besluit om te lenen - en uiteindelijk ook de investeringsbeslissingen - worden beïnvloed. Het laat zien waarom we er niet van kunnen uitgaan dat juridische regels die voor gewone activa goed werken ook voor IE werken, en waarom prioritering van de doelstellingen van IE-wetgeving waarschijnlijk niet de beste oplossing is om de strijdigheden tussen IE-wetgeving en wetgeving rond securitisatie op te lossen.

Dit onderzoek roept op om de grenzen van de IE-bescherming opnieuw te evalueren en om te onderzoeken of het huidige juridische regime voor IE nog wel geschikt is voor verdere verkenning van de potentiële sociale en economische waarde van IE.

Curriculum vitae

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Short bio	
Min LIN is a Ph.D. Candidate at the European Doctorate in Law and Economics. She passed the National Bar Exam of China in 2011 and is a member of the State Bar Association in China. Her Ph.D. dissertation is entitled “Law and Economics of Security Interests in Intellectual Property”. Her main research interests are law and economics, intellectual property law and corporate finance.	
Education	
Ph.D. Candidate, European Doctorate in Law and Economics, University of Hamburg (Germany), Erasmus University of Rotterdam (the Netherlands), University of Bologna (Italy)	2012-2016
European Master in Law and Economics, the University of Hamburg (Germany), University of Bologna (Italy), Berkeley, University of California (the U.S.), and Erasmus University of Rotterdam (the Netherlands)	2011-2012
Master of International Business Law (MSc), the University of Macau (Macau SAR)	2008-2011
Bachelor of Law, Wuhan University (China)	2004-2008
Work experience	
Research assistant, Prof. Rostam J. Neuwirth, Faculty of Law, University of Macau	2009-2011
Graduate assistant, Institute for Advanced Legal Studies, University of Macau	2008-2010
Intern, Wuhan Maritime Court	2008
Research assistant (pro bono), Centre for Protection for the Rights of Disadvantaged Citizens (CPRDC) of Wuhan University	2007-2008
Prizes and awards	
Diploma with Distinction, 6th Intellectual Property Law School and Master Classes, Institute of European Studies of Macau & Maastricht University	2009
1st Prize for the Excellent Undergraduate Thesis Award of Hubei Province, China	2008
Publications	
R.J. Neuwirth & LIN Min, “Macau S.A.R.,” in Reto M. Hilty & Sylvie Nérison (eds.), <i>Balancing Copyright – A Survey of National Approaches</i> (Max Planck Institute Studies on Intellectual Property and Competition Law, vol. 18) (New York: Springer, 2012) 645-675	2012

LIN Min, “Comparative Analysis on the Modes Utilized by Chinese Government Funds in Promoting the Collateralization of Intellectual Property” (in Chinese), (2010) 14 <i>Cadernos de Ciência Jurídica</i> 193-209	2010
Translation publications: R.J. Neuwirth J. (2011) “Regulatory Challenges of the Creative Economy”, in Wu Handong (ed.) <i>Intellectual Property Rights Annual Journal</i> , 66-83 (Huang Meng & Lin Min, trans.) Beijing: Peking University Press (in Chinese language)	2011
R.J. Neuwirth J. (2010) “The UNESCO Convention on the Protection and Promotion of the Diversity of Cultural Expressions at Its Third Anniversary”, in Wu Handong (ed.) <i>Intellectual Property Rights Annual Journal</i> , 55-102 (Lin Min, trans.) Beijing: Peking University Press (in Chinese language)	2010
Others	
Admitted to Chinese Bar Association	2011

EDLE PhD Portfolio

Name PhD student : Min LIN
 PhD-period : 2012-2016
 Promoters : Prof. Dr. Thomas Eger
 Prof. Dr. Michael Faure

PhD training

<i>Bologna courses</i>	<i>year</i>
Introduction to the Italian Legal System	2012
Game Theory and the Law	2012
Economic Analysis of Law	2012
Behavioural L&E I – Game Theory	2012
Behavioural L&E II -Enforcement Mechanisms	2012
Experimental L&E - Topics	2012
European Securities and Company Law	2012
European competition law and intellectual property rights	2012
Introduction to Statistics	2012
Experimental L&E - Methods	2012
<i>Specific courses</i>	<i>year</i>
Academic Writing Skills for PhD students (Rotterdam)	2013
Seminar Series ‘Empirical Legal Studies’	2013
<i>Seminars and workshops</i>	<i>year</i>
Bologna November seminar (attendance)	2014
BACT seminar series (attendance)	2013-2016
Joint Seminar ‘The Future of Law and Economics’ (attendance)	2014-2015
Rotterdam Fall seminar series (peer feedback)	2014
Rotterdam Winter seminar series (peer feedback)	2015
<i>Presentations</i>	<i>year</i>
Bologna March seminar	2013
Hamburg June seminar	2013
Rotterdam Fall seminar series	2013
Rotterdam Winter seminar series	2014

Bologna November seminar	2014
Attendance (international) conferences	year
Presented on “Enforceability of Contractual Restrictions on Assignability in the Case of IP Collateralization” in the Second WINIR Symposium on Property Rights, the University of Bristol, UK	2016
Teaching	year
Others	year
Team Leader, 12Startup 2015, Delft University of Technology, the Netherlands	2015
Summer Institute in Law and Economics, Chicago University, the US	2014