European Competition Policy in Financial Services:

Rules and empirical insights

Het Europese Mededingingsbeleid in de Financiële Diensten Sector:

Regelgeving en empirische inzichten

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Etleva Gjonça
geboren te Tepelene, Albanië

Erasmus University Rotterdam

Promotiecommissie

Promotoren:	Prof.dr. E. Argentesi
	Prof.dr. R.J. Van den Bergh
Overige leden:	Prof.dr. M.G. Faure LL.M.
	Dr.mr. P.J. Engelen
	Dr. A. Minniti

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To my father

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LIST OF ABBREVATIONS

ANIA	Italian Association of Insurance Companies
CICR	Italian Inter-departmental Committee for Credit and Savings
CRD IV	Capital Requirements Directive IV
DGS	Deposit Guarantee Scheme
EBA	European Banking Authority
ECB	European Central Bank
ECJ	European Court of Justice
EIOPA	European Insurance and Occupational Pensions Authority
ESMA	European Securities and Markets Authority
EU	European Union
GMM	Generalized Method of Moments
HHI	Herfindahl-Hirschman Index
IBA	Italian Banking Association
ICA	Italian Competition Authority
IV	Instrumental Variables
IVASS	Italian Insurance Supervisory Authority
NEIO	New Empirical Industrial Organization
OLS	Ordinary Least Squares
PCM	Price-Cost Margin
SCP	Structure-Conduct Performance
SRM	Single Resolution Mechanism
SSM	Single Supervisory Mechanism
TFEU	Treaty on the Functioning of the European Union
U.S.	United States of America
UK	United Kingdom

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Chapter 1

Introduction

1.1 Background

In the words of Stigler, "Competition is the process of rivalry between two or more parties that strive for something that all cannot obtain".[1] Generally, competition is described as the process of rivalry between firms that are keen to make profits and is the driving force behind markets.[2] This contains rivalry in prices, in quantities, in technology, in R&D, in marketing, or in the application of innovative organizational systems. Competition and efficient markets are indispensable for the development of the private sector and economic growth. Nonetheless, though markets work well most of the time, real competition is not automatic, and can be impaired by the anti-competitive conduct of firms or improper public policies and regulations.

[1] Stigler (2008).

[2] Krafft (2000).

Similarly, as in other sectors of the economy, competition in the financial services sector matters for a number of reasons.[3] It encourages efficiency, better quality of services, greater innovation, lower prices, and improved global competitiveness.[4] Enhanced competition also enables insurance companies and banks to expand or enter new markets.

In order to analyze competition in financial services and to measure its intensity, classical industrial organization attributes such as the entry/exit and contestability need to be taken into account. Also, additional aspects that characterize the provision of the financial services such as various distribution channels (i.e. brokers, agents, or bank-assurance in insurance, and the use of ATMs in banking), or information networks in the production and consumption of services (i.e. the large externalities of stock exchanges) need to be considered. Obviously, all these aspects lead to complex competition structures and make it difficult to decode the financial services industry.

Moreover, it is widely acknowledged that, besides the effective competition in the financial services sector, there exist other public policy objectives that receive the attention of policymakers and regulators. Among them, the soundness of financial institutions and the stability of the overall financial system are of utmost importance. As a result, the existence of potential interplays and trade-offs between

[3] See for more, Claessens (2009).

[4] See Organization for Economic Co-operation and Development (OECD) (2009), p. 8.

different policy objectives simply call for a more comprehensive analysis of competition in this sector.

1.2 European Competition Regulatory Framework in Financial Services Sector

Traditionally, the financial services sector in Europe has been subject to national policy measures. Due to the 'special' nature of the financial services provision, in several Member States, the insurance sector featured the characteristics of a public monopoly and governments heavily regulated the banking services.[5]

With the establishment of the European Community (after the entry into force of the Treaty of Lisbon, the European Union), the situation altered following the enactment of essential reforms of the financial services. Consequently, the former regulatory approach complemented by stringent control and restrictions on pricing, new entries, and line-of-business was removed in favor of private sector participation. This in turn led to enhanced competition, but also raised further competition issues.[6]

Despite this setting, the financial services industry has traditionally claimed that due to its special features, the business activities relating to the financial

[5] For instance, in Italy and France.

[6] Most of the discussion that follows in subsequent paragraphs is based on the insights of Lista (2013), pp. 17-20.

services provision that face market difficulties should not be subject to the application of EU competition law. Therefore, since the start of the EU, both insurers and banks negated the full enforcement of the anti-trust framework.

In the insurance world, it has often been held that the insurance industry should be distinguished from other sectors of the economy based on the idea that insurance business faces high risk and uncertainty and, thus, should be mainly considered as an instrument of risk management. Therefore, horizontal cooperation in the form of joint determination of risks, co-insurance and re-insurance as well as standardization of policy terms have been represented as measures necessary to deal with the insolvency risk. Other arguments in favor of the immunity of insurance activities from EU competition law include the claim that price competition can be harmful for insurers' financial soundness, given that the provision of insurance services is characterized by excessive capacity, and that competition can damage public confidence in insurance markets.

On the other side of the financial services sector - in the banking domain, it has also been conventionally claimed that banking services are so 'special' and of such paramount economic importance that the potential failure of banks facing awakened from harsh price competition would lead to disastrous consequences for the financial system. As in the insurance sector, the loss of confidence in one major bank may spread into a loss of confidence in the entire market, because the inability of one bank to meet its obligations can potentially drive healthy banks into

insolvency. The risk then becomes systemic endangers the whole financial system and the real economy.

Certainly, the application of EU competition rules to the financial services industry faces several difficulties due to certain features that characterize insurance and banking industries. One of them relates to the fact that insurers and banks can assume several roles within the wholesale financial markets. They can be retailers, wholesalers, customers, and suppliers and therefore are capable of affecting the end retail consumers indirectly.[7]

Another feature is that horizontal agreements, which characterize both insurance and banking sectors, cannot simply be held illegal because the anti-competitive effects may be outweighed by efficiency gains. For banks, it is apparently critical to collaborate in order to deliver payment systems. For insurers, horizontal agreements are regarded as essential in order to share risks and deal with the insolvency risk.

Additionally, the recent process of convergence between insurance and banking industries has intensified even more the anti-trust sensitivity of the forms of cooperation between insurance and banking undertakings. The intense growth of bank-insurance companies has led to a scenario in which different departments of the same undertaking can provide both insurance and banking services.

[7] See Faull and Nickpay (2007), p. 636.

A highly relevant point for the development of competition in the EU Member States is the on-going process of the harmonization of the financial services provision. Various insurance and banking reforms have been introduced with the aim of creating a single European market in financial services.

The main step regarding the harmonization of insurance services dates back to the early 1990s when the Council Directives 92/49/EEC[8] and 92/96/EEC[9] were implemented. The aim of the two directives was to promote the creation of a single market in the insurance sector and the establishment of a system for financial supervision of insurance undertakings. The understanding of insurance directives requirements, however, did not remain free of ambiguities. Thus, new directives such as Directive 2002/83/EC [10] concerning life assurance and Directive

[8] Council Directive 92/49/EEC of 18 June 1992 on the coordination of laws, regulations and administrative provisions relating to direct insurance other than life assurance and amending Directives 73/239/EEC and 88/357/EEC.

[9] Council Directive 92/96/EEC of 10 November 1992 on the coordination of laws, regulations and administrative provisions relating to direct life insurance and amending Directives 79/267/EEC and 90/619/EEC (Third life assurance Directive).

[10] Council Directive 2002/83/EC of the European Parliament and of the Council of 5 November 2002 concerning life assurance.

2000/31/EC[11] concerning the use of communication technology in the insurance sector were approved with the aim of tackling potential inconsistencies.[12]

In the banking sector, the initial step of the harmonization process was made through the implementation of the First Banking Directive[13] in 1977. This Directive aimed at excluding discriminatory constraints on the freedom of establishment and freedom to provide banking services. In 1989, a Second Banking Directive[14] followed aiming at harmonizing the Member States laws with regard to the authorization of financial institutions. This process was further deepened by the introduction of the Capital Requirement Directive,[15] which was intended to create a more efficient payment system and sounder banks.

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[11] Council Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2002 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market.

[12] Among additional directives were Council Directive 2000/26/EC of 16 May 2000 on the approximation of the laws of the Member States relating to insurance against civil liability in respect of the use of motor vehicles and amending Council Directives 73/239/EEC and 88/357/EEC (Fourth motor insurance Directive).

[13] First Council Directive 77/780/EEC of 12 December 1977 on the Coordination of Laws, Regulations and Administrative Provisions Relating to the Taking-up and Pursuit of the Business of Credit Institutions.

[14] Second Council Directive 89/646/EEC of 15 December 1989 on the Coordination of Laws, Regulations, and Administrative Provisions Relating to the Taking-up and Pursuit of the Business of Credit Institutions and Amending Directive 77/780/EEC.

[15] The Capital Requirements Directive is comprised of two Directives: a) Directive 2006/48/EC of the European Parliament and of the Council of 14 June 2006 relating to the taking up and pursuit of the business of credit institutions, and b) Directive 2006/49/EC of

The onset of the 2007-2008 financial crisis called for more coordinated regulation among Member States and further action for better supervision of the financial sector. For this reason, in the aftermath of the crisis, the European Commission has proposed several reforms to create a sounder financial sector. In this regard, a new European supervisory architecture[16] was introduced in 2011 that consists of three supervisory authorities: the European Banking Authority (EBA) that deals with bank supervision, the European Insurance and Occupational Pensions Authority (EIOPA) that deals with insurance supervision, and the European Securities and Markets Authority (ESMA) that deals with the supervision of capital markets, credit rating agencies and trade repositories.

Afterwards, in 2012 the EU heads of State and Government agreed to establish a Banking Union in order to make the European banking sector more transparent, unified and safer. The Banking Union consists of two pillars: the Single Supervisory Mechanism (SSM)[17] and the Single Resolution Mechanism (SRM). The SSM that confers new supervisory powers to the European Central Bank (ECB) for the banks in the euro area became fully operational in 2014. Meanwhile, the

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the European Parliament and of the Council of 14 June 2006 on the capital adequacy of investment firms and credit institutions.

[16] Commission MEMO/10/434.

[17] Council Regulation 1024/2013/EU of 15 October 2013 conferring specific tasks on the European Central Bank concerning policies relating to the prudential supervision of credit institutions.

Commission has already proposed the SRM in order to ensure efficient resolution of banks facing severe difficulties.[18]

In addition, stronger prudential reforms were enacted in 2013 through a package of capital requirements for banks, the so-called 'CRD IV - Capital Requirements Directive IV'.[19] The CRD IV implements the new global standards on bank capital generally known as Basel III. In addition, the Agreement on Deposit Guarantee Scheme (DGS) confirmed by the European Parliament in 2014 completed the single rulebook on crisis management.[20]

All things considered, the role of the financial services sector in the economy is immense. Insurers and banks are financial intermediaries that collect large funds through premiums and deposits, creating an important source of capital, and lend

[18] In order to complete the Banking Union, the Commission introduced in 2015 a proposal for the creation of a European Deposit Insurance Scheme that would provide stronger and more uniform insurance cover for all retail depositors.

[19] The CRD IV implements through Regulation 575/2013/EU of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation 648/2012 /EU and Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC.

[20] Commission MEMO/13/1176. The single rulebook aims to provide a single set of harmonized prudential rules and is applicable to all financial institutions in the single market. The European Council coined the term 'single rulebook' in 2009 in order to refer to a unified regulatory framework for the EU financial sector that would complete the single market in financial services.

money to individual and commercial customers willing to borrow.[21] They encourage savings and channel them to investment, provide financial protection against risks and promote sustainable economic growth. Therefore, as Lista (2013) notes, "the sector is so important and complex that it invariably needs to be subject to competition law in order to avoid market deficiencies and to ensure that an adequate framework of consumer protection is fully functional."[22]

For this reason, since the outset of the EU, the Commission has stated that EU competition rules apply to the financial services.[23] The initial approval of this stance arrived in the *Zuchner*[24] case, when the European Court of Justice discharged declarations regarding banks 'falling outside the scope' of the Article 101 and 102 of the Treaty on the Functioning of the European Union (TFEU). Then, the Commission released the first two decisions regarding the insurance sector: *Nuovo CEGAM* [25]*and Fire Insurance.*[26] The subsequent decision was appealed before the CJEU in the case of *Verband der Sachversicherer.*[27] In refusing the claims of an association of insurers that "unrestrained competition in the insurance sector would enhance the risk of insolvency to the detriment of consumers", the ECJ underlined that in the absence of

[21] See Huertes and Silverman (1933).

[22] At p. 18.

[23] See the EC (1972), points 51-57.

[24] Case C-45-172/80 *Zuchner v. Bayerische Vereinsbank AG* (1981) ECR 2021, 20130.

[25] *Nuovo CEGAM* (1984) OJ L99/29.

[26] See *Fire Insurance (1985)* OJ L35/20.

[27] See Case C-45/68 *Verband der Sachversicherer (1987) ECR 405, 449-452.*

idiosyncratic rules, Articles 85 and 86 EC (currently, Articles 101 and 102 TFEU) find full application to the insurance business.[28]

Still, during recent decades, in the financial services sector particularly in insurance, the Commission has often permitted types of 'horizontal agreements concerning a relevant cost element making up the final price vis-à-vis customers,' throughout its decisions to issue a block exemption for the insurance industry.[29]

Competition concerns in the financial services sector may also arise in relation to Article 102 TFEU, mergers and acquisitions, and Article 107 (state aid). Nevertheless, the most important aspect of the application of EU competition rules to this sector arises from Article 101 TFEU and the regulation of forms of horizontal cooperation.[30]

For this reason, this thesis will primarily focus on the application of EU competition law, particularly on the application of Article 101(3) TFEU. Later on, the focus will shift to additional EU law provisions that are relevant for competition in the financial services such as the application of Article 49 (the freedom of establishment), Article 56 (the freedom to provide services), and Article 63 (the free movement of capital). More specifically, Article 49 stipulates the right of establishment of insurance and banking undertakings to pursue activities from a fixed base in a Member State for an indefinite period of time. The freedom to

[28] See Faull and Nickpay (2007), p. 636 and Lista (2013), p. 18.

[29] See Lista (2013), p. 20.

[30] See Lista (2013), p. 21.

provide services under Article 56 entails the carrying out of an economic activity for a temporary period in a Member State in which either the provider or the recipient of the service is not established. Lastly, Article 63 imposes an obligation to abolish progressively restrictions on the movement of capital and on payments between Member States and between Member States and third countries. All the provisions set out in these Articles aim at creating and ensuring the proper functioning of the internal market. Pursuant to these EU law provisions, the Council has enacted various insurance and banking reforms that were mentioned earlier and whose main goal was the harmonization of insurance and banking services in the internal market.

1.3 Aim of the Thesis

This thesis considers aspects of the application of EU competition law as well as of additional provisions of the EU law (in particular, rules on the free movement of services and capital) relevant for competition in the financial industry. The main focus will be on the insurance industry, although analysis of the banking sector will be provided as well.

Initially, Chapter 2 will endeavor to analyze the application of Article 101(3) TFEU to the insurance sector. Specifically, it will make an attempt to answer whether the insurance sector should be fully subject to the application of EU competition rules. In order to answer this question, the thesis will provide a critical

analysis of the traditional arguments advanced by the insurance industry and on the basis of which the insurance sector has received for more than two decades different treatment under EU anti-trust rules. The relevant arguments will be discussed based on a comparative analysis between insurance and banking features.

In the subsequent chapters (Chapters 3 and 4), the aim is to investigate how effective are the harmonization measures in insurance and banking for enhancing competition in the internal market. Such measures are aimed not only at enhancing the cross-border competition in the EU level, but also the competition within the national markets in Member States.

In order to meet these objectives, Chapter 3 will investigate the level of competition in the non-life insurance market in Italy. Further, another aspect which is pertinent for competition in insurance markets, namely the interplay between competition and the financial soundness, will be assessed. A similar analysis will follow in Chapter 4, but here the focus will be on the Italian banking sector. One of the objectives will be to provide new empirical evidence on the interplay between bank competition and soundness.

1.4 Methodology

For the purposes of the research conducted in this thesis, several methodologies will be used.

In the following Chapter, the discussion will be based on the positive method of law and economics and will incorporate an analysis of case law and comparative law and economics. First, it will provide a positive analysis of the current EU legal framework for competition policy in the insurance and banking sectors. Then, the evolution of the application of EU competition law to the insurance and banking sectors will follow. Lastly, an attempt will be made to identify similarities between insurance and banking on the basis of arguments advanced by the insurance industry to show it as a unique sector, which deserves special treatment from EU anti-trust rules.

In Chapters 3 and 4, the empirical investigation will mainly rely on the field of the New Empirical Industrial Organization. More specifically, a relatively novel non-structural measure, already recognized in the literature as the Boone indicator, will be employed. This indicator captures the impact of competition on the performance of firms. The idea behind this approach is that competition rewards efficiency: relatively more efficient firms attain a better performance in terms of higher profits at the cost of their less efficient counterparts. When competition increases, all firms in a market may experience a fall in profits, but this effect is greater for less efficient firms. In other words, more intense competition results in a severe punishment of relatively less efficient firms as compared to more efficient ones.

1.5 Outline

This thesis is organized as follows: Chapter 2 evaluates whether the distinctiveness of insurance business is a relevant and convincing justification for the reduced scope of EU competition law, based on the analogy between insurance and banking sectors. In this view, arguments advanced by insurance associations to distinguish insurance in particular from other sectors of the economy, including banking. They claim that it deserves special treatment from EU anti-trust rules because they fail to recognize the similarities and the ongoing convergence between the two types of financial services. In such a setting, it is argued that the differential treatment of the insurance sector from the EU anti-trust rules needs to be scrutinized by policymakers with a view of making it fully subject to effective competition.

Chapter 3 investigates how competition has evolved in the Italian non-life insurance sector following the harmonization of the insurance services provision. Further, it assesses the nexus between competition and financial soundness in this market. The empirical analysis consists of two parts: a) the first part estimates the Boone indicator of competition in the non-life insurance for the period 1998-2013; b) the second part examines the nexus between competition and soundness. Findings suggest that during the sample period the competition in the Italian non-life insurance market was characterized by an unstable trend suggesting an unremarkable improvement, and that competition positively affected the financial soundness of insurers. Additional tests suggest that: a) in the motor insurance

segment, the motor third-party liability insurance was relatively more competitive than the other two business lines: the land vehicle insurance and marine third-party liability; b) the non-life insurers were relatively less competitive than life insurers.

Chapter 4 includes an empirical investigation of the level of competition in the Italian banking market and its effect on stability during the period 2006-2014. Since the current banking literature points to ambiguous results, this Chapter also attempts to provide new evidence on the interplay between bank competition and soundness. Before evaluating this relationship, the study measures the level of bank competition in Italy by using the Boone indicator. Similar to the findings obtained in the analysis undertaken in the non-life insurance sector, the results indicate a positive relationship between bank competition and soundness. This Chapter contributes to the empirical literature in two ways: a) by providing new evidence on the relationship between bank competition and stability where competition is measured by a relatively new indicator and by covering a period of a major external shock (such as the 2007-2008 financial crisis); b) by analyzing the impact of bank competition on stability at a single country level, while the current literature considers it mainly on a cross-country framework.

Finally, Chapter 5 discusses the main findings and concludes.

Chapter 2

INSURANCE AND BANKING: SHOULD SIMILAR THINGS BE TREATED ALIKE?

2.1 Introduction

For more than two decades the insurance sector has been exempt from the full application of EU competition law. The main motivation, traditionally advanced by the insurance industry, in order to justify such a differential treatment, has been the distinctiveness of the insurance business.[31] It seems that based on this reasoning, a block exemption regulation has been initially granted to the entire sector by the

[31] See the Submissions to the Court of Justice made by insurance associations in the case of *Verband der Sachversicherer*, Case-45/68 *Verband der Sachversicherer* (1987) ECR 405, 449-452.

European Commission in 1992, and later, renewed in 2003 and 2010.[32] The current regulation, which exempts agreements in the form of joint determinations of risk, and co-insurance and re-insurance pools, has recently come under scrutiny by the Commission, with a preliminary view towards a complete repeal.[33]

This chapter evaluates whether the distinctiveness of the insurance business is a relevant and convincing justification for the reduced scope of EU competition law. It discusses the traditional arguments that have been used to depict insurance as a unique industry by comparing it with banking. Such an approach seems appropriate since the European markets of insurance and banking traditionally have

[32] In EU competition law, block exemptions are regulations issued by the European Commission or by the European Council. The block exemptions are adopted for a certain time period and reviewed during that period. Some block exemptions pertain to specific sectors. However, the Commission has implemented a number of exemptions that apply more generally to vertical, horizontal and technology transfer agreements (Jones and Sufrin, 2014, p. 263).

[33] According to the Report on the functioning and future of the IBER published in March 2016, the Commission found that "the strict conditions for the creation of a sector-specific block exemption are no longer met: at this stage, the market conditions for the insurance industry do not appear to necessitate the existence of an IBER for the compilation and distribution of joint calculations, tables and studies; and the renewal is not justified with regard to re-insurance and co-insurance pools because of its limited use and relevance." See the Report from the Commission to the European Parliament and the Council on the functioning of Commission Regulation 267/2010/EU on the application of Article 101(3) of the Treaty on the functioning of the European Union to certain categories of agreements, decisions and concerted practices in the insurance sector, available at http://ec.europa.eu/competition/sectors/financial_services/iber_report_en.pdf.

had no exact boundaries between their activities.[34] Both sectors play a vital role in modern financial markets and share a variety of economic functions. They are financial intermediaries that receive money from individuals and commercial customers in form of deposits or premiums and lend to customers willing to borrow.[35] Often, they have also been considered as 'the two sides of the same coin'.[36] Moreover, during the last two decades, the worlds of insurance and banking have been moving closer together, generated by financial liberalization and innovations.[37] However, the treatment of insurance by EU competition law remains quite different from that of banking.

This chapter attempts to contribute to the ongoing policy debate on the role of EU competition rules in the insurance sector, particularly to the future role of the block exemption regulation. To the best of my knowledge this is the first paper that discusses the relevance of the distinctiveness of insurance business so as to justify a blanket exemption from EU cartel prohibition by taking a comparative analysis between the features of insurance and banking sectors.

The rest of the chapter is organized as follows: Section 2.2 introduces features of the insurance and banking, highlights their distinctions, similarities and the recent trend of convergence between them. Sections 2.3 and 2.4 describe the

[34] See Nurullah and Staikouras (2008).

[35] See Huertes and Silverman (1933).

[36] Manwaring (1977) and Lista (2013), p 15.

[37] See Knight (2005).

application of EU policy in insurance and banking and approaches taken so far by the European Commission. Section 2.5 discusses the distinctiveness of insurance with respect to banking. Finally, Section 2.6 presents the concluding remarks.

2.2 Insurance and Banking

This section introduces features of insurance and banking, their main distinctions and similarities. It also argues that, over the past decades, the differences between insurers and banks have declined. Nowadays, products and services offered by insurers are converging or competing with those that have been usually provided by banks. The worlds of insurance and banking are gravitating towards each other. Such a gravitating process may be important for EU competition policy in insurance, which has always treated it as unique and separate from the rest of the financial services sector.

2.2.1 Insurance

Modern insurance has its roots in the 18th century, in the aftermath of Bernoulli's development of the law of the large numbers.[38] The idea behind it is that the occurrence of individual risks will tend toward an expected average once these risks are pooled in sufficiently large amounts.[39]

[38] Turk (2015).

[39] Avraham (2012).

Basically, insurance exists to handle the risks faced by policyholders, by forming a risk pool that offers protection against potential future losses. The pooling of risks is the cornerstone of an insurer's business model.[40] Insurers receive premiums that depend on the specific type of insured risks. Meanwhile, policyholders pay premiums based on the loss risk that they carry into the pool.[41]

Insurance converts the risk that a single policyholder assumes to the one that is collectively borne by a large number of policyholders. Put differently, insurance converts likely vast future losses into smaller ones by means of recurrent premium disbursements. Nevertheless, since not all risk can be insured limits exist with regard to the types of coverage provided by insurance products. This can be due to the fact that the risk of claims is greatly unpredictable, or because the policyholder has other motives to make a claim. Thus, an essential part of the main businesses of insurers is to properly evaluate whether specific risks belong to this category and as a result are uninsurable.

There are three main categories of insurance: life insurance, non-life insurance and re-insurance.

Life insurance

Life insurance offers protection for policyholders against the financial costs of death and illness. It also provides long-term savings products and pension solutions.

[40] Acharya et al. (2011).

[41] See Insurance Europe (IE) (2014), p 10.

Protection is basically attained through the pooling of life risk.

There are two main types of life insurance. The first one is the whole life insurance that can be obtained for an unlimited duration and covers the whole policyholder's lifetime. The second is the term life insurance that can be provided for a certain period of time at a specific premium.[42]

A further type of life insurance is what is known as annuity or private pension. Through annuity, policyholders are helped to lessen the risk of outlasting their financial assets. It converts the savings of policyholders into a definite regular income over their lifetime. Life insurers collect regular premiums during the contribution stage, manage them and deliver pension benefits during the retirement stage.

Life insurers in Europe provide several types of annuities, which vary according to the number of beneficiaries, emergence of medical conditions, and share of savings. These types of products are of increasing significance in Europe. They offer alternative solutions to public pension schemes that have been facing problems due to ageing populations in some Member States.

Furthermore, life insurance offers a variety of investment alternatives, such as unit linked insurance and endowment policies. These products aim at enhancing long-term private investment, which is highly beneficial to society.

[42] See IE (2014), p.13.

Non-life insurance

Non-life insurance offers protection against the risk of unfavorable events associated with a financial loss. The policyholder "pays a premium in exchange for a promise to be reimbursed later for the financial consequences of a covered event, subject to the conditions pre-arranged in the contract."[43]

The major part of non-life insurance services is also known as property and casualty insurance since they provide protection against property damage and legal liability originating from harm caused to third parties' property. In case such events may lead to bankruptcy for an uninsured individual, the business model of property and casualty insurers enables them to assume these risks. Property and casualty insurance products, which are widely used in Europe, are motor insurance, homeowners or tenants insurance, flood insurance or general natural catastrophe insurance.

While, health insurance is a particular form of non-life insurance that provides protection against the risk of medical costs, the special types of insurance systems differ according to jurisdictions/countries. The entities that can manage health insurance systems can be governments, private insurers, or non-profit organizations.

[43] IE (2014), p. 11.

Re-insurance

Re-insurance is no more than a form of insurance for insurers. Its purpose is to reduce the risk of an insurer by sharing it with other reinsurers. When the risk is greater than the assets capacity of bearing it, insurers may consider transferring a part of this risk to a reinsurer.

The re-insurance company obtains parts of a potential obligation in consideration of a part of premium received by the initial insurer. The initial insurer, which hands over its insurance portfolio to the reinsurer, is generally called the ceding party. The insurance portfolio can be comprised of a portion of a particular policy or a number of policies. Afterwards, it may be relinquished to a reinsurer, which in response may offer financing and/or protection against tail risks.[44]

The re-insurance is important for several reasons. First, it can increase the flexibility of initial insurers. Second, it can spread tail risk throughout various regions since reinsurers conduct their business globally and serve as a buffer. This indicates a crucial macro-economic role that directly preserves financial stability. It also allows reinsurers to keep a moderate part of the risk emanating from certain adverse events. Indeed, the risk can be further diversified to capital markets by means of insurance linked securities or to new reinsurers.

[44] IE (2014), p. 19.

2.2.2 Banking

Banking plays a significant role in the economy. Banks act as financial intermediary institutions between lenders and borrowers. They perform various economic functions and provide a great variety of products, services and business models. Despite differences in banking models, the core activity of a bank is the collection of deposits and granting of loans to individual and corporate customers.

Both deposits and loans have a range of forms and durations: deposits as current account deposits, savings accounts, fixed term or inter-bank overnight deposits; loans as current account overdrafts, mortgages or investment loans. Usually, loans have longer maturities than deposits. Consequently, banks undertake maturity transformation, a process by which they manage to align lenders' and borrowers' requirements.

Maturity transformation depends on the supposition that not all depositors will require to withdraw their money at the same moment. Therefore, public confidence in banks and the banking system is essential. When confidence is lost a massive withdrawal of deposits can quickly lead to a bank failure, and consequently, to systemic risk.[45]

[45] According to Kaufman and Scott (2003), "systemic risk refers to the risk or probability of breakdowns (losses) in an entire system as opposed to breakdowns in individual parts or components and is evidenced by "comovements" (correlation) among most or all the parts.". For other definitions see Hendricks (2009), and Group of Ten (2001).

Usually, retail banks are involved in balance sheet activities, and specialize in evaluating borrowers' creditworthiness, and in monitoring the way borrowers fulfill their obligations. Their reward is gained by the difference between the interest rates offered to depositors and the ones requested from borrowers. Furthermore, the retail banks safeguard the functioning of payment systems, which connect bank accounts and facilitate monetary exchange. Moreover, they provide credit and create money.

Amongst their core activity, several investment banks operate in the off-balance sheet activities that are characterized by two categories: derivatives and financial guarantees. Such market undertakings have become widespread in latest decades, and have introduced a new risk management component in addition to what has been traditional deposit and lending.

Derivatives are products that comprise options, swaps, futures, securitized assets and forward contracts. The major part of these undertakings is reported on the balance sheet; some others may stay off-balance and be considered as assets or liabilities. Financial guarantees are products that permit banks to back up obligations; one form of financial guarantee is the 'note issuance facility', used by banks to promise to buy a company's debt securities at or below pre-determined interest rates.[46]

Though off-balance sheet undertakings have been shown to be profitable,

[46] See IE (2014), p. 21.

they have also created new risks or introduced new forms of current risks. Banks now are exposed also to funding risk, counter-party credit risk, or interest rate risk. Some of these risks linked to loans are transferred to wider financial markets through securitization.[47]

In recent decades, some European banks have increasingly adapted a universal banking model, through which a wide variety of financial services are provided. This development was imposed by the Second Banking Directive in Europe in 1989,[48] and encouraged by the financial harmonization. In order to increase the risk diversification, large universal banks may now offer payments processing, loans, deposits, asset management, investment advice, and securities transactions.[49]

2.2.3 Insurance and Banking: Similar or Different?

As previously noted, insurers and banks perform nearly the same economic functions; both can be defined as financial intermediaries that receive money from private individuals or companies in the form of deposits or premiums and lend money to customers wishing to borrow.[50]

[47] Securitization is the process of creating new products by using current assets.

[48] Second Council Directive 89/646/EEC of 15 December 1989 on the Coordination of Laws, Regulations, and Administrative Provisions Relating to the Taking-up and Pursuit of the Business of Credit Institutions and Amending Directive 77/780/EEC.

[49] See IE (2014), p. 22.

[50] See Huertas and Silverman (1933) and Lista (2013) p. 15.

Some authors contend that the real distinction between banks and insurers is the nature of customer's claims.[51] If customers of the bank can claim and withdraw their money despite a preset deadline of the deposits or simply on demand, the same does not hold for policyholders of insurance services.[52]

Other distinctions relate to different types and degrees of risks that insurers and banks face. Main risks faced by insurers are underwriting risk, market risk, and mismatch risk. Particularly, the underwriting risk is typical only to insurers and refers to financial losses engendered by incorrect appraisal of insured risks or by unexpected settings. The market risk exists in the asset side of the balance sheet. It occurs when insurers become subject to some degree of investment risk, originating from asset price oscillations. The mismatch risk occurs when the economic values of assets and liabilities develop differently over time.

Meanwhile, banks mostly face credit risk, liquidity risk, and market risk. The credit risk arises when a borrower cannot pay off a loan fully or partially. Banks are exposed to liquidity risk due to a maturity mismatch between assets and liabilities; assets (usually, long-term loans) can hardly be immediately converted into cash, while liabilities (short-term deposits) can be easily withdrawn. This is why banks access other credit sources such as the inter-bank market or the central bank, which serves as the lender of the last resort.

Both insurers and banks invest in financial assets, but the reasons they do so

[51] See for more, Huertas and Silverman (1933).

[52] Huertas and Silverman (1933).

are different. Investment is a core activity for insurers. In contrast, for retail banks investing does not represent a main activity but a tactic in order to increase profits. In their role as investors banks face price oscillations of financial instruments both on and off the balance sheet. Thus, the market risk springs from foreign exchange and commodity risk positions in the entire balance sheet.

A further distinction is that while banks face considerable liquidity risk due to the shorter duration of their liquidities as compared to that of their assets, insurers face a less problematic liquidity risk. This is mainly due to three reasons. First, policyholders are normally less disposed to terminate their policies even in periods of market turmoil. Most insurance policies enforce a penalty for early submission of policies. Second, insurers manage to balance the length and lack of liquidity of their assets and liabilities. They are usually highly diversified, and take advantage of the risk diversification realized through different product lines. This in turn restrains the degree to which unanticipated claims can happen. Finally, there does not exist an 'inter-insurer' market analogous to the inter-bank market. Therefore, there is no risk of a domino effect in case where one insurer faces liquidity problems.

Additionally, while both are exposed to systemic risk, the degree of exposure is different. This is due to different business models. The business model of a bank depends on multi-faceted interconnections with the remainder of the financial system. When a bank becomes larger, its degree of interconnections and systemic risk increases. Meanwhile, insurers are traditionally considered as more financially

stable. The bigger an insurer becomes, the more stable it can get since, according to the law of large numbers, the correlation between risks decreases with the total number of risks insured.[53]

A further distinction regards investment and funding. The return on investments for banks involves risks linked to changes in asset prices or developments in the economy that are perhaps less vulnerable to the law of large numbers calculations.[54] Also, insurers and banks funding structures are opposites. The balance sheet of an insurer consists of short-term liquid assets, comprised of policy premiums that are paid instantly, while its liabilities are long term and relatively non-liquid future claims owed to policyholders.[55] The insurers' balance sheet is stable, given that long-term policyholders' liabilities and assets are matched. In contrast, the banks' balance sheet consists of short-term liquid liabilities in form of deposits, and long-term non-liquid assets that are represented by loans.

Due to these differences banks are usually more influenced by economic developments associated with the business cycle. Bank failures restrict the availability of credit to businesses and consumers, which can further depress economic activity and impair economic growth.[56] It is because of these reasons that

[53] IE (2014), p. 29.

[54] See Acharya et al. (2011).

[55] Acharya et al. (2011) and Mishkin (2013).

[56] Reinhart and Rogoff (2009).

banks have been seen as protagonists of financial crises whilst leaving insurers out of the main stage.[57]

Notwithstanding the differences, the similarities and growing areas of convergence between insurance and banking sectors are more important.[58] Insurers and banks preserve an investment spread on the money they gather from their customers (bank deposits for banks and insurance premiums for insurers); they undertake market risk beyond their core business risks. The financial risks faced by both have become more complex since the investment is supported by external funding and customer money, exposing shareholder equity and risk based capital to market fluctuations.

Additionally, over the last decades, the distinctions between insurers and banks have been narrowing. This is mainly due to the fact that modern insurers offer several products and services, whose economic functions are similar to those traditionally, offered by banks. For example, life insurers provide whole life products, which compete with savings accounts or term bank deposits. One of these products supplied by insurers is 'guaranteed investment contracts'. Based on these contracts, the policyholder places funds with the insurance company in return for the repayment of interest at a certain amount. For some contracts, the policyholder

[57] Baluch et al. (2011) and Kindleberger and Aliber (2005).

[58] Knight (2005).

may require the withdrawal of the principal, similarly as in the case of bank deposits.[59]

In the same manner, consumer and business credit facilities provided by banks such as overdrafts, term loans, or credit cards can be likely to compete with personal loans offered by life insurers. Albeit to a lesser degree, home loans of banks may also compete with home loans offered by life insurers.[60]

In addition, property and casualty insurers now offer products that compete with those provided by banks. One of them is the 'surety bond', which insurers generally offer in case of construction projects. Through the surety bond, insurers indemnify the financial risk that a particular bonded contractor will fail to satisfy its contractual commitments, and function in a similar way to commercial loans offered by banks.[61]

A more prominent example of market convergence is 'insurance linked securities'. Through this product, an insurer creates a special purpose vehicle to issue securities that are backed by collateral derived from premium payments on a pool of insurance policies.[62] By transforming individual insurance policies into

[59] See Wallison (2009).

[60] See OECD (1998), p. 32.

[61] See Wallison (2009).

[62] See Barrieu and Albertini (2009).

securities, insurance linked securities such as catastrophe bonds allow insurers to avoid traditional re-insurance relationships and directly access capital markets.[63]

Another form of property and casualty insurance is 'private mortgage insurance'. Private mortgage insurers sell policies to mortgage originators or private home-owners that insure against the risk of mortgage default.[64] Policies that back the viability of mortgages do not relate to actual physical accidents to property in the way that home-owners' insurance does; instead, mortgage insurance functions in the same way as a put option that can be highly valued as a cyclical asset.

A relevant line of property and casualty policies is provided by 'monoline' insurers, which offer financial guarantee insurance against the default on low risk municipal bonds.[65] Another form of insurance and banking convergence is reflected in the growing tendency of insurers entering into direct competition with banking by providing financial products that are not presented as insurance. For example, many life insurance companies have created securities lending programs that lend out the insurer's assets to other investors. In addition, insurance companies are increasingly competing with banks by engaging in direct corporate lending and real estate finance[66] These developments in non-insurance under-writing make insurers a good alternative to traditional banks, particularly with regard to lending activities.

[63] Cummins and Weiss (2009).

[64] Schich (2009).

[65] Schich (2009).

[66] Allen & Overy (2012).

2.3 European Competition Policy in Insurance

The focus of this section is the EU cartel prohibition policy in insurance. It does not deal with the abuse of the dominant position, merger control or state aid. In all these areas, the insurance sector is not treated in a particular way. Then, the section presents the so-called 'special features' of insurance business and introduces the current block exemption regulation. Finally, it reviews several insurance cases that pertain to the EU anti cartel policy.

2.3.1 Background

Within the EU, the legal framework for the prevention of cartels resides mainly in Article 101 TFEU. Over the last years, it has been amended through framework legislation,[67] notices, guidelines, and block exemptions.[68] Specifically, Article 101(1) TFEU prevents "all agreements between undertakings,[69] decisions by associations of

[67] Council Regulation 1/2003/EC of December 16, 2002, on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty amended by Council Regulation 411/2004 of February 26, 2004 and Council Regulation 1419/2006 of September 25, 2006.

[68] See EC (2011).

[69] Article 101 TFEU applies to agreements and concerted practices between undertakings and decisions by association of undertakings. The term 'undertaking' is not defined in the Treaty but it is settled in the case law that it 'encompasses every entity engaged in an economic activity, regardless of the legal status of the entity and the way in which it is financed' (Jones and Sufrin, (2014, p 127). See also Case C-67/96, *Albany International BV*

undertakings and concerted practices that my affect trade between Member States, and which have as their object or effect, the prevention, restriction or distortion of competition within the common market".[70] Article 101(1) prohibits: a) setting directly or indirectly purchasing or selling prices or any other trading conditions; b) limiting or controlling production, markets, technical development, or investment; c) sharing markets or sources of supply; d) applying dissimilar conditions to equivalent transactions with other trading parties, therefore placing them at a competitive disadvantage; and e) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature

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v. Stichting Bedfrijfspensioenfond Textielindustrie (1999) ECR I-671, Jacobs AG, para. 206, and Case C-41/90 *Höfner and Elser v. Macroton GmbH* (1991) ECR I-1979, para.21.

[70] The Court of Justice has explained that the words 'object or effect' in Article 101(1) TFEU are not cumulative but alternate conditions. An agreement, decision, or concerted practice is thus caught if either its 'object' or its 'effect' is the restriction of competition. The fact that an agreement falls or does not fall within the 'object or effect' class has a crucial effect on the possibility of a violation being established and the burden of proof. In a case where it is revealed that the object of an agreement is to restrict competition (and other conditions of Article (101)1 TFEU are satisfied), an infringement of Article 101 is proved unless it can be shown that the agreement fulfills the conditions of Article 101(3). In the case where the object of agreement is not found to restrict competition, the burden of proving that this is its effect remains on the person claiming the infringement. When this is proven the burden shifts on the parties to defend it under Article 101(3). (Jones and Sufrin, 2014, p 204). See also, Case 56/65, *Société Techique Minière v. Maschinenbau Ulm GmbH* (1966) ECR 235, 249 and Case C-234/89, *Delimitis v. Henninger Bräu* (1991) ECR I-935, para 13.

or according to commercial usage, have no connection with the subject of such contracts.

In the case where an agreement limits competition according to Article 101 TFEU, an insurance undertaking can appeal Article 101(3) TFEU as a defense.[71] In such a situation the competition authority evaluates the pro-competitive effects of an agreement (defined by Article 101(3) TFEU) against the anti-competitive impact of it.[72] However, this evaluation occurs only if four collective conditions prevail:[73] 1) the welfare improvement condition; [74] 2) the passing-on condition; [75] 3) the indispensability condition;[76] and 4) the non-elimination of competition condition.[77]

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[71] Geradin et al. (2012, p. 106) note that, "Article 101(3) TFEU embodies an exception rule that defuses the application of Article 101(1) to agreements that bring a positive net contribution to consumer welfare." The authors further highlight that the rationale under the exception rule of Article 101(3) TFEU originates in over enforcement concerns. Article 101(1) covers many anti-competitive practices that also wield pro-competitive effects, due to its general wording.

[72] "The exception rule introduces a 'balancing' exercise into Article 101 TFEU" (Geradin et al., 2012, p. 162). Once a restriction of competition has been established under Article 101(1), it needs to be assessed against potential welfare enhancing effects under Article 101(3).

[73] "According to the well-settled case law, the conditions are cumulative" (Gerardin et al, 2012, p. 163).

[74] The first condition for the benefit of an exemption requires proof that the agreement contributes to improving production or distribution or promotes technical/economic progress. According to the Commission, the key valid source of improvement consists in 'objective economic benefits', or 'pro-competitive effects' that occur 'by way of efficiency gains' (Geradin et al., 2012, p 164).

Although the competition rules of the TFEU do not provide an exemption for the insurance sector, the Commission started to be active in this area only in 1972.[78] The belated application of anti-trust law in insurance was attributed to two reasons: first, due to the 'special features' of the insurance industry; and, second, due to the existence of strict national regulatory systems in some Member States.

In the following decades, the EU regulatory framework for the provision of insurance services had experienced major transformations. A number of insurance

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[75] Pursuant to the second condition of Article 101(3) TFEU, consumers must receive 'a fair share' of the agreement's resulting benefits. In other words, "an agreement that is only beneficial to the parties cannot benefit from an exemption" (Geradin et al., 2012, p. 169).

[76] According to the third condition for the application of Article 101(3) TFEU, the agreement must 'not impose on the undertakings concerned restrictions, which are not indispensable to the attainment of these objectives'. As Geradin et al. (2012, p. 171) explain, "this condition implies the demonstration that there is no less restrictive alternative that achieves the same amount of efficiencies. If there are no alternatives, or if there are alternatives that deliver fewer efficiency gains, the indispensability condition will be fulfilled." See also, Tridimas (1999).

[77] The last condition for the application of Article 101(3) TFEU is that the agreement does not 'afford (the parties) the possibility of eliminating competition in respect of a substantial part of the products in question'. The main issue is to guarantee that after the agreement sufficient 'rivalry' still remains in the market (Geradin et al., 2012, p 172).

[78] Since 1972, the Commission stated in its Second Report on Competition Policy that EU antitrust law applies to the insurance industry. The Court confirmed this in 1987 in *Verband der Sachversicherer* when it found that a recommendation by an insurance association to its members on the level of gross insurance premiums was at odds with the EU competition rules. European Commission: http://ec.europa.eu/competition/sectors/financial_services/insurance.html.

and financial services Directives have been introduced aiming at creating a single European insurance market, facilitating the provision of insurance services, the promotion of cross-border activities and the enhancement of competition.

However, insurers and their associations often have contended that because of the special nature of the insurance business, the sector cannot fully rely on market forces and a free competitive process. As a consequence, not only was the regulation necessary in insurance but there was also a need to give distinct attention in the EU anti-trust policy. It is argued that based on the 'special features' the European Commission initially granted in 1992 the Insurance Block Exemption Regulation (IBER).[79] Since then, the Commission has renewed the regulation in 2003[80] and then again in 2010 (albeit not fully).[81] The following section presents the 'special features' of insurance.

[79] Commission Regulation 3932/92, as of December 1992, on the Application of Article 85(3) of the Treaty to Certain Categories of Agreements and Concerted Practices in the Insurance Sector.

[80] Commission Regulation 358/2003, of 27 February 2003, on the Application of Article 81(3) of the Treaty to Certain Categories of Agreements, Decisions and Concerted Practices in the Insurance Sector.

[81] Commission Regulation 267/2010 of 24 March 2010, on the Application of Article 101(3) of the Treaty to Certain Categories of Agreements, Decisions and Concerted Practices in the Insurance Sector.

2.3.2 Special Features of Insurance

There are mainly five 'special features' that are used to justify a reduced role for EU competition law in insurance.[82]

First, the *premium calculation* argument: Perhaps, the main feature of the insurance industry is risk and uncertainty. Consumers buy insurance in exchange for the guarantee that the insurance company will pay for certain unforeseeable losses or expenses. Furthermore, insurance companies face uncertainty about the likelihood that the insured events will occur and about the likely cost of claims. Therefore, the insurance industry needs to rely on specific assumptions in order to measure the potential risks in the future. Even though there are cases when events occur frequently enough to permit insurance companies to provide a view about the likelihoods, the historical data available to individual companies as to their own historical claims may not be representative of the overall population, which would yield unreliable estimates of risk.[83] Hence, the cooperation between insurance companies in order to gather reliable statistics is deemed as necessary by the insurance industry and consequently, it is advanced to justify an exemption from cartel prohibition.

Second, the *re-insurance* argument: The insurance industry depends on 'certain uniformity' of policy conditions and risk assessment in order to keep

[82] See for more, Faure and Van den Bergh (1995), Roth (1998), and Hughes and Florian (2014).

[83] See Hughes and Florian (2014).

transactions costs low. In general, insurance companies rely on the principle of the law of large numbers in order to decrease their degree of risk exposure. Nevertheless, counting on the law of large numbers may not always result in reduced risks particularly in the case of large risks insurance. In such situations, an efficient way of reducing risk is to take joint underwriting with other insurers. This in turn enables insurance providers to offer insurance services that otherwise could not be provided independently.[84] Put differently, this argument states that, "cooperation in the form of the co-insurance and re-insurance is necessary to meet the needs of the modern insurance markets, where insurance companies are requested to cover risks that exceed the assets of an individual insurance undertaking."[85]

Third, the *market transparency* argument: Insurance products are products that the consumer finds hard to judge and compare, because they are generally defined by very complex policy conditions.[86] Often, it is argued that transparency in the insurance industry is not always guaranteed, resulting therefore, in a lessened ability of consumers to evaluate and compare insurance policies. In such circumstances, competition may be impeded. Consequently, consumers may not be able to choose the insurance policy that better satisfies their needs. The lack of

[84] See OECD (1998), p. 27.

[85] Faure and Van den Bergh (1995) and Faure (2002).

[86] Roth (1999).

market transparency creates information problems. The latter deter the functioning of the market mechanisms and can lead to inefficient results.[87]

Fourth, the *capacity* argument: It is claimed that, with regard to the production of insurance services, there are no material limits to the extension of insurance capacity and to market access.[88] Insurance is a class of the financial services industry, which is characterized by excessive capacity. The excessive capacity may cause greater price competition, which in turn may cause undesirable results, such as bankruptcies.

Fifth, the *insolvency (financial security/stability)* argument: Public confidence and consumers' trust in insurance markets is crucial. As stated by Roth (1999), "confidence in the financial stability of insurers is an essential pre-condition for the general public to use insurance as an instrument for planning the future." If an insurance company faces failure or solvency problems, this in turn may lead to high social costs for consumers. Consequently, it may damage public confidence in the insurance industry. This is also summarized by Faure and Van den Bergh (1995), who stated that, "competition may lead to bankruptcies, which would make it impossible for the insurance companies to fulfill their obligations *vis-a- vis* the insureds; the latter have to be protected against the insolvency risk."

[87] Faure and Van den Bergh (1995).

[88] Roth (1999).

2.3.3 Insurance Block Exemption Regulation

The first two block exemption regulations (granted in 1992 and later in 2003) were applicable to four types of cooperation between insurance companies subject to certain conditions: a) the establishment of common risk premium tariffs based on collectively ascertained statistics or on the number of claims; b) the establishment of standard policy conditions; c) the common coverage of certain types of risks; and d) the establishment of common rules on the testing and acceptance of security devices.[89]

In 2010, following a consultation and evaluation process, the Commission decided to renew two of the four types of agreements that had been covered by previous block exemptions: a) joint compilations, tables and studies; and b) co-insurance and re-insurance pools. Exemptions for standard policy conditions and security devices were not renewed.

The first exemption concerns agreements on joint compilations, tables and studies, which are considered valuable since they enable insurance companies to

[89] In general, agreements that fall within the domain of a block exemption are exempt from the Article 101(1) TFEU prohibition and the national courts are free to retain the terms of the block exemption should the validity of the agreement be raised before such a court. The general rule is that when the conditions of the block exemptions are not fulfilled, the regulation cannot be applied in its entirety. Whether the conditions of a block exemption are not fulfilled, the national court will be bound to determine whether or not the agreement violates Article 101(1), and whether it individually meets the Article 101(3) criteria (Jones and Sufrin, 2012, pp. 264-265).

better assess the potential costs of insurance products. According to the Commission, a better quality of assessment would be likely to facilitate market entry and benefit consumers.

Article 3(1) of the current IBER sets out that the exemption is granted to the exchange of certain types of information between insurance companies, such as: a) the number of claims during a given period; b) the number of individual risks insured; c) the total amount paid or payable in respect of claims during the relevant period; and d) the total amount of capital insured for each risk year during the relevant period.

Meanwhile, Article 3(2) points out that the above exemptions have to be made available on 'reasonable, affordable and non-discriminatory terms' to any insurance undertakings or entrants, which are not active in the markets where the studies have been conducted. This condition makes markets more transparent to potential new entrants, thus lowering barriers to entry, and resulting in stronger competition.

The second type of agreements exempted by the regulation concerns those agreements that have as their object the setting-up and operation of groups of insurance undertakings for the common coverage of a specific category of risks in the form of co-insurance and co-reinsurance.[90]

[90] Article 5 of the IBER.

The IBER allows insurance pools for 'new risks', without any market share thresholds, for a period of three years. New risks are defined under Article 1 as risks that did not previously exist and that require 'the development of an entirely new insurance product', and in exceptional cases, risks that have changed so materially that 'it is not possible to know in advance what subscription capacity is necessary' to cover such a risk.[91]

More generally, the IBER covers pools for other risks, subject to the market shares of the pool participants not exceeding certain thresholds. The aggregate market share of the insurers that comprise a pool for risks other than 'new risks' cannot exceed twenty percent for co-reinsurance pools and twenty-five percent for re-insurance pools.[92]

In particular, the Commission further clarifies in its 2009 Report on the Functioning of the 2003 Insurance Block Exemption that "pools may be considered not to be anti-competitive, no matter how high their market share, as long as pooling is necessary to allow their members to provide a type of insurance that could not be provided by one insurance company alone".[93]

In order for the IBER to apply there cannot be: a) any restriction or sanction on individual undertakings withdrawing from the pooling arrangements following a

[91] Article 1.6 of the IBER.

[92] Article 6.2 of the IBER.

[93] Hughes and Florian (2014).

'reasonable period of notice';[94] b) any restrictions on output, or allocation of geographic or product markets;[95] c) any obligations to sell through the pool;[96] d) any agreement on commercial premiums not sold through the pool;[97] and e) any compilation and sharing of information that gives an indication on the level of commercial premiums. [98]

Nevertheless, if an agreement falls beyond the scope of the IBER, then it does not automatically infringe EU anti-trust law but is subject to individual assessment and is assessed according to Article 101 TFEU.

2.3.4 Anti-trust Cases

Since insurers operate in various categories of risks and their policyholders are usually individuals who can obtain advice and assess offers from brokers, there may exist opinions that insurance should not be of particular interest to competition authorities. Indeed, the insurance industry has been subjected to intense scrutiny by EU competition authorities. Also, the fact that certain cooperation agreements have been exempted from cartel prohibition for a long period of time has not been an excuse.

[94] Article 7(a) of the IBER.

[95] Article 7(c) (d) and (e) of the IBER.

[96] Article 7(b) of the IBER.

[97] Article 7(f) of the IBER.

[98] Article 3.2(c) of the IBER.

There is a significant body of case law across Europe that supports this. Particularly, it focuses on how various agreements may have an anti-competitive object or effect under Article 101 TFEU and Member States' equivalent or similar prohibitions of anti-competitive agreements.

In this view, in 2007 the German *Bundeskartellamt* (the German anti-trust authority) prohibited a pool of insurers from concealing financial loss liability risks for auditors and chartered accountants, notwithstanding that this dated back to a state directive from the 1930s. Although this decision was eventually overturned on the basis of flaws in the market definition adopted by the *Bundeskartellamt* and thus the market share calculations, it highlights the importance of insurers periodically assessing carefully whether their cooperative arrangements would infringe the EU competition law.

Likewise, cooperation agreements have been the focus of attention for the UK Office of Fair Trading. One example is its decision taken in 2012 to accept commitments from seven of the UK's leading private motor insurance companies and two IT software providers with regard to the WhatIf? Private Motor data exchange tool. This case shows the importance of being aware of the principles that underpin the IBER. WhatIf? is a market analysis tool used by brokers to provide quotations to their clients which, according to the OFT, was also used by 'most insurers operating in the broker channel of private motor insurance.' This tool contained pricing information on all products that participating insurers offered through brokers, which meant that it was outside the scope of the block exemption.

It is worth noting that the OFT expressed the view that the information exchange was an object infringement of competition law with the information exchange occurring not directly between insurers but via IT service providers. This view was based on the precise nature of the information exchanged and the fact that it concerned future conduct.

In the same year, the European Commission closed an investigation of several provisions associated with claim sharing and joint re-insurance agreements in the marine insurance sector. The focus of the examination was the International Group Agreement (IGA) and the Pooling Agreement between the P&I clubs, which comprised rules on the claims sharing, joint insurance, and the contractual relationships between the P&I clubs and their associates. The main purpose of the investigation was to assess whether several agreements' provisions decreased competition between P&I clubs, and limited the access of commercial insurers and additional P&I insurers to the relevant markets.[99]

2.4 European Competition Policy in Banking

Just as in the insurance sector, at the outset of the EU the banks denied the application of the EU competition law to the banking sector. In fact, the first time that the ECJ confirmed the full applicability of the EU anti-trust law in banking

[99] P&I clubs are joint non-profit making associations that offer to their members (the ship owners) a special form of direct marine insurance known as protection and indemnity insurance.

arrived in the case *Zuchner v Bayerische Vereinsbank AG*.[100] In *Zuchner*, the ECJ denied the claims of the *Vereinsbank,* which argued that the EU competition rules did not apply to banking because of the special nature of their services, and that banking undertakings should have been considered as undertakings "entrusted with the operation of services of general economic interest" and not be subject to the EU competition rules. Apart from the ECJ declarations in the *Zuchner* case, the application of the EU anti-trust framework in the banking sector continued to be blocked by severe regulatory restrictions that existed in some Member States. Partly, these restrictions were justified by alleged concerns that free market forces in banking were a source of financial instabilities.[101]

In the 1970s, the banking sector witnessed major transformation following the harmonization process promoted at the European level that fully liberalized interest rate controls, investment restrictions of financial bodies and cross-border access for foreign banks. Since then, EU competition law has been fully applied to the banking sector. Indeed, banking undertakings have been subject to an ongoing and intense scrutiny by the EU anti-trust authorities. A testimony for this is the significant body of case law.

For instance, during 1994 – 1998, eight Austrian banks created the largest EU banking cartel, called the 'Lombard Club'. Banks agreed to fix interest rates for

[100] Case C-45-172/80 *Zuchner v. Bayerische Vereinsbank AG* (1981) ECR 2021, 20130.

[101] Edey and Hviding (1995) note that in the early 1970s "the protection of small savers with limited financial knowledge was an important objective of controls on banks."

deposits and loans. The Commission gathered ample proof of collusion to verify the violation of Article 101 TFEU. All banks collaborated in the investigation, and the fines equaled €124.26 million.[102] Another cartel case occurred in 1997 among German and Dutch banks. In this case, the European Commission imposed a total of €100.8 million in fines: the colluding banks engaged in price fixing for currency exchange.

Another case includes Visa International and MasterCard, which made an agreement on setting multi-lateral interchange fees. Initially, the Commission decided that Visa Europe's multi-lateral interchange fees infringed Article 101 of the Treaty. Later, after negotiations, Visa Europe agreed to limit its yearly cross-border multi-lateral interchange fees. In the case of Master Card, the Commission issued a decision in 2007, requesting MasterCard to abolish multi-lateral interchange fees because they served as a bottom price for payment cards.

In 2007, the European Commission considered violations of Groupement des Cartes Bancaires and established that Groupement had charged higher cards costs for new banks entering the market. However, the Commission decided not to enforce any fines but demanded an end to the anti-competitive behaviour of Groupement.

In 2011, the European Commission undertook an investigation on the credit default swaps market.[103] The preliminary stage of investigation process established

[102] See for more, Hasan and Marinč (2016).
[103] EC (2014).

that during 2006 -2009, thirteen investment banks, including ISDA and Markit, had jointly operated to stop two exchanges (Eurex in 2007, and CMDX in 2008) from entering the credit derivatives trading market by mutually refusing several inputs that are essential for the take-off of exchange trading. Such activity is deemed more efficient and less disposed to systemic risks.

A few years later, the Commission investigated the application of the decisions previously adopted in the financial data markets. In addition, it has been monitoring the application of the agreements' obligations that Standard and Poor signed in 2011. Specifically, under this agreement the company would supply the International Securities Identification Numbers unbundled from additional data. In the same way, the Commission started to screen whether Thomson Reuters was complying with the commitments imposed by the Commission in 2012, according to which it would license usage rights to the Reuters Instruments Codes to its customers in order to obtain data from other financial data providers.

In addition, in December 2013, the Commission took decisions on two cases, the first such cartel cases since the start of the recent financial crisis. The total fines imposed amounted to €1.7 billion. The companies that established the settlements were: Barclays, Deutsche Bank, the Royal Bank of Scotland, Société Générale, UBS, JP Morgan, Citigroup and RP Martin. Among them, Barclays, Deutsche Bank, the Royal Bank of Scotland, and Société Générale participated in a cartel in the market for

interest rate derivatives denominated in euros (EIRD)[104] while Citigroup, Deutsche Bank, JPMorgan, Royal Bank of Scotland, RP Martin and UBS participated in one or more bilateral cartels in the market for interest rate derivatives denominated in yen (YIRD).[105] Deutsche Bank and RBS were involved in both infringements.

In October 2014, The European Commission found that two international banks, RBS and JP Morgan, took part in a cartel whose purpose was to influence the Swiss franc Libor benchmark interest rate between March 2008 and July 2009. Banks agreed to settle the case with the Commission under a basic procedure; therefore, RBS received protection from fines for revealing the existence of the cartel to the Commission while JPMorgan was fined € 61.6 million (after benefitting from a reduction of its fine for its cooperation with the investigation under the Commission's 2006 Leniency Program).

2.5 Failing to Make Insurance Distinct

This section evaluates the distinctive nature of insurance by comparing features of insurance business with those of the banking industry. Given the similarities and the ongoing convergence between the two industries, this section attempts to analyze

[104] Euro interest rate derivatives are interest rate derivatives denominated in Euros. The main benchmark interest rates to which EIRD products are linked to are the EURIBOR rates.

[105] Yen interest rate derivatives are interest rate derivatives denominated in Japanese Yen. The main benchmark interest rates to which YIRD products are linked to are the Japanese Yen LIBOR rates.

the relevance of the traditional arguments advanced by insurers over years and on the basis of which, they have received immunity from the full scope of the EU anti-trust law. Arguments are discussed based on a comparative analysis between insurance and banking.

2.5.1 Premium Calculation Argument

As previously discussed, one of the key arguments advanced by the insurance industry to justify differential treatment from EU competition rules regards certain difficulties insurers face with the calculations of policy premiums.[106] Reliable historical statistics are crucial for the accurate calculation of premiums; therefore, cooperation agreements among insurers are indispensable to mitigate insolvency risk, improve the provision and insurance services, and consequently, satisfy the first requisite for an exemption.

It is obvious that the main rationale underlying this argument is that insurers operate with risks and uncertainty. Thus, in order to manage risk and deal with uncertainty, it is necessary that they cooperate and share information on loss historical statistics. However, insurers are not the only providers of financial services that have to deal with risk and uncertainty.[107] Banks, just like insurers, do not simply operate with risks and uncertainty; they are exposed to a whole range of risks. Their main activity on the assets side consists of the purchase of claims of

[106] Faure (2002).

[107] Faure and Van den Bergh (1995) and Thimann (2014).

uncertain future cash flows, which are financed through a limited amount of equity supplemented by funds provided by creditors.[108] Moreover, as already mentioned, insurers and banks are both financial intermediaries that receive money from private individuals and companies and lend to those that are willing to borrow. This is simply risk management and is basic business activity not only for insurers but also for banks.[109]

The specific nature of cooperation agreements in order to calculate policy premiums becomes even more ambiguous especially with regard to certain types of policies in the life insurance line, which are comparable with long-term savings or deposits offered by banks. The necessity of such forms of cooperation only in insurance undertakings seems weak. since calculating interest rates for long-term deposits that assume a considerably high risk is not an easy task for banks as well. In addition, there is evidence, albeit to a limited extent, that banks are involved not only in the distribution of insurance products but also in the underwriting process.[110] In such cases, the specificity and necessity of cooperation agreements in order to gather and share historical statistics can be, at least, equally important or applicable also for banks. Forecasts of expected future losses are not constructed on historic loss information in the case of certain specific risks. Therefore, the exchange of information is redundant. Examples may include the insuring of risks based on

[108] See Maes and Kiljanski (2009).

[109] See Huertes and Silverman (1933).

[110] See EC (2007), p. 12.

stock market movements or the risks based on weather patterns, substantial information on which is already available.[111]

In sum, the argument that pro-competitive cooperation agreements for the purposes of premium calculations are specific and indispensable only to the insurance industry (and not to other sectors) is not convincing. Moreover, it does not hold for all insurance lines and products. There exist crucial differences among various insurance lines with respect to the risk calculation. As pointed out in Faure (2002), there are many cases in which statistics can be obtained easily and there is no need for cooperation, especially with regard to the compilation of mortality tables necessary in the risk determination of life insurance products. Thus, it seems that it cannot be used any longer as a justification for a generalized exemption across all the insurance industry.

2.5.2 Re-insurance Argument

At first glance, it appears that re-insurance is an explicit form of business undertaken exclusively in the insurance industry. Therefore, the pro-competitive cooperation in necessary, and consequently, should be exempted from the cartel prohibition. In this respect, the necessity for 'certain uniformity' of policy conditions

[111] OECD (1998), p.30.

and risk assessments in co-insurance and re-insurance business stems from the specific types of business operated by insurers. [112]

Although the re-insurance argument deserves some recognition, the specificity of cooperation agreements for the common coverage of certain types of risks requires additional analysis. Pro-competitive cooperation is not unusual for other providers of financial products, especially banks. One form of such cooperation that seems comparable to re-insurance or co-insurance is the funding of large projects through syndicated loans.[113] Syndicated loans are debts issued by a group of creditors to a single client. The amounts credited are very large, and cannot be funded by only one creditor. Funds are used to finance strategic development projects in infrastructure, huge acquisitions or expansion projects. As in the case of re-insurance, there is a chief creditor for each syndicate.

There are also other bank products that provide similar economic functions as those of re-insurance. For example, certain financial risk management products such as credit derivatives are a form of re-insurance against adverse market movements, imitating the effect of insuring an insurer in case of specific large risks in the insurance industry. Although not identically the same, the existence of these products at least shadows the distinction between insurance and traditional bank products.[114]

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[112] Roth (1999).

[113] See for more detailed discussion, Fernandez and Graells (2009).

[114] OECD (1998), p 31.

Additionally, the specificity and necessity of pro-competitive cooperation in re-insurance for all lines of insurance needs further scrutiny. The efficiency and the pro-competitive nature of this type of cooperation depend on the type of risks, the extent to which they are diversified and claims frequency. Pooling arrangements that facilitate the re-insurance on large scales or in high-risk lines may contribute to an improved level of competition.[115] However, there may be other cases such as the nuclear insurance line in which the pooling of risk may result in inefficient re-insurance.[116] Pooling of risks in national nuclear insurance pools may lead to high premiums and a short availability of insurance coverage as well as to potential low financial restrictions on the liability of nuclear power plants as a consequence of the lobbying powers of the nuclear insurance pool and nuclear sector.[117] Interestingly, a consumer who participated in the recent review process of the IBER, expressed concern with regard to the existence of pools in nuclear insurance, pointing out that the European market for nuclear insurance is not competitive due to the existence of pools in this line.[118]

[115] Havens and Theisen (1986).

[116] Faure and Van den Bergh (1990).

[117] Faure and Van den Bergh (1995).

[118] For more, see Summary Report of the Replies to the Public Consultation on the Review of the Insurance Block Exemption Regulation, available at http://ec.europa.eu/competition/sectors/financial_services/KD0414707ENN.pdf (accessed 1st August 2015).

2.5.3 Market Transparency Argument

Often, it is argued, aiming at legitimizing the immunity of the insurance industry from the application of EU anti-trust rules that insurance products are products that the consumer finds hard to judge and compare, because they are usually defined by very complex policy conditions.[119]

Like insurance products, bank products are often very complex. For instance, credit products such as mortgage loans, overdrafts, or even credit cards have a range of terms and conditions that are not easily understood by consumers. The Commission identified the lack of consumer ability to understand, evaluate and compare bank products, as a competitive concern in the European retail banking in the sector inquiries conducted in 2008.[120]

There are several information problems that may arise due to the lack of transparency. In insurance, the most particular problem is that of the reversed adverse selection. This type of adverse selection, known also as the insurer side adverse selection occurs when there exists a difference in the quality of insurance

[119] Certain information problems may delay the market mechanisms and harm efficiency. In response to such market failures, forms of regulation such as standardizations of policy terms had been deemed the right regulatory response. Apparently, this has constituted the third condition for the existence of the block exemption since its first introduction in 1992 and the subsequent renewal in 2003, in which cooperation on the design of standard policy conditions used to fall under their scope. However, it is important to note that the current regulation ended the block exemption in this area.

[120] Caiazza et al. (2008).

policies and information barriers that prevents policyholders from correctly assessing these policies according to their qualities. As a result, a policy of low quality coverage will cost more than it actually offers. Or, insurers that wrongly priced their premiums may face non-payment of claims and risk insolvency. In turn, both effects may lead to a loss of public confidence towards insurance as a result of several externalities that arise from non-payment and/or under-payment.

Both the theoretical and empirical literature in insurance provide little evidence of the existence of this type of information problem, particularly for European insurance. The only study undertaken in this topic is recent research by Schwarz,[121] which investigates policies of homeowners' insurance in six states in the U.S. The paper compares sixteen homeowners' insurance policies found in North Dakota and Pennsylvania to the standard policy provided by the International Services Office. Based on the findings, the author raises concerns that some insurers may be taking advantage of consumers' illiteracy. They try to hide differences between the policies by increasing back coverage. Policy differences may not be necessarily harmful unless the heterogeneity in coverage is joined by lack of transparency. The latter prevents consumers from choosing insurance on the basis of coverage terms. Moreover, it generates a situation in which insurance companies that offer low quality products at high prices may exploit consumers.

[121] Schwarz (2011).

A similar adverse selection problem can occur in banking. Information barriers and a variety of credit products may prevent consumers from accurately evaluating different offers. Credit products such as mortgage loans have different availability, duration, repayment conditions, collateral and associated risks. In addition, consumers may face information barriers when deciding what type of mortgage loan to apply for, which may prevent them from accurately evaluating their quality. Consequently, the costs may outweigh the benefits in case of a poor quality loan. Or, banks, which do not correctly value the loans, may face a default of loan instalments. This in turn may lead to a negative public attitude towards banks.

The argument that insurance business is specific due to the lack of transparency that characterizes its nature and the occurrence of subsequent related information problems is not convincing. Similar information problems may occur in banking. In addition, the argument appears not to hold for all lines of insurance. The assumption that consumers are not capable of understanding, assessing and comparing the insurance products offered by all lines of insurance is not correct. Usually, this does not apply in the area of business insurance. In this line, knowledgeable buyers that are able to discuss in detail policy terms and conditions challenge insurance companies. The lack of transparency, therefore, mainly arises in the case of consumer insurance.[122]

[122] See Faure (2002) and OECD (1998), p. 33.

2.5.4 Capacity Argument

This argument holds that since insurers can easily extend their capacity, it is likely that they can be involved in harmful price competition. Unlimited competition in insurance can lead to excessive risk taking by some insurance companies. The excessive risk taking can lead to insurance insolvency risks.[123]

This argument is not correct for two main reasons: First, in the financial services world, not only are insurers able to quickly and easily extend their capacity. Other providers of financial services such as banks can effortlessly expand their balance sheet, and consequently their business volume. For banks, expansion that simply involves entering into new financial contracts, on both assets and liquidity sides does not require extensive investment.[124] Moreover, it should be noted that the insurance supply is not always unlimited with respect to quantity; it depends on operational costs, and it may be restricted in certain insurance lines on the basis of insurable objects such as industrial fire insurance and motor vehicle insurance.[125]

Secondly, the argument is not sustained by theoretical or empirical evidence. On the contrary, there exist a number of papers that show that strong competition can increase excessive risk-taking in banking. For example, Beck et al. (2013) show that an intensification of competition has a larger effect on banks' instability in economies where there exist harsher activity limitations, well established stock

[123] See Faure and Van den Bergh (1995) and Roth (1999).

[124] See Maes and Kiljanski (2009).

[125] See Finsinger (1989).

exchanges, greater systemic stability, substantial deposit insurance and more effective credit information sharing systems. Likewise, Jimenez et al. (2010) using Lerner indices based on bank-specific interest rates, find a negative relationship between loan market power and bank risk-taking.

All in all, the capacity argument fails to draw distinct lines between insurance banking. Both sectors are able to easily and quickly extend their capacities, albeit within some limits. While the excessive risk taking as a result of higher competitive pressure is supported by academic work in banking literature, similar evidence is not yet provided for insurance. Thus, exempting the insurance industry from the application of EU anti-trust rules based on this argument is simply flawed. Further, as several authors have already pointed out, it also remains unclear why this argument should be advanced as a justification for a restriction of competition in insurance markets. The issue of excessive capacity has not been, and still is not, a subject of the European competition authority.[126] The insurance regulation - Solvency II, particularly deals with excessive capacity. Similarly, a broad prudential regulation - Basel III, already addresses this issue for banking.

2.5.5 Insolvency/Financial Stability Risk Argument

The rationale of this argument is that consumers' trust and confidence in the insurance sector is of crucial importance for the industry in order to be accepted.

[126] Roth (1999), Faure (2002), and Maes and Kiljanski (2009).

Indeed, public confidence and consumers' trust are equally fundamental for both banking and insurance markets. The confidence of the public is crucial to safeguard stability in banking and is an essential pre-condition for using insurance products as an instrument for future planning.[127] All banks operate in conditions of fractional liquidity reserve. As already discussed, banks liabilities are very liquid deposits, while their assets are mainly non-liquid loans. When depositors start losing confidence in the solvency of their banks, the first normal reaction is to withdraw their deposits leading to serious problems for banks. This situation creates a lack of confidence, not only for the insolvent banks, but also for the solvent ones. The insolvency risk causes bank failures, which in turn introduce the possibility of system-wide failures or systemic risk.

Like banks, insurers face an insolvency risk when they are unable to meet their financial obligations. This is due to a maturity mismatch between assets and liabilities. However, the failure of an insurer that operates in the core business does not cause systemic risk that can be spread to the financial system. In the insurance world there exists less contagious risk, better substitution chances, and less financial exposure as compared to banking. This is also supported by empirical evidence. According to Cummins and Weiss (2014), the main activities of the U.S. insurers do not generate systemic risk. They are neither necessarily large nor

[127] See Hasan and Marinč (2016) and (Roth, 1999).

interconnected with other companies such as to pose a systemic risk, via their core business.

In contrast, life insurers are more exposed to crisis than their property and casualty counterparts since they are more leveraged and vulnerable to credit and liquidity risks owing to investment in complex financial products. The financial innovation that has enabled insurers to enter banking by selling products with large non-insurance components has increased the interconnection of insurance with the banking sector and financial services sector in general. As a result, and as a growing body of empirical research suggests, the insurance industry is now both a potential source and victim of systemic risk.

Several papers have investigated the role of systemic risk in insurance markets. For example, Bell and Keller (2009) examine the systemic risk of insurers and conclude that "classic insurers do not present a systemic risk'" However, the non-core activities may still pose a systemic risk. Also, Baluch et al. (2011) studied the role that the European insurance industry played in the recent financial crisis. Their findings show that systemic risk was lower in insurance than in banking, but has been amplified due to the increased involvement of insurance in non-core activities.

Like all prior arguments, this argument is also flawed. The high insolvency risk as a result of high price competition and the necessity of consumer protection is of particular importance not just to the insurance industry. The same holds and is of paramount importance to other providers of financial services, at least to banks.

This argument fails one more time to portray insurance business as 'special' vis-à-vis other providers of financial services such as banks. Consequently, exempting certain insurance agreements from cartel prohibition based on this argument is no longer relevant.

In addition, even though consumer protection is one of the foremost aspects of competition law, and a single EU market requires consumer protection in order to increase confidence in the financial services sector,[128] there is a broad prudential regulation in place that deals with insolvency risk aiming at protecting the small and uninformed policyholders. The existence of specific instruments, such as capital requirements, governance and risk management requirements, creates conditions for healthy competition in insurance markets. Also, it is worth mentioning that across Europe there are insurance guarantee schemes that provide effective protection for policyholders in case insurers fail, in a similar way to how deposit insurance agencies provide for depositors in the banking industry.

Insurance guarantee schemes provide last resort protection to policyholders offering protection either by paying compensation to policyholders or by securing the continuation of insurance contracts. Across Europe, in thirteen countries only one scheme operates. In five countries (Latvia, Romania, Malta, Spain, and the UK) there are general systems that cover both life insurance and non-life insurance:

[128] See Commission Communication of 26 June 1997 on the financial services: enhancing consumer confidence, COM(97) 309 final.

three countries (France, Germany and Poland) have a general scheme for life insurance and another three have a general scheme for non-life insurance (Denmark, France and Ireland). Finally, six countries have very specific schemes that cover particular classes of non-life insurance (Belgium, Finland, Germany, Italy, Poland and Spain).[129]

2.6 Conclusions

The current anti-trust framework of insurance regulation in Europe is on the brink of significant changes. As pointed out recently in the preliminary impact assessment by the European Commission, the chances are that the block exemption system in insurance may follow its natural way and the same path as most of the previous sector-specific exemption regulations, and therefore, be completely repealed.

In the light of this process, this chapter argued that the insurance sector can still not be considered as 'peculiar', at least vis-à-vis banking, and therefore, can no longer be treated as 'sui generis' for EU competition law. Specifically, the traditional arguments that have been advanced by insurance associations to justify different treatment by the EU competition rules have lost their relevance. They fail to recognize the similarities and an increasing convergence between the two sectors of the financial services industry. Although certain contrasts exist between them, the similarities and growing areas of overlap are much more significant. Further, within

[129] EC (2007), p. 36.

the insurance sector, the differences can be at least as numerous as those between insurance and banking.[130] Thus, how can a blanket exemption for the entire insurance industry still be in place?

Insurers and banks are both financial intermediaries that operate under risk and uncertainty; the risk management is at the core of their business. Moreover, the on-going convergence between the two sectors has left a major imprint in risk management, which has tended to evolve in similar ways and draw them closer together.[131]

In addition, the gravitating process between the two worlds, has led to the development of products of services whose economic functions are more and more comparable. Nowadays, insurance products compete with banking products, while there exist banking products which mimic functions very like those of insurance products such as that of re-insurance.

Unsurprisingly, they cannot differ much even with respect to the existence of information problems that arise from the lack of market transparency. This is particularly accurate especially in the retail segments of insurance and banking, in which the complexity of terms and conditions of insurance policies and banking products raise similar competitive concerns.

Further, both insurers and banks are able to quickly and easily extend their capacity, albeit not without limits. The potential harmful consequences, such as

[130] See Knight (2005).

[131] See Knight (2005).

excessive risk-taking in insurance markets resulting from unlimited price competition that may be generated by the alleged capability of insurers to extend capacity, are not yet supported by the literature. In contrast, there is evidence that high competitive pressure increases the excessive risk-taking in banking. Nonetheless, banks remain subject to the full application of EU anti-trust rules, while insurers do not receive the same treatment.

In addition, they are both exposed to the insolvency risk. Public confidence and consumers' trust are equally fundamental to preserve the financial soundness of insurers and banks and safeguard stability in the financial markets. Lack of public confidence increases the insolvency risks, which may cause failures in both insurance and banking sectors. The possibility of system-wide failures remains present in both, although it is more evident in banking and in the life insurance line.

Furthermore, the insurance sector is not homogenous. The conditions for exemption on the basis of the traditional arguments do not hold for the entire insurance industry since they disregard essential differences with regard to risk calculation among different insurance lines and products. Also, the efficiency of the pro-competitive nature of arrangements with regard to re-insurance and co-insurance pools is not always guaranteed; it is very dependent on the type of risks, the extent to which they can be diversified, and the frequency of claims.

Hence, the differential treatment of insurers and banks by EU competition law deserves additional analysis by the policymakers. Meanwhile, further research may provide valuable insight into insurance sector developments across EU Member

States in order to better evaluate the effectiveness of a blanket exemption for the entire industry.

Chapter 3

COMPETITION AND FINANCIAL SOUNDNESS: EVIDENCE FROM THE ITALIAN NON-LIFE INSURANCE MARKET

3.1 Introduction

The non-life insurance market in Italy has witnessed major developments during the last two decades following the harmonization of insurance services in the mid-1990s. The harmonization process was initiated through the adoption of the EU Third Non-Life Insurance Directive (in 1994), and has continued through several national legislative changes.[132] Such a process generated significant deregulation and liberalization of the market, whose main objectives were to improve insurers'

[132] For instance, Decree 223/2006 and Decree 1/2012.

efficiency, and enhance consumer choice of insurance services by increasing competition.[133] By the time such a goal had been accomplished, insurers would have also improved their financial soundness.

The soundness of insurance companies is important to policyholders, investors and policymakers. Particularly, after the 2007-2008 financial crisis the issue of preventing insurance companies from default and increasing the sound financial health of insurance markets has attracted the attention of EU policymakers. [134] In this view, the Italian non-life insurers as well as their counterparts throughout the EU have recently started (January 2016) to implement Solvency II - a harmonized risk-based approach, which enhances insurers' resilience by applying minimum capital requirements necessary to cover insolvency risks.

The purpose of this chapter is twofold: i) to investigate how competition has changed in the Italian non-life insurance sector in the aftermath of the deregulation and liberalization process; and ii) to assess the nexus between competition and financial soundness in this market. The non-life insurance sector in Italy provides an interesting environment in which to analyze competition and its association with financial soundness. It is the fifth largest market in the EU and the eighth in the world in terms of gross written premiums. [135] In 2014, the gross written premiums amounted to Euro 32.8 billion and total assets to Euro 109.8 billion.

[133] See Cummins and Rubio-Misas (2006).

[134] See Cummins et al. (2017) and Vaughan (2015).

[135] According to Swiss RE (2014) and ANIA (2015).

The empirical analysis consists of two parts. First, the Boone indicator of competition in the non-life insurance market is estimated for the period 1998-2013. The Boone indicator is a relatively new measure of competition that captures the effect of competition on firms' performance. The rationale behind this approach is that competition rewards efficiency: relatively more efficient firms achieve a superior performance in terms of higher profits at the expense of their less efficient counterparts. Secondly, we assess the interplay between competition and financial soundness. Closely following Cummins et al. (2017) and Schaeck and Cihák (2014), the latter is estimated by using an indicator of the insurance soundness (Z-score) as the dependent variable and the Boone indicator as the independent variable.

This chapter contributes to the literature by applying the Boone indicator to assess the competitive behavior of Italian non-life insurers. This measure has been employed in the past for life insurers.[136] As far as is known, only Bikker and Popescu (2014) have used it to examine competition in the non-life insurance market in the Netherlands. In addition, this is the first attempt to examine the nexus between competition and financial soundness in the Italian non-life insurance sector.

The remainder of the chapter is organized as follows: Section 3.2 highlights the features of the non-life insurance market in Italy, describes the institutional and legal environment as well as the recent approach of the national anti-trust authority.

[136] Bikker and van Leuvensteijn (2008), Bikker (2012) and Cummins et al. (2017).

Section 3.3 reviews the related literature. Section 3.4 presents the theoretical background and empirical strategy. Section 3.5 outlines the data selection and explains variables. Section 3.6 presents the Boone estimates and findings about the competition-soundness nexus. Lastly, Section 3.7 concludes.

3.2 Italian Non-Life Insurance Market

This section presents an overview of the legal and institutional environment, anti-trust cases as well as describes the main features of the market.

The Legal Environment and Institutional Setup

During recent decades, the non-life insurance sector in Italy has been subject to several reforms, initiated at the EU level and later, at the national one.

The key reform dates back to July 1994 when the EU Third Non-Life Insurance Directive (the 'Third Directive') was enacted.[137] The Third Directive completed the deregulation and liberalization process by opening the market for individual purchasers of insurance and retained home country control for all non-life risks.[138] In particular, the Third Directive consisted of three components: i) the

[137] Council Directive 92/49/EEC of 18 June 1992 on the coordination of laws, regulations and administrative provisions relating to direct insurance other than life assurance and amending Directives 73/239/EEC and 88/357/EEC.

[138] Prior to this directive, the First Directive (Directive 73/239/EEC of 24 July 1973) and the Second Directive (Directive 88/357/EEC of 22 June 1988) introduced the freedom of

establishment of a single EU licence, whereby an insurer is required to obtain only one licence to operate in the EU rather than being licensed in each Member State; ii) the principle of home country supervision, whereby an insurer is regulated only by the Member State that issued the licence, iii) the abolition of the 'substantive insurance supervision', which means that supervision is limited to solvency control, and that pricing, contracting and other aspects of insurer operations are effectively deregulated. This marked the first time that insurers were allowed to engage in true price competition in personal insurance lines, and also to compete more freely in terms of products and services. Once the Third Directive was enacted, the Italian public authorities could no longer control prices and insurance policy conditions. Italian insurers started to price policies according to the risk attitudes of policyholders, and introduced the 'bonus/malus' mechanism.[139]

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establishment and freedom to provide non-life insurance services. In particular, the First Directive granted insurers the right to establish subsidiaries, branch offices, and agencies in each EU Member State; it established basic prudential rules and retained the host country supervision.[138] Moreover, host countries retained the right to stringently regulate all aspects of market conduct, including prices. The Second Directive enabled insurers to conduct activity outside their home country without having to create branches in host countries. The principle of home country supervision was also adopted.

[139] "The 'bonus/malus' system is a mechanism that relates the price/premium with the performance of the motor policyholder. The premium upon the initial stipulation or renewal of a contract will be raised or lowered depending on whether or not the policyholder has been responsible for an accident claim in the previous year. The basic principle is: the more accidents a policyholder has caused over the years, the higher the premium". (ANIA, 2009)

In 2002, the Solvency I amended the EU insurer solvency regime (previously introduced in 1973).[140] According to the new regulation, non-life insurers had to keep an adequate solvency margin according to certain requirements. A few years later, the Solvency II (introduced in 2009) fully harmonized the EU insurance regulation.[141] Solvency II consists of three main pillars: i) the first pillar covers the capability of an insurer to prove its adequate financial resources and consists of quantitative requirements such as the amount of capital an insurer must hold; ii) the second pillar specifies requirements for the governance and risk management framework; iii) the third pillar focuses on the disclosure, reporting and transparency requirements.

In spite of the changes in EU legislation, the Italian government has introduced additional reforms aiming at enhancing competition in the non-life insurance market. Particularly, in 2006, the Decree 223/2006 (also known as 'Bersani Decree') introduced a new set of rules on the relationship between parties involved in the sale of third-party motor liability policies.[142] The new Decree, which

[140] Council Directive 2002/13/EC of the European Parliament and of the Council of 5 March 2002 amending Council Directive 73/239/EEC as regards the solvency margin requirements for non-life insurance undertakings.

[141] Council Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance.

[142] Decree 223/2006 introduced a new regulatory system on competition and free markets. The Italian Parliament approved the implementing Law 248/2006 on August 4, 2006. Named after Pierluigi Bersani, the former Minister of Economic Development.

came into force in 2007, followed a policy of liberalization. Particularly, Article 8 improved business relationships between insurance undertakings and their agents by: i) banning exclusive sales arrangements for motor insurance policies; ii) requiring that the commission earned on the sale of such policies be published, and iii) preventing insurers from imposing minimum prices or maximum discounts on agents. The Law 248/2006 that amended and implemented the 'Bersani Decree' required agents to inform the policyholder of the level of commission they have agreed with the insurer. Such information must be displayed on the agent's premises and shown clearly in the premium quotation given to the customer.[143]

In 2012, the Decree Law 1/2012 (also known as the 'Grow Italy Decree') introduced additional rules on the third party liability, insurance intermediation and consumer protection. [144] The new regulation specified requirements for intermediaries that participate in the distribution of motor third-party liability insurance. In particular, Article 34 stipulates that each intermediary must provide transparent and complete information to the policyholder, before signing the contract, on the price and other contract terms offered by at least three other

[143] The Decree introduced also a new direct indemnification scheme covering claims-handling procedures arising from the use of a motor vehicle. An insured person who is injured as a result of a motor vehicle accident will be reimbursed directly by his or her insurer without having to claim compensation from the insurer that covered the partly liable for the accident.

[144] Decree Law 1/2012 of 24 January on liberalization, converted with amendments into Law 27/2012 of 24 March, containing 'Urgent measures for competition, the development of infrastructures and competitiveness'.

insurers. This requirement applies to distribution via intermediaries such as to agents, brokers, banks or other financial intermediaries. An additional two rules focus on pricing: i) the undifferentiated prices for policyholders in the best merit class; and ii) the application of a premium reduction for a year without accidents. Both measures are drafted in order to increase contract transparency and enhance policyholder information.

In Italy, the non-life insurance sector is regulated and supervised by the Italian Insurance Supervisory Authority. Since the beginning of 2013, the IVASS has been integrated with the central bank – the Bank of Italy. Additionally, the Italian Competition Authority is in charge of competition law enforcement in the non-life insurance market.

The Anti-Cartel Policy: The Italian Approach

It is often held that insurance undertakings may not be of particular interest to competition authorities since insurers operate in various lines of business providing coverage of various types of risks. Moreover, the policyholders are usually individuals who can obtain advice and evaluate offers from brokers. In fact, the non-life insurance industry in Italy has been subject to anti-trust scrutiny by the national competition authority. It seems that the existence of an EU block exemption regulation, which allows certain cooperation agreements in insurance markets, has not influenced the authority's stance. In this regard, the ICA has assumed the

investigation of several undertakings between non-life insurers in order to verify whether their conduct was in line or deemed a violation of the Article 101 TFEU.

An early case dates back in September 1999 when the ICA opened an investigation concerning the exchange of information between thirty-nine insurers operating in the motor vehicle insurance line.[145] One year later, the ICA found that fifteen insurers used identical polices' conditions. In addition, they did not provide separate coverage for fire and theft insurance but included them in the third-party liability. The ICA alleged that insurers had participated in a concerted practice of the exchange of information of both aggregate and individual data. According to the authority the exchange of information and consequently, the horizontal behavior constituted a violation of the anti-trust regulatory framework.

Several years later (September 2011), the ICA conducted an investigation into several insurers (HDI-Gerling Industrie Versicherung AG, Faro Compagnia di Assicurazzioni and Riassicurazzioni S.p.A., Navale Assicurazzioni S.p.A and Primogest S.r.L), which had signed an agreement on sharing the market for the public tendering procedures regarding third-party liability and employer's liability policies of various healthcare units and hospitals in the Province of Campania. The ICA found that the horizontal agreement among three insurance companies and one

[145] They were: Allianz Subalpina, Allstate, Assimoco, Assitalia, Augusta, AXA, Azuritalia, Bayerische, BNC, Commercial Union, Duomo, Fata, Fondiaria, Gan, Generali, Helvetia, Italiana, ITAS, Lloyd Adriatico, Lloyd Italico, Maeci, Mediolanum, Meie, Milano, Nationale, Nuova MAA, Nuova Tirrena, Piemontese, RAS, Reale Mutua, Royal Insurance, Royal & Sun Alliance, Sai, Sara, Toro, Unipol, Vittoria, Winterthur, Zurigo (Cocorrese, 2011).

joint agency was very serious and restricted competition. Thus, it decided to fine all parties for the concerted practices.

In 2013 The ICA opened an investigation against eight insurers, for the violation of Article 101 TFEU. The investigation was initiated based on a complaint from the association of insurance brokers, which claimed that existing agreements with major insurers prevented them from dealing with more than one company, and therefore infringed Article 101 TFEU. The companies under investigation proposed a set of commitments, which ICA deemed necessary and sufficient to deal with its competition concerns. The anti-trust authority made the proposed commitments binding upon the parties concerned and closed the proceedings without finding an infringement.

Lastly, in March 2015, after a two-year investigation, the ICA fined two main Italian insurers (Generali Italia and UnipolSai Assicurazzioni) approximately 29 million euro for the infringement of Article 101 TFEU. The anti-trust authority found anti-competitive conduct in providing insurance services in fifteen cities. According to the ICA, the companies agreed not to compete in order to make all public tenders fail. By applying this strategy, they were enabled to renew the existing contracts with the public transportation companies. The ICA held that such a concerted practice allowed companies to maintain lower costs and charge higher prices for insurance policies. Therefore, the conduct was deemed a violation of the Article 101 TFEU.

Overview of the Market

The Italian non-life insurance sector ranks the fifth in the EU after Germany, France, the UK and the Netherlands. In 2013, the profitability of non-life insurers (in terms of gross written premiums) fell by 4,9 percent. The declining trend was also observed in other major EU markets such as in Spain, the Netherlands and the UK (See Figure 3.1). In contrast, the profitability of non-life insurers increased in Germany and France by 2,4 and 2,0 percent, respectively. In Italy, the fall in premiums was mainly attributed to a decrease in the motor insurance premiums and contracts.

The non-life insurance consists of five lines of business: 1) motor vehicle; 2) accident and health insurance; 3) property risk and fire; 4) general liability 5) other non-life insurance such as legal, travel and credit insurance. Figure 3.2 shows the composition of non-life insurance in terms of gross written premiums.

Figure 3.1: Non-life gross written premiums (euro Million)

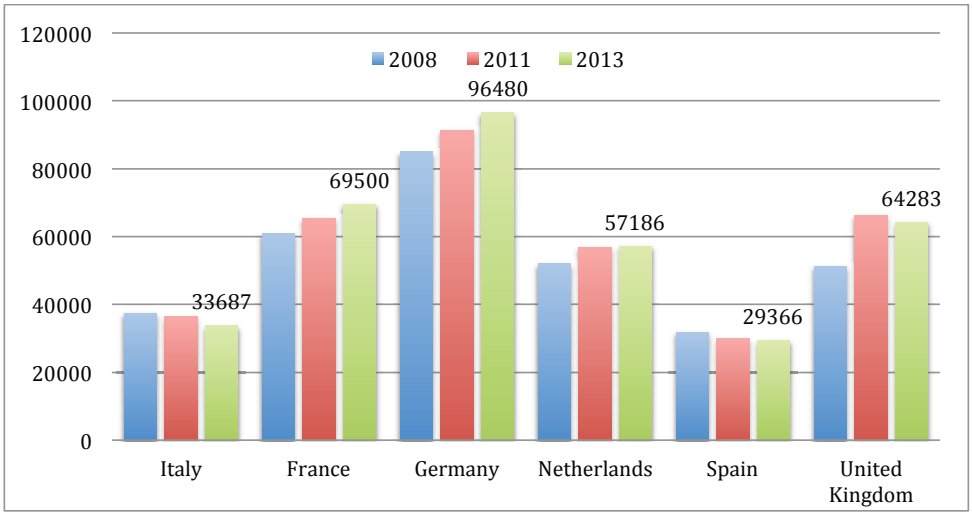


Figure 3.2: Composition of gross non-life premiums by line of business over time

Motor insurance has been the most important line of business each year with a market share that has varied between 54,86 percent - 60,53 percent. In 2013, motor vehicle business represented 55,44 percent of the overall total non-life insurance. The second major line was accident and health (14,92) followed by property and fire (14,69 percent).

In the same year, the Italian motor insurance, which was the third largest market in the EU, declined by 7,7 percent due to lower registration of new cars. With regard to other large European markets, the largest motor insurance in Europe, Germany, registered 5,8 percent growth in premiums. France, the second largest market reported 1,2 percent growth in motor premiums. In contrast, the UK market continued to experience a decline in gross premiums by 3,9 percent; the profitability of Spanish motor insurance also fell by 4,2, and the Dutch motor market declined by 2,8 percent (Figure 3.3, Insurance Europe, 2015).

With regard to concentration, in 2013, the five largest insurance companies controlled 37,45 percent of the market, where the largest company had a market share of 24 percent (Figure 3.4). In the same year, the ten largest insurers controlled 46,85 percent of the market. Over the sample period, the 5-firm concentration ratio followed a declining trend from 1998 till 2005; it sharply increased in the years preceding the recent financial crisis (2006-2007), and returned to its declining trend from 2008 till 2011. The high concentration ratio of the five largest insurers during the last two years indicates a relatively concentrated market partly due to an ongoing wave of mergers and acquisitions.

Figure 3.3: Motor gross written premiums (in Euro million)

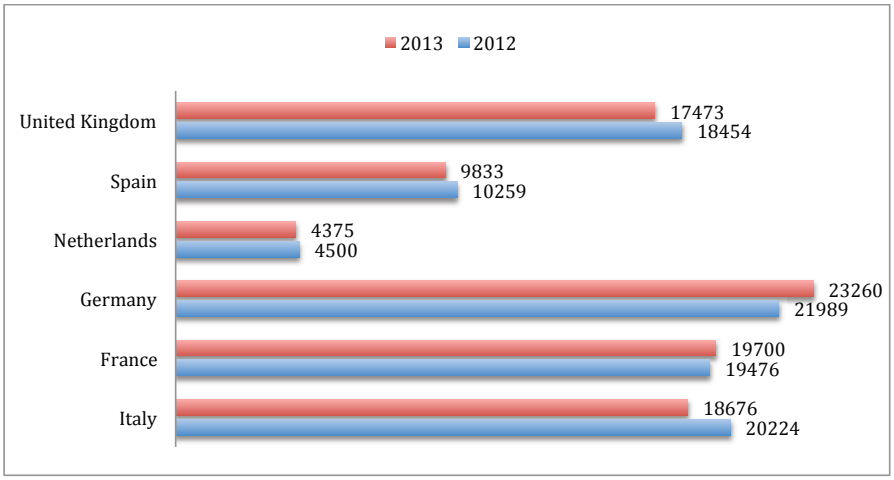
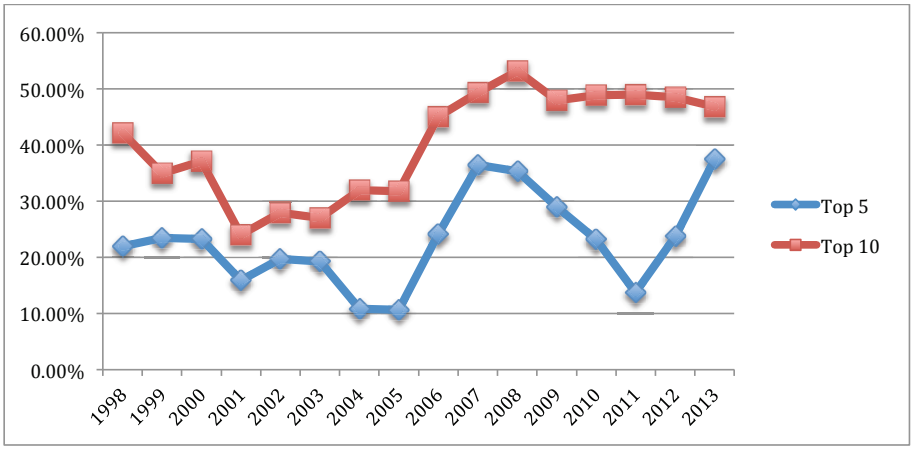


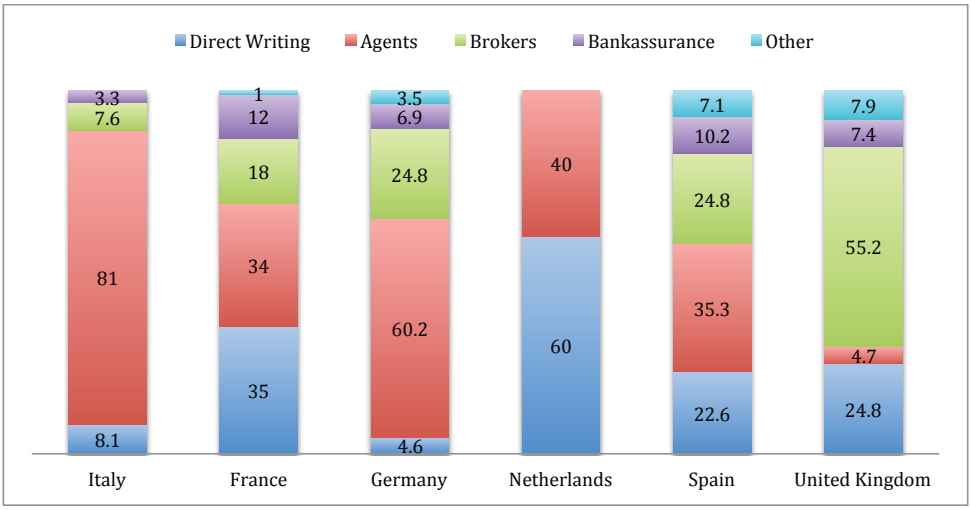
Figure 3.4: Concentration ratios in non-life insurance industry



There are several distribution channels such as direct writers, agents, brokers and bancassurance. In 2012, the network of agents collected around 81 percent of total

non-life insurance premiums (compared to 40 percent in the Netherlands, 35,3 percent in Spain, 34 percent in France, see Figure 3.5). In the same year, around 8 percent of non-life insurance policies were sold through direct writers; while the rest were through affiliated banks and brokers. Among other EU markets, only the German non-life insurance distribution model was similar to the Italian model with the agent network of around 60 percent. Meanwhile, direct writing was the main channel in the Netherlands; in France 60 percent of total premiums were equally distributed by agents and direct writing (35 percent for direct writing and 34 percent for agents); in the UK the main channel was held by brokers.

Figure 3.5: Breakdown of non-life premiums by distribution channels – 2012 (in %)



3.3 Related Literature

An extensive body of literature examines the effects of competition in the insurance markets. In particular, a great number of papers focus on the insurer competition and efficiency. Whilst, the academic literature that examines the effect of competition on insurer soundness is a lot less developed. The following section presents related studies that investigate competition, efficiency, and the nexus between insurer competition and soundness.

3.3.1 Literature on Competition and Efficiency in Insurance

The empirical literature on competition and efficiency in the insurance sector mostly consists of studies that focus on the U.S. market.[146]Its remainder includes cross-country analysis and papers on national insurance markets.

The first empirical paper that analyzes efficiency and competition in the Italian insurance market is Cummins and Turchetti (1996). The paper provides evidence of the development of technical efficiency for both life and non-life insurers during the period 1985-1993. The authors employ Data Envelopment Analysis (DEA) to estimate production frontiers for each year, and find no efficiency change. DEA is a non-parametric method, formally developed by Charnes et al. (1978), that does not require the specification of a production or cost function, but rather computes the efficient 'best practice' production and cost frontiers based on

[146] Cummins and Weiss (2014).

the linear combination of insurers in the market. Then, DEA measures the performance of each insurer compared to the 'best practice' efficient frontiers.

In a later study, Turchetti and Daraio (2004) investigate how deregulation affected market structure, performance and efficiency of the motor insurers in Italy during 1982-2000. Besides DEA, the authors apply also the Malmquist analysis to measure efficiency.[147] Findings show that cost efficiency, particularly total factor productivity, improved during the sample period.

Recently, Coccorese (2012) employ the Panzar and Rosse (1987) model to measure competition in the Italian motor insurance market in order to assess the decision (taken in 2002) of the Italian Anti-trust Authority to fine thirty-nine insurers for their collusive behavior.[148] The author finds evidence that non-life insurers realized profits that were equivalent to profits under monopoly or collusive oligopoly conditions suggesting that the decision of the Anti-trust Authority was appropriate.

Among cross-country studies, Fenn et al. (2008) estimate the efficiency of the fourteen EU countries. They use Stochastic Frontier Analysis (SFA) introduced by Aigner et al. (1977) to measure production frontiers. Their findings indicate evidence of a small but steady decline in the cost efficiency of Italian non-life

[147] The Malmquist method measures developments in technology and efficiency relative to the borders for different time periods. It calculates the total factor productivity, which is the product of technical change and technical efficiency change (Grasskopf, 1993).

[148] See Section 3.4.1 for a detailed explanation of the Panzar and Rosse (1987) model.

insurers (from a score of 0.933 in 1995 to 0.926 in 2001, where insurers who operate at the frontier of technical possibility have a score of one). Eling and Luhnen (2010) use both SFA and DEA to examine technical and cost efficiencies in a sample of thirty-six countries over the 2002-2006 period. Their results indicate a steady technical and cost efficiency growth in international insurance markets. Italian non-life insurers had a lower average technical efficiency (0.42 out of 0.5 that is the average of the sample), while life insurers performed better (the average technical efficiency is 0.78 out of 0.71, and cost efficiency is 0.67 out of 0.59). Berry-Stöelze et al. (2011) examine the efficiency, structure and performance relationship for twelve EU non-life insurance markets over the period 2003-2007. They use DEA to measure cost, revenue and scale efficiency and show that the more cost and revenue efficient insurers charge lower prices than their less efficient counterparts.

Several papers have focused on competition and efficiency in national markets. Using DEA methodology, Cummins and Rubio-Misas (2006) find evidence that scale economies existed in the Spanish insurance market during 1989-1998; Cummins and Xie (2013) show that U.S. non-life insurers realized increasing returns to scale during 1993-2009, while Mahlberg and Url (2010) find a significant long-term decline of cost efficiency and an increase of the total factor productivity in the German insurance market over 1991-2006.

There exist several papers that have exploited the Boone approach to measure the degree of competition in insurance markets. This relatively new approach is based on the idea that competition rewards efficiency and punishes

inefficiency. Put differently, in more competitive markets, efficient firms perform better, in terms of profits and/or market shares than the less efficient ones.

Bachis et al. (2007) apply this approach to assess how competition evolved in motor insurance markets in the UK during the period 1985-2005. Their findings show that competition pressures were high during the 1990s, but they declined in the subsequent years. Further, their results indicate that in the private motor insurance market, the lessening of competitive pressure occurred during the period when the larger insurers gained some benefit from increasing returns to scale.

Bikker and van Leuvensteijn (2008) employ this measure to investigate competition and efficiency in the Dutch life insurance market over 1995-2003. Their findings point to weaker competition during the recent years of the sample period. In addition, the comparison between estimates of the Boone indicator in the life insurance with those in other Dutch services industries shows the less competitive behavior of life insurers.

Bikker (2012) uses this method by using market shares as a proxy of performance. Using a dataset on Dutch life insurers, he found evidence of competitive pressure in this market over the period 1995-2010. However, the intensity was stronger in commercial insurance lines, and weaker on the personal lines. In addition, estimates of the Boone indicator show a weaker competitive pressure in life insurance rather than in the non-life insurance and banking.

Also, Bikker and Popescu (2014) utilize it to investigate the competitive behavior of the non-life insurance market in the Netherlands over the period 1995-

2012, particularly, focusing on the 2006 health insurance reform. They conclude that the insertion of the public health care funds in the health insurance market triggered a decline in the overall competitive intensity.

3.3.2 Insurance Competition and Financial Soundness: Background and Related Studies

Unlike banks, there is no extended academic literature regarding the possible effects of insurance competition on financial soundness. One reason is that traditionally, insurers have been considered as relatively stable.[149] Therefore, researchers have mostly focused on the investigation of bank insolvencies and their potential to jeopardize the stability of the financial system. It is only after the recent financial crisis of 2007-2008, when the American International Group (AIG) almost defaulted, that the soundness of insurance firms and the concept of systemic risk in insurance markets became more relevant. As Das et al. (2003) note, despite the fact that the contagious effects when insurers default may not be as dangerous as the ones when banks default, they have significant potential to disrupt the financial system and negatively impact the real economy. Therefore, the soundness of insurance companies is of major importance for various stakeholders such as policyholders, policymakers, and regulators.

[149] See for more Das et al. (2003).

Insurers should remain financially sound in order to meet their obligations towards policyholders. A default can arise via inadequate provisions for claims or insufficient capital to cover losses. Therefore, insurers must hold large amounts of capital to maintain reasonably low probabilities of insolvency.

Life insurers, whose products are effectively used as bank deposits, introduce the potential for the same maturity mismatch and associated solvency problems as in the banking sector. Therefore, it is not surprising that the effect of competition on life insurance soundness mimics similar ambiguity to the effect of competition on the financial stability of banks. The solvency problems for non-life insurers originate mainly from a very high risk of loss in the case of natural catastrophes and other unexpected events. For instance, liability insurers may have to pay for claims brought several years after policies are sold, when legal liability standards and the interpretation of policy provisions may have changed. Thus, the risk of many non-life losses is very difficult to evaluate.

Competition creates relentless pressure for low insurance policy prices, which in the short run may contribute to an advantage for policyholders, but it may pose adverse effects and result in high insolvency risk in the long run. More specifically, lower prices could mean lower amounts of premiums, which in turn can affect the profitability of insurers. Low profitability means a reduced level of investment, and consequently, lower investment income. The risk of insolvency stemming from low investment is even higher especially when faced by the long-term decline of interest rates. Low profitability can also have a direct impact on

equity capital since one of its major contributors is the retained profit. Overall, an increase in competition faces a trade-off between short-term advantages for policyholders and increased insolvency risk in the long run. In the non-life insurance, low policy prices may also contribute to inadequate interest rates and increased insolvency risk, especially for difficult to price coverages subject to large, but slow developing losses.[150]

While there exist a few studies on the soundness and systemic risk of insurance, there is no extended literature regarding the possible effects of competition and its determinants on the financial soundness of insurers. An early work is Rees et al. (1999) that discusses price competition, solvency and regulation in insurance markets. The authors consider a Bertrand model of identical insurers that set a fair premium at market equilibrium and put enough capital to cover the total claims in the market. They show that when policyholders have full information about the risk of insolvency of insurers, then price competition leads to a Pareto-efficient equilibrium in which there is no probability of insolvency: in the Nash equilibrium firms will hold enough capital to meet the maximum claims that they may face.

Dutang et al. (2013) present a non-cooperative game to model the effect of competition for policyholders on the solvency of non-life insurers. Authors extend the Bertand model of Rees et al. (1999) by introducing a lapse model and an

[150] See Harrington (2005).

aggregate loss model for policyholders. In the lapse model, the behavior of the policyholder is captured by a lapse probability that is a function of premiums. Numerical illustrations suggest that the Stackelberg premiums are higher than Nash premiums. Further, these premiums decrease as the number of insurers increases. The Nash equilibrium is a natural notion for those lines of business with no strong control/leadership (i.e. individual insurance). While, the Stackelberg equilibrium is appropriate for lines that are characterized by oligopolistic tendencies, (i.e. commercial lines).

Cummins et al. (2017) is the first study that empirically analyzes the link between competition and soundness in the EU life insurance industry over the period 1999-2011. They test the *transmission mechanism* hypothesis, developed by Schaeck and Cihák (2014), which postulates that competition enhances financial soundness with efficiency being the transmission mechanism. The authors use the Boone indicator to measure competition intensity and find no evidence of major improvements in ten major EU markets. Their findings, however, indicate a positive link between competition and financial soundness.

Other researchers have focused on how consolidation and consequently, high concentration affects insurance soundness. High concentration in insurance markets is one of the factors that impact upon the ability of policyholders to find alternative providers of insurance cover in case of an insurer default.[151] Particularly, in the non-

[151] See for instance, French and Vital (2014).

life insurance markets, an insurer's default may create a situation in which certain economic activities are interrupted due to the loss of insurance protection for the policyholders. The likelihood of such situations is higher when a small number of insurers dominate the market.

Weiβ and Mühlnickel (2013) investigate the effects of consolidation in the insurance market. As they point out, mergers between insurers can have a beneficial impact but also can be detrimental to the financial soundness, and to the systemic risk of merging firms. On the one hand, a merger reduces competition between the remaining insurers allowing them to achieve monopoly rents. Further, an increase in the insured pool can result in reduced risk and potentially higher profits. Consequently, merged insurers could decrease their insolvency risks. On the other hand, efficiency gains following the merger can lead to higher insolvency risk due to post-merger adjustment issues. Similar to banks, it is possible that an increase in size could generate 'too-big-to-fail' insurers, which in turn may provide managers with incentives to take excessive risks. The paper studies the effects of the 409 international mergers (domestic and cross-border) that took place over 1984-2010. The authors show that consolidation in the insurance market increases the moderate systemic risk and as a result, decreases financial soundness. Their findings also indicate that size, leverage and diversification across all lines of business facilitate the undermining effect of consolidation on financial soundness.

3.4 Methodology

In this section, we present a relatively new competition indicator, initially introduced by Boone et al. (2005) and modified by Boone (2008). Then, the empirical model, employed to estimate the relationship between insurer competition and financial soundness, is introduced.

3.4.1 Competition as a Function of Efficiency: The Boone Indicator

Background and the Theory

Academics and policymakers acknowledge the important role that competition plays in the economy. Nonetheless, they still do not agree on the best assessment method. Conventional competition measures can be classified in two major strands: the structural and non-structural indicators. The first strand is based on the traditional Industrial Organization approach, which focuses on the relationship between market structure and performance (the *Structure-Conduct-Performance (SCP)* paradigm).[152] According to the SCP paradigm, the competitive level of a market can be inferred from its structure; market concentration incentivizes firms to behave in a non-competitive manner, which in turn leads them to higher profitability levels. Meanwhile, non-structural indicators are based on the NEIO

[152] Initially proposed by Bain (1951) and later by Tirole (1988), the rationale behind this hypothesis is that collusion is hard to be achieved when the number of firms is large.

methodology, which assesses the degree of competition by directly observing the behavior of firms in the market.

There are two main structural measures: concentration ratios and the Herfindhal-Hirschman Index (HHI).[153] The concentration ratios (CR_k) measure the market share of the k leading firms in the market.[154] The ratio equals zero for an infinite number of equally sized firms and one when all firms operating in the market are included in the calculation. The HHI index is calculated by summing up the squares of the market shares of all firms. Its value ranges from 1/n (where n is the total number of firms) to one for monopolies. The HHI highlights the relative importance of larger firms by assigning them a greater weight as compared to smaller ones.

Despite empirical evidence that supports the SCP paradigm,[155] there exist a number of studies that question the reliability of the SCP theory.[156] Accordingly, the non-structural NEIO measures have been introduced. Their main aim is to capture competition level by directly assessing the behavior of firms. The initial NEIO

[153] Another indicator is the number of firms, which simply counts the total number of firms operating in the market.

[154] The most commonly used values are 3, 5 and 10, but there is no clear rule.

[155] For instance, Berger and Hannan, (1998), Bikker and Haaf, (2002).

[156] Berger et al. (2004), Claessens and Laeven (2004), Cocorrese (2009), Bikker and Spierdik (2008).

measures are the Lerner index, and Panzar and Rosse (1987) model.[157] Both of them are based on the oligopoly theory and a static model of competition.

The Lerner index or Price-Cost Margin (PCM) is measured as the ratio of the difference between price and marginal cost to the price. The index is equal to zero in the case of perfect competition (when price and marginal cost coincide). The greater the index the higher the market power in the market. The other method consists in computing the H-index proposed by Panzar and Rosse (1987), which is equal to the sum of the elasticities of total revenues to factor input prices. It measures competition by the degree to which a change in factor input prices affects the firm's revenues. Its value ranges between zero and one. When H-index is equal to one, then perfect competition exists. If it equals to zero, there exists perfect collusion. While, any value between zero and one implies monopolistic competition.

Recently, Boone et al. (2005) and Boone (2008) have introduced a new non-structural measure. Already recognized in the literature as the Boone indicator, its objective is to capture the dynamics of markets rather than focusing on a static analysis of markets. The main idea behind this measure is that more intense competition leads to a reallocation of profits from relatively less efficient firms towards more efficient firms (those with lower marginal costs). When competition

[157] Another method is a simultaneous-equation approach developed by Iwata (1974), Bresnahan (1982) and Lau (1982). This method assesses competition by simultaneously estimating supply and demand functions to produce a parameter that measures the behavior of firms. Since it is very data intensive, this approach is not extensively used.

increases, all firms in a market may experience a fall in profits, but this effect is greater for less efficient firms. In other words, more intense competition results in severe punishment for relatively less efficient firms as compared to more efficient ones. Therefore, the marginal costs difference between firms with different efficiency levels can be mirrored into the profits difference.

Boone (2008) exploits this effect to introduce a Relative Profit Differences (RPD) model, where there are I firms that can enter and compete in a market. Firms produce homogenous goods and compete on a level playing field (changes in competition affect firms directly and not indirectly). Efficiency is assumed one dimensional (captured only by marginal cost), and observable. The latter means that firms can be ranked according to their efficiency levels such that lower i implies higher efficiency: $n_1 \geq n_2 \geq \cdots . \geq n_I$. Further, Boone does not impose any specific mode of competition such as Bertrand or Cournot. He simply assumes that each firm chooses the vector of strategic variables $a_i \in R^K$. This choice leads to the output vector $q(a_i, a_{-i}, \theta) \in R_+^L$ for firm i where $a_{-i} = (a_1, \dots, a_{i-1}, a_{i+1}, \dots a_I)$, and θ is a parameter that captures the aggressiveness of firms' conduct in the market. A more aggressive conduct can be related, for example, to higher substitution elasticity between goods produced by different producers.

Further, Boone postulates additional assumptions about the relationship between efficiency and costs. Given that $C(q, n_i)$ specifies the costs of production for firm i, while $n_i \ni R_+$ measures a firm's efficiency level, then for a given output vector $q \ni R_+^L$, it is assumed that:

$$\frac{\partial C(q,n)}{\partial q_l} > 0 \quad (1)$$

$$\frac{\partial C(q,n)}{\partial n} \leq 0 \quad (2)$$

$$\frac{\partial\left[\frac{\partial C(q,n)}{\partial q_l}\right]}{\partial n} \leq 0 \quad (3)$$

for each product $l \in \{1,2, \ldots L\}$.

The propositions of the above inequalities state that: i) higher production levels lead to higher costs (firms have positive marginal costs); ii) more efficient firms produce with lower costs (firms with higher n produce the same output vector q with lower costs C); iii) marginal costs are lower for more efficient firms (higher n firms produce the same output vector q with lower marginal costs for each product l). Given this setup, firms play a two-stage game. In the first stage, they decide simultaneously and independently whether to enter or not. This is determined by the entry costs and expected profits. Only firms that are able to recover their entry costs enter. In the second stage, the existing firms know new entrants, and all of them choose simultaneously their actions in order to maximize profits. This gives subgame perfect equilibrium for each stage.

Boone (2008) considers an increase in competition, which may be due to more aggressive conduct among firms, or a fall in entry barriers. Then, a more

aggressive conduct (parameterized as $d\theta > 0$) increases competition if the expression:

$\frac{dlnq(n,N,I,\theta)}{d\theta}$ is increasing in n. (4)

According to the author this is a generalization of the *output reallocation effect*. When firms produce homogenous goods, a rise in θ increases the output of a firm relative to a less efficient one. In other words, when stronger competition decreases firms' output levels, the decrease in output is greater for less efficient firms. The RPD is defined as the ratio of profit level differences:

$$RPD(n,\theta) = \frac{\pi(n'',\theta)-\pi(n,\theta)}{\pi(n',\theta)-\pi(n,\theta)} > 0 \quad (5)$$

An increase in competition via more aggressive conduct (or a fall in entry barriers) raises RPD for any three firms with $n^{**} > n^{*} > n$.[158] That is,

$$\frac{dRPD(n,\theta)}{d\theta} > 0 \quad (6)$$

where variable profits are defined as $\pi(n,\theta) = R(n,\theta) - C(n,\theta)$. In words, the RPD is sensitive to the degree of competition. Boone (2008) theoretically shows how the

[158] See Boone (2008), Teorem 1.

RPD can measure the degree of competition. The approach is theoretically applicable, but it poses some difficulties for empirical analysis. This is mainly due to the requirement of ranking firms according to their efficiency levels. Thus, actually practitioners estimate the relationship between performance, measured by profits, and efficiency, proxied by marginal costs. Moreover, in a recent work, Boone et al. (2013) explain that the profit elasticity to marginal cost that can be assessed through a regression of profits on marginal costs is closely related to RPD. Hence, the relation between profits and costs can be expressed as follows:

$$ln\pi(n,\theta) = \alpha(\theta) - \beta(\theta)\phi(n,\theta) \qquad (7)$$

Under the assumptions that marginal costs are decreasing in efficiency ($\phi'_n < 0$), and that efficiency if perfectly captured ($\phi(n,\theta) = \phi(n)$), then $\frac{dRPD(n,\theta)}{d\theta} > 0$, implies that $\frac{d\beta(\theta)}{d\theta} > 0$. This outcome gives the intuition behind the Boone indicator. A steeper relation between profits and costs over time, therefore, a higher β implies more intense competition in the market. Boone et al. (2013) estimate Equation (7) using a logarithmic transformation of both profits and costs variables. The main advantage of using log-log specification is to interpret the slope β as elasticity. However, authors acknowledge that using logarithms may lead to a selection bias since observations with negative profits need to be deleted.

Literature on the Boone Indicator

There are several studies that use the approach of the Boone indicator to estimate the nexus between profits and marginal costs, though, using different econometric specifications, variables' choices, and estimation methods.

A number of studies apply logarithmic transformation of profits.[159] However, other authors opt for the level of profits instead of the logarithmic transformation avoiding the selection bias.[160] This is also the road followed here. In addition, van Leuvensteijn et al. (2011) and De Bonis et al. (2015) use the logarithmic of market shares, which are always positive, as a measure of profitability.

Several researchers employ average variable costs as a proxy of marginal costs.[161] This study resorts to the same proxy of marginal costs. Meanwhile, other papers[162] calculate marginal costs by estimating a translog cost function[163] or a linear cost function.[164]

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[159] See for instance, Griffith et al. (2005), Creusen et al. (2006), van Leuvensteijn et al. (2011), Delis et al. (2012), Clerides et al. (2015) and Diallo (2015).

[160] Such as Schaeck and Cihák (2014) and Cummins et al. (2017).

[161] Maliranta et al. (2007), Amador and Soares (2012), Peroni and Ferreira (2012), Kick and Prieto (2013), Schaeck and Cihák (2014), Cummins et al. (2017).

[162] van Luvensteijn et al. (2011), Tabak et al. (2012), Bikker and Popescu (2014).

[163] The translog cost function assumes that the technology of an individual firm can be described by one multiproduct production function. This function derives a dual cost function using output levels and factor prices as arguments.

[164] See Delis (2012) and Clerides et al. (2015).

The estimation techniques range from Ordinary Least Squares (OLS), fixed-effects models, Instrumental Variable (IV) techniques, and local regressions. For example, Bikker (2012) and Bikker and Popescu (2014) use OLS regressions. Braila et al. (2010), Polder et al. (2009), Bikker and van Leuvensteijn (2008), Boone (2000), Boone et al. (2007), Amador and Soares (2012) introduce firm and time fixed effects to assess competition dynamics. Additional papers apply IV approaches in order to adjust for potential endogeneity issues, which may be present if profits and marginal costs are jointly determined. For example, Schaeck and Cihák (2014), Cummins et al. (2017) and van Leuvensteijn et al (2011) use a two-step GMM estimator with one-year lagged values of average cost variables as instruments.[165] Recently, other studies estimate the relationship between profits and marginal costs through the local regression procedure.[166]

Advantages and Limitations

The Boone indicator has several appealing features and offers some advantages over classical competition measures. First, under the assumptions of product homogeneity, symmetry of firms, constant marginal costs, simultaneous and independent choice of the strategic variable, the indicator is monotonic in the

[165] Nevertheless, Boone et al. (2013) argue that even in the presence of endogeneity, the indicator is still a robust measure of competition.

[166] For instance, Scheirsch and Schmidt-Ehmcke (2010), Delis (2012) and De Bonis et al. (2015).

intensity of competition. As Boone (2008) shows, the RPD model is theoretically more robust than PCM and the H index, which sometimes increase and sometimes decrease with more intense competition. Unlike PCM and H index, RPD always increases when the level of competition in the market strengthens.

Secondly, the approach overcomes several concerns that other measures suffer from. For instance, it is argued that the H index requires restrictive assumptions about the market existing in long-run equilibrium, while the PCM is criticized for not capturing product substitutability.[167] Moreover, it overwhelms certain shortcomings of concentration indices.[168] This is particularly important as the recent competition literature on financial services markets shows that the relationship between concentration and competition is ambiguous.[169]

Third, the Boone indicator captures the dynamics of the market; it estimates competitive pressure on an annual basis, and assesses developments over time. Unlike concentration indices, PCM and the H-index that capture only the outcomes of competitive conduct, the indicator is able to capture continuous interaction among firms by focusing on their conduct.

Fourth, it is not very data intensive, and can be applied with a small number of observations. As previously mentioned, the sensitivity of RPD to a change in competition holds for *any* three firms, thus it can be used in datasets where not all

[167] See Vives (2008).

[168] See Degryse et al. (2009).

[169] See Berger et al. (2004).

firms in a market are sampled/observed. Put differently, the reallocation of estimated profits among a subset of firms can deliver information for all the market. In this regard, this approach is novel because it enables the measurement of competition not only for the entire markets, but also for various sub-markets. This is an advantage, specifically, over the H-index that can be estimated only for the overall markets.

Fifth, several empirical studies show that unlike the PCM, the Boone indicator is less sensitive to the business cycle.[170] Griffith et al., (2005) conclude that Boone estimates are significantly less affected by cyclical downturns than the PCM. In addition, Boone et al. (2013) calculate the PCM for various markets and find that it is significantly and positively correlated with the business cycles.

Nonetheless, as any other model-based indicator, the Boone indicator approach is not free of limitations. The RPD model assumes that higher efficiency is transformed into lower prices or higher profits, but this may not be always the case, particularly during short time periods. The decrease in price may lead to a higher market share, while the increase in profits can help them maintain the same share as before. Therefore, it should be assumed that firms pass at least a part of their efficiency gains on to consumers. For instance, firms may choose to implement new marketing strategies instead of reducing prices. Therefore, firms providing the most highly demanded products may not only increase profits but also spend more.

[170] See for instance, Griffith et al. (2005) and Boone et al. (2013).

Hence, there may be the case that the relationship between profits and marginal costs can turn positive when firms compete in quality.[171]

Further, the RPD does not take into account the trade-off between different dimensions of competition. Boone (2008) considers cases where competition is increased either through more aggressive conduct, or lower entry barrier, or higher substitution of goods in the market. In other words, it does not consider the case where a rise in competition through more aggressive conduct may reduce the intensity of competition because fewer firms are left in the market. Put differently, there may be cases where the initial rise in competition is outweighed by a fall in the number of firms, which in turn may result to less competition.

The Estimation Model

As previously mentioned, Boone et al. (2013) show that the elasticity of profits to marginal costs, estimated by the derivative of the logarithm of profits to the logarithm of marginal costs, is closely related to the RPD. However, this specification applies a logarithmic transformation of profits, excluding all firms with non-positive profits. This choice appears arbitrary, as the natural outcome of competition is to drive less efficient firms out of the market. Instead, Schaeck and Cihák (2014) and Cummins et al. (2017) who use the Boone indicator to measure the competition in the financial services industry (banking and insurance, respectively), apply the level

[171] Tabak et al. (2012).

of profits instead of its logarithmic transformation in order to avoid selection bias. For this reason, this study also resorts to the same econometric specification. Thus, the Boone indicator model for insurer i can be expressed as:

$$\pi_{it} = \alpha + \beta \ln(mc_{it}) + \varepsilon_{it} \quad (8)$$

where π_{it} measures profit of insurer i at time t, β is referred as the Boone indicator, and mc_{it} denotes marginal costs. Since marginal costs cannot be directly observed, we follow Boone et al. (2005), Schaeck and Cihák (2014) and Cummins et al. (2017) and employ average costs as a proxy of marginal costs.[172]

Further, in order to measure the evolution of the indicator over time, equation (8) is modified to include year dummies and their interactions with the average costs variable. Hence, the model that is estimated is the following:

$$\pi_{it} = \alpha_{it} + \sum_{k=1}^{T} \beta_k d_k ln(ac_{it}) + \sum_{k=1}^{T-1} \gamma_k d_k + \varepsilon_{it} \quad (9)$$

where π_{it} measures profit of insurer i at time t, ac_{it} denotes average costs, d_k are dummy variables for years 1 to T, and ε_{it} is the error term. We expect that insurers with relatively lower average costs (more efficient) than those with higher average costs (less efficient) gain more profits, i.e. $\beta_k < 0$. The effect is greater when the

[172] Given that under the assumption of constant average costs, average and marginal costs coincide.

competitive pressure is higher, since the more efficient insurers outperform the less efficient counterparts.

As in the existing literature on insurance competition [173] and bank competition,[174] we are aware of potential endogeneity issues in the estimation of Equation (9). The current studies emphasize the likelihood of a joint determination of performance and costs. Therefore, in this chapter, the approach is to test first whether there is endogeneity in the specifications. This test consists of the difference between two Sargan-Hansen J- statistics: one for the equation in which average costs variables are treated as endogenous, and one for the equation in which average variables costs are treated as exogeneous. Under conditional homoscedasticity, the endogeneity test statistic is numerically equal to a Hausman test statistic. [175] Subsequently, if the endogeneity is present, we apply an instrumental variable technique such as the two-step Generalized Method of

[173] Cummins et al. (2017).

[174] van Leuvenstein et al. (2011), Tabak et al. (2012), Koetter et al. (2012), Schaeck and Cihák (2014).

[175] Hayashi (2000). Under the null hypothesis that the specified endogenous independent variables can actually be treated as exogenous, the test statistic is distributed as chi-squared with degrees of freedom equal to the number of independent variables tested. A rejection of the null hypothesis would indicate that the endogenous variables cannot be treated as exogenous.

Moments (GMM).[176] In line with existing literature, we use one-year lags of the average costs variables as instruments.[177] Otherwise, we use standard panel data techniques such as the fixed-effects model, which captures the unobservable characteristics of each insurer in each year.[178]

According to Bikker and van Leuvensteijn (2008), the Boone indicator can be applied to assess: i) the evolution over time of coefficient β_k within an industry/market, and ii) the potential cross-section nature of the evolution of competition in one market relative to other markets. Since measurement errors are less likely to vary over time than over markets, the first interpretation is more robust than the second one. This chapter mainly focuses on the change of β_k coefficients over time within the Italian non-life insurance market. However, in order to gain an overview of its relative competitiveness with respect to other markets, we also estimate β_k coefficients for the Italian life insurance.

3.4.2 Impact of Competition on Financial Soundness

This subsection introduces the empirical model employed to estimate the relationship between insurance competition and financial soundness. In line with

[176] The choice of GMM estimator versus traditional instrumental variables estimator as two-stage OLS (2SLS) is derived from the use of the optimal weighting matrix and the relaxation of the i.i.d. assumption (Schaeck and Cihák, 2014; Cummins et al., 2017).

[177] Boone et al. (2013) show that even in the case of endogeneity, the indicator is still a good measure of the evolution of competition.

[178] See Bikker and van Leuvensteijn (2008) and Tabak et al. (2012).

the current literature (Schaeck and Cihák, 2014 and Cummins et al., 2017), we estimate the competition-soundness nexus through the following model:

$$Z_{it} = \alpha + \beta_1 B_t + \beta_2 F_{it} + \beta_3 M_t + \varepsilon_{it} \quad (10)$$

where Z_{it} is the measure of insurer soundness for insurer i at time t. B_t is the absolute value of the Boone indicator, estimated from Equation (9) at time t. F_{it} is the vector of insurer-specific variables, M_t is the vector of non-life insurance market characteristics and macro-economic variables. A negative sign of the coefficient β_1 would indicate a positive effect of competition on the soundness of the non-life insurers. The rationale for employing the absolute value of the Boone indicator is to make it proportionate to competition. In addition, to achieve results that are more robust and presentable, specifications are added which employ the logarithmic transformation of the absolute value of the Boone estimates.

Endogeneity issues may be present in the estimation of Equation (10); it may be the case that less financially strong insurers may increase their insolvency risk by underwriting more risky policies. This in turn can easily be interpreted as a sign of stronger competition. Thus, in order to adjust for any potential endogeneity between competition and soundness measures, we follow the same approach as in the estimation of Equation (9). Initially, we test whether there is endogeneity in the specification. In case endogeneity is confirmed, we follow Cummins et al. (2017) and use the Two-Stage Least Squares (2SLS) method.

The Boone indicator coefficients are instrumented with the Institutional Development Index, and an interaction term of the GDP per capita with the market share of the foreign insurers. The Institutional Development Index is used in order to capture the overall quality of institutions and governance.[179] The level of governance and institutions quality in a country is an important pre-requisite for competition.[180] The information for this index is obtained from the 2014 World Bank database on governance indicators.

Also, following Cummins et al. (2017), we include an interaction term of the real GDP per capita with the market share of foreign insurance companies in total non-life insurance business (expressed in terms of total premiums) in order to capture the level of entry barriers. The real GDP per capita can directly influence the growth of insurance premiums. Thus, an increase of GDP per capita will increase the total premiums signaling more intense competition. Further, an increase in the market shares of foreign companies indicates lower entry barriers and consequently, a higher level of competition. The information for the market share of

[179] The Institutional Development Index is calculated as an average of six indicators: the political stability and absence of violence (capturing perceptions about the likelihood that the government will be stable), government effectiveness (capturing the quality of civil service), regulatory quality (proxing the qualities of policies and regulations), rule of law (proxing the degree to which economic agents trust the society rules), voice and accountability (proxing the ability of citizens to select their governments, freedom of expressions and free media), and control of corruption (Kaufman et al., 2009; Cummins et al., 2017). The Index ranges from around -2,5 (weak) to 2,5 (strong) institutions.

[180] Kaufmann et al. (2009) and Cummins et al. (2017).

foreign companies in total domestic non-life business is retrieved from the OECD insurance statistics database. The information on the real GDP per capita is attained from the World Development Indicators of the World Bank.

3.5 Data and Variables

3.5.1 Data

For the purposes of this research we use data from the INFOBILA, a database provided by *Associazione Nazionale fra le Imprese Assicuratrici* (ANIA).[181] INFOBILA provides yearly financial reports (balance sheets and income statements) for all insurance companies that have been operating in Italy over the period 1998-2013.

Previous studies have stated that the assessment of the Boone indicator is sensitive to the relevant market definition.[182] Boone (2008) suggests that in order to obtain accurate estimation of competition by using this indicator the market under investigation need to be at the three-digit or four-digit level. This study defines the relevant market at the four-digit ISIC classification. According to ISIC classification, the non-life insurance industry belongs to a four-digit category, which is the most detailed industrial category.[183] This seems to be a quite realistic

[181] Available at http://www.infobila.ania.it.

[182] See for more, Schiersch and Schmidt-Ehmcke (2010) and Amador and Soares, (2012).

[183] The International Standard Industrial Classification of All Economic Activities (ISIC) is the international reference classification of productive activities. Its main purpose is to provide a set of activity categories that can be utilized for the collection and reporting of

approach between the insurance services that can be considered close substitutes and the number of insurers that operate in the non-life insurance market. This choice is also in line with similar empirical studies conducted in the non-life insurance markets in other EU countries.[184]

The dataset is constrained in several ways. First, due to the data necessities for the calculation of the dependent and independent variables in Equation (9), we eliminate observations with non-positive operating costs. We also exclude observations with negative invested assets and equity capital, which are used for the constructions of control variables in Equation (10). Secondly, we exclude insurance firms for which we do not have at least three continuous years of data. The definitive sample comprises 1749 yearly observations; it is an unbalanced panel with a minimum of 90 firms for each year.

Table 3.1 provides summary statistics for the main variables used in Equations (9) and (10). The average profits amount to 3,7 percent, while ROA is lower (1,2 percent). The ratio of operating costs to total premiums is 0,504, while the ratio of average variable costs to average premiums is 0,964. The concentration ratio ranges from 10,7 percent to 37,5 percent. In the dataset, the number of active companies in Italy was 128 in 1998 and 90 in 2013.

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statistics. The economic activities are divided into a hierarchical, four-digit structure of mutually exclusive categories. The categories at the highest level are called sections. Then the classification continues into more detailed categories, which are coded as two-digit divisions, three-digit groups and at the greatest level of detail, four-digit classes.

[184] For instance, Bikker and Popescu (2014).

Table 3.1: Summary statistics

Variable		Mean	Std. Dev.	Min	Max
Insurer Level					
ROA		0,012	0,072	-0,596	0,287
Z-score		2,726	1,229	0,221	4,979
Average Costs (Specification 1)		0,504	2,301	0,031	6,800
Average Costs (Specification 2)		0,964	0,774	0,007	14,610
Insurer Size		11,909	2,044	7,947	17,038
IAR		0,619	0,184	0,003	0,997
Leverage		0,128	1,474	-7,997	2,534
Country Level					
Concentration		0,244	0,098	0,107	0,375
Market Size		17,310	0,137	17,014	17,444
GDP Growth		0,244	0,098	0,107	0,375
Real Interest Rate		3,831	0,897	2,567	5,962
Instruments					
Institutional Development Index		0,561	0,065	0,480	0,690
Market Share		0,302	0,030	0,259	0,348
GDP per Capita		24821,94	2592,75	19961,00	27758,00
Number of observations per year					
1998	*128*	2004	*104*	2010	*98*
1999	*129*	2005	*108*	2011	*97*
2000	*122*	2006	*103*	2012	*92*
2001	*122*	2007	*105*	2013	*90*
2002	*117*	2008	*110*		
2003	*117*	2009	*107*	Total	*1749*

Note: ROA is the ratio of total profits before taxes to total assets; Insurer size is the natural logarithm of total assets; Market size is the natural logarithm of the total assets of the non-life insurance market; IAR is the ratio of invested assets to total assets; Average Costs (Specification 1) is the ratio of operating costs to total premiums; Average Costs (Specification 2) is measured as the ratio of average variable costs to average variable premiums; Leverage is the ratio of net premiums to equity capital; Concentration is the cumulative market share held by the five largest insurers (in premiums); Real Interest Rate is the lending interest rate adjusted for inflation; Institutional Development Index is the average of political stability, government effectiveness, regulatory quality, rule of law, voice and accountability, control of corruption; Market Share is the share of foreign insurers in total premiums; Z-score is the sum of ROA and Capital Ratio to the standard deviation of ROA. It is calculated for each of three years and is expressed in logarithm.

3.5.2 Variables

Boone Indicator

The dependent and independent variables of interest in Equation (9) are measured in the following ways: First, as suggested by Boone (2008) and Cummins et al. (2017), profits are measured as the ratio of the difference between average variable revenues and average variables costs to total assets. The reason for the inclusion of total assets in denominator is to normalize profits for the insurer's size. It is often argued that the standard model of Boone indicator does not take into account the size of firms.[185] Therefore, profits are normalized by size using total assets as a proxy.

Secondly, we use two measures of average costs: i) the ratio of operating costs to total income;[186] and ii) the ratio of average variable costs to average variable income.[187] The average costs components are net incurred claims and operating expenses; the average income components are net premiums and net investment income.

Financial Soundness of Insurers

The dependent variable of interest in Equation (10) is the soundness of non-life insurers, measured by the Z-score, which is calculated as follows:

[185] Schiersch and Schmidt-Ehmcke (2010).

[186] Boone (2008), Creusen et al. (2005), Bikker and van Leuvensteijn (2008).

[187] Cummins et al. (2017).

$$Z = \frac{(ROA + E/A)}{S.D.ROA} \quad (11)$$

where ROA is return on assets, E/A defines the equity to assets ratio, and $S.D.ROA$ is the standard deviation of the return on assets. The Z-score is a widely used measure of financial soundness/stability in insurance[188] and banking.[189] It captures the distance of a particular insurer from the insolvency. When there is no sufficient equity to cover losses, the insurer becomes insolvent. Put differently, the Z-score measures the number of ROA standard deviations that an insurer's ROA has to fall in order to surpass its equity capital. According to Tabak et al. (2012), it is straightforward to show that the Z-score is inversely proportional to the probability of default. Therefore, a higher Z-score implies a higher probability of solvency (or lower probability of insolvency), providing a direct measure of soundness/stability.

In line with the existing literature, a three-year rolling time window is employed for $S.D.ROA$ to permit for variation in the denominator of the Z-score and to avoid its values being driven by the variation in the levels of capital and

[188] See for instance, Shim (2011) and Cummins et al. (2017).

[189] See Dermirgüc-Kunt et al. (2008), Tabak et al. (2012), Schaeck and Cihák (2014).

profitability.[190] In the regression analysis that we present in Section 3.6.2, we use the natural logarithm of the Z-score to control for non-linear effects and outliers.[191]

Control Variables

In Equation (10) we control for a number of insurer-specific, market-specific and macro-economic variables that may affect the financial soundness. In particular, we use the natural logarithm of total assets (*Insurer Size*) to control for the differences in size of the insurers.[192] In addition we employ the ratio of invested assets to total assets (*IAR*) to capture the efficiency of insurers' accounts receivable management, and the ratio of net premiums to equity capital (*Leverage*) to measure the performance of insurers.[193]

The market specific variables include the cumulative market share held by five largest insurers (*Concentration*) to capture the effect of the market structure. In the past, concentration has usually been considered as a measure of competition. But recently, several papers argue that it cannot directly measure competitive behavior[194] and can be better viewed as a determinant of competition.[195] In

[190] See for instance, Pasiouras and Gaganis (2013), Schaeck and Cihák (2014) and Cummins et al. (2017).

[191] See Dermigüç-Kunt et al. (2008).

[192] For instance, Cummins et al. (2017).

[193] Cummins et al. (2004) and Cummins et al. (2017).

[194] Claessens (2009).

[195] Bikker and Haaf (2002).

economies with strong institutions and effective competition policies, high concentration might not be necessarily associated with anti-competitive conduct. We also use the total premiums of the non-life insurance market (*Market Size*) to capture the differences in the market size for each year. Finally, we control for the impact of the macro-economic environment by using the growth of the real GDP (*GDP Growth*), and lending interest rate adjusted for inflation (*Real Interest Rate*). Lastly, we include a crisis dummy variable (*Crisis Dummy*) to control for the period since the financial crisis started (2008-2013).

The information on the GDP Growth and Real Interest Rate is obtained from the World Development Indicators of the World Bank. The information for the rest of variables is obtained from the INFOBILA.

3.6 Empirical Results

3.6.1 Boone Indicator Estimates

Main Results

Table 3.2 presents estimates of the Boone indicator based on Equation (9) with profits expressed in level and average costs in logarithm. As already mentioned, average costs are represented by two specifications: i) the ratio of operating costs to total premiums, and ii) the ratio of average variable costs to average variable premiums.

Columns (1) and (2) show estimates of β_k coefficients and standard errors based on the first specification of average costs. Fixed-effects are introduced since there is no endogeneity. Coefficients range from (-0,0035) to (-0,0671) and are significant for the entire sample period despite the first two years.

Columns (3) and (4) present β_k coefficients and the corresponding standard errors based on the second specification of average costs. The test for endogeneity rejects the null hypothesis of the exogeneity of the average costs in all years; therefore we usesthe two stage GMM estimator with one year-lagged average costs as instruments. The relevance of the excluded instruments was tested by the Anderson correlation statistic (Hayashi, 2000). The null hypothesis of this test is that the matrix of reduced form coefficients has rank K-1, where K is the number of independent variables, meaning that the equation is under-identified. Under the null hypothesis of under-identification, the statistic is chi-squared distributed with L-K-1 degrees of freedom, where L is the number of instruments (whether included in the equation or excluded). A rejection of the null hypothesis indicates that the model is identified. Based on the Anderson correlation coefficient and significance, the under-identification is rejected. In other words, instruments are relevant. Since the equation is exactly identified (the number of excluded instruments is the same as the endogenous variables), over-identification tests cannot be performed.

Table 3.2: Boone indicators for the non-life insurance market

Year	Specification 1		Specification 2	
	(1)	(2)	(3)	(4)
	Coefficient	Std.Error	Coefficient	Std.Error
1998	-0,0035	(0.006)		
1999	-0,0609	(0,005)	-0,1475***	(0,014)
2000	-0,0159**	(0,006)	-0,1903***	(0,018)
2001	-0,0134*	(0,008)	-0,1874***	(0,022)
2002	-0,0151**	(0,007)	-0,0821***	(0,012)
2003	-0,0230***	(0,009)	-0,1824***	(0,028)
2004	-0,0219**	(0,009)	-0,1078***	(0,030)
2005	-0,0394***	(0,010)	-0,0842**	(0,034)
2006	-0,0423***	(0,011)	-0,1240***	(0,022)
2007	-0,0671***	(0,010)	-0,1860***	(0,028)
2008	-0,0488***	(0,008)	-0,1543***	(0,016)
2009	-0,0451***	(0,008)	-0,1673***	(0,019)
2010	-0,0273*	(0,010)	-0,2102***	(0,026)
2011	-0,0294***	(0,008)	-0,1291***	(0,034)
2012	-0,0217**	(0,010)	-0,1027**	(0,040)
2013	-0,0382**	(0,013)	-0,0366***	(0,014)
Intercept	0,0045	(0,008)		
Overall R-squared	0,0499		0,1592	
Within R-squared	0,1285			
Between R-squared	0,0239			
Endog Test (p-value)			0,000	
Anderson corr (p-value)			0,000	
Observations	1749		1749	

Note: This table presents coefficients of the Boone indicator. The estimation methods are the fixed effects for the panel data (Columns 1 and 2) and the two-step GMM (Columns 3 and 4). All equations include bank-specific time effects. The ***, **, * denote statistical significance at 1%, 5% and 10% level respectively.

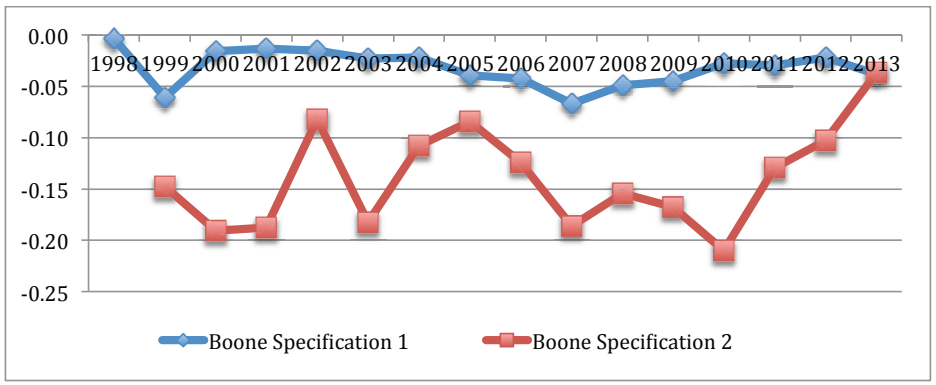
As results show, all estimated coefficients of the Boone indicator are negative, significant and higher in absolute terms as compared to the coefficients obtained from the estimation of Equation (9) with the first specification of average costs. This may be due to a more accurate approximation of average costs (net incurred claims

are included in the construction of the average costs measure besides net operating costs). However, since we cannot entirely check for the validity of instruments, the first specification of average costs is preferred.

Figure 3.6 shows that the β_k coefficients, measured with the first specification, do not fluctuate much over time. We observe an upward trend from 1999 to 2002, implying a decline in competition over the respective years. Then, from 2002 till 2007 the intensity of competition has increased on a gradual scale.

During 2008-2013, we observe a fluctuating trend, but still higher levels of competition as compared with those of the preceding period. Meanwhile, the second specification of average costs renders a comparable pattern over time with a lot of fluctuations of the level and trend of competition.

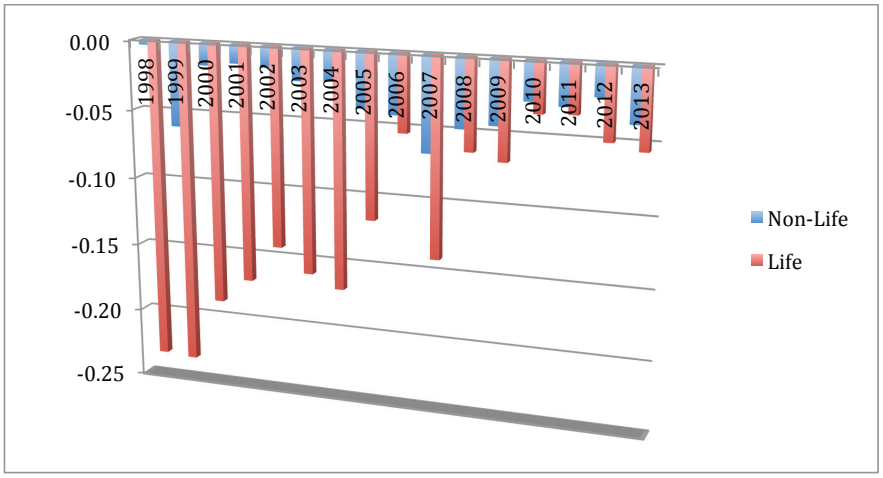
Figure 3.6: Effects on profits of average variable costs



In order to evaluate the relative competitiveness of the non-life insurance market, we compares β_k estimates of non-life insurance with those of life segment using the

same measure of profits and the first specification of average costs. The reason for employing the latter is that the estimation of the Equation (9) with this specification does not suffer from endogeneity issues. Results are presented in Figure 3.7. Estimates for life insurance range from (–0,0526) to (-0,2649), and are significant in all years. The average is (-0,1473), while that of non-life insurance is (-0,0315), implying that during the sample period, the non-life insurance sector in Italy has been relatively less competitive than the life insurance sector. This result seems to be similar to that of Bikker and Popescu (2014), which shows that the non-life insurance market in the Netherlands was less competitive than life insurance over the period 1995-2012.

Figure 3.7: Boone indicators for non-life and life insurance markets



Robustness Tests and Further Analyses

To check how stable the main empirical results are, we estimate Equation (9) based on a different measure of dependent variable of interest. We employ a version of return on assets - ROA, measured as a ratio of technical results over total assets.[196]

Table 3.3 presents the results. As in the benchmark model, we use two specifications of average costs to estimate Equation (9). Similarly, the fixed-effects estimator and the two step GMM approach are used. In the first and second columns, β_k estimates range from (-0,0097) to (-0,0644).

The average β_k score is (-0,0320) and is very close to the average coefficient (-0,0315) obtained from the estimation of the benchmark model. Besides the magnitudes of coefficients, their level of significance is also high and comparable to those of the benchmark model (statistically significant in 12 out of 16 years).

In addition, similar results for β_k estimates are obtained when the second specification of average costs is used. Even in this case, all coefficients are significant and higher in magnitude (Column 3 and 4). Tests for endogeneity and relevance of instruments show that average costs are endogenous and their one-year lagged values are relevant instruments. The main conclusion is that significant negative

[196] Several authors have employed ROA or its modified versions to measure the profitability of insurers and other financial institutions. For more, see Bikker and van Leuvensteijn (2008), and Schaeck and Cihák (2014).

values for the Boone estimates appear to be robust for various specifications of dependent, independent variables and estimation methods.

Table 3.3: Boone indicators with ROA as dependent variable

	Specification 1		Specification 2	
Year	(1)	(2)	(3)	(4)
	Coefficient	Std.Error	Coefficient	Std.Error
1998	-0,0202	(0,016)		
1999	-0,0097	(0,006)	-0,1647***	(0,021)
2000	-0,0275*	(0,016)	-0,1507***	(0,022)
2001	-0,0187	(0,016)	-0,2116***	(0,027)
2002	-0,0267***	(0,009)	-0,1450***	(0,029)
2003	-0,0335***	(0,010)	-0,1564***	(0,029)
2004	-0,0288***	(0,011)	-0,1259***	(0,027)
2005	-0,0431***	(0,012)	-0,1150***	(0,027)
2006	-0,0462***	(0,012)	-0,1297***	(0.027)
2007	-0,0644***	(0,011)	-0,3307***	(0,085)
2008	-0,0442***	(0,013)	-0,2635***	(0,085)
2009	-0,0421***	(0,012)	-0,1827***	(0,022)
2010	-0,0294*	(0,016)	-0,2603***	(0,039)
2011	-0,0256***	(0,007)	-0,1513***	(0,031)
2012	-0,0229	(0,015)	-0,1105***	(0,034)
2013	-0,0373***	(0,014)	-0,0487***	(0,013)
Intercept	-0,0378*	(0,022)		
Overall R-squared	0,0764		-0,0817	
Within R-squared	0,1540			
Between R-squared	0,0453			
Endog test (p-value)			0,000	
Anderson Corr (p-value)			0,000	
Observations	1749		1749	

Note: This table presents coefficients of the Boone indicator when the dependent variable is measured by ROA. The estimation methods are the fixed effects for the panel data (Columns 1 and 2) and the two-step GMM (Columns 3 and 4). All equations include bank-specific time effects.
The ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

Further, we estimate the β_k coefficients for the motor vehicle insurance market. As previously mentioned, motor vehicle insurance has been the most important line of business during the sample period with an average market share of 57 percent of all the non-life insurance sector in Italy. Moreover, it is comprised of three submarkets: 1) land vehicle, 2) motor third-party liability, and 3) marine third-party liability.

The aim of conducting such an analysis is two-fold: First, it is related to the definition of relevant market. As previously mentioned, the Boone indicator is sensitive to the relevant market definition.[197] The accuracy of its estimates depends on how correctly the relevant market is captured. Secondly, it attempts to investigate how competition has evolved in each sub-market of the motor insurance. In addition, it would be useful to investigate whether there have been any improvements in the competitive environment in the motor third-party liability after the introduction in 2007 of a major policy reform such as the 'Bersani Decree'.

We estimate the β_k based on Equation (9). Profits are measured by the ratio of profits to total premiums,[198] while average costs are captured by the ratio of operating costs to net premiums.[199] The choice of dependent and independent

[197] See for more discussion, Boone (2008), Schiersch and Schmidt-Ehmcke (2010) and Amador and Soares (2012).

[198] Several papers utilize this ratio (Bikker and Popescu, 2014; Bikker and van Leuvensteijn, 2008).

[199] The ratio of operating costs to net premiums is used in Bikker and van Leuvensteijn (2008).

variables specifications is constrained by the availability of data. The information used for their construction is obtained from the INFOBILA.

Table 3. 4 presents estimations of the Boone indicator using a fixed effects approach for each business line of motor vehicle insurance. Coefficients are negative for all lines and years, and most of them assume significance. These results seem to be similar when the results were obtained from the estimation of Equation (9) for the overall non-life insurance market. Estimates are more significant for the land vehicle insurance and motor third-party liability. The low significance of β_k estimates during several years for marine liability insurance may indicate a moderate level of competition in this market.

If one considers the average coefficients over the sample period, we observe a somewhat lower value of the Boone indicator for the land vehicle insurance (-0,2280) versus that of the third-party motor liability (-0,2459) indicating that the latter has been relatively more competitive than the land vehicle line. This is of particular interest since a major pro-competitive reform that was implemented in 2007 by the Italian government (the 'Bersani Decree') focused on the further liberalization of the distribution channels in the third-party motor liability.

Table 3.4: Boone indicators for the motor vehicle insurance market

Year	Land Vehicles		Motor Liability		Marine Liability	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
1998	-0,386***	(0,082)	-0,198**	(0,084)	-0,096	(0,147)
1999	-0,186***	(0,039)	-0,163***	(0,033)	-0,314***	(0,105)
2000	-0,228***	(0,049)	-0,175***	(0,049)	-0,419***	(0,099)
2001	-0,238***	(0,054)	-0,203***	(0,059)	-0,401**	(0,240)
2002	-0,232**	(0,101)	-0,304***	(0,090)	-0,332	(0,200)
2003	-0,122	(0,115)	-0,316***	(0,086)	-0,399**	(0,187)
2004	-0,351***	(0,101)	-0,092	(0,129)	-0,419***	(0,135)
2005	-0,340***	(0,076)	-0,259*	(0,145)	-0,755***	(0,175)
2006	-0,260**	(0,103)	-0,290**	(0,117)	-0,800***	(0,249)
2007	-0,147***	(0,036)	-0,270***	(0,081)	-0,855***	(0,239)
2008	-0,201***	(0,027)	-0,167***	(0,051)	-0,317	(0,289)
2009	-0,277***	(0,074)	-0,410***	(0,075)	-0,213	(0,316)
2010	-0,302***	(0,070)	-0,207**	(0,092)	-0,410**	(0,188)
2011	-0,222***	(0,069)	-0,228***	(0,051)	-0,331**	(0,155)
2012	-0,265***	(0,064)	-0,350**	(0,160)	-0,395	(0,262)
2013	-0,349***	(0,047)	-0,298**	(0,146)	-0,447	(0,298)
Intercept	-0,352***	(0,117)	-0,633***	(0,138)	-0,018	(0,271)
Overall R-squared	0,363		0,381		0,117	
Within R-squared	0,363		0,351		0,092	
Betw. R-squared	0,432		0,398		0,089	
Observations	1167		1092		770	

Note: This table reports coefficients of the Boone indicator for each line of business of the motor vehicle insurance market, namely the land vehicles insurance, motor third-party liability insurance and marine third-party liability. The estimation method is the fixed effects for the panel data.. The ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

In order to assess whether there has been any change in competitive conditions after the introduction of this particular reform, we compare the pre-Decree period (1998-2006) average with the post-Decree period (2007-2011)

average.[200] The average indicator scores are (-0,2222) and (–0,2564), respectively. The difference is statistically significant and suggests higher levels of competition on average in the post-Decree period compared to the preceding period. This finding indicates that, after the introduction of the 2006 reform, the competition intensity in the third-party motor liability improved.

3.6.2 Competition and Soundness

Main Results

The empirical results of Equation (10) are presented in Table 3.5, where the insurer soundness on the competition indicator and a number of independent variables are regressed. Positive coefficients would indicate that corresponding variables are directly proportional to soundness. In Columns (1) and (3) we employ the Boone indicator as the proxy of the competition level. Since this indicator is inversely proportional to competition (the more negative the indicator, the more competitive the banking market) its absolute value is added in order to assume direct association. In addition, in Columns (2) and (4) the logarithmic transformation of the Boone indicator is used in order to make the results more robust and easier to interpret.

[200] The post-decree period is restricted to 2011, since in January 2012 the overall insurance market has been subject to another policy change, known as the *Grow Italy* Decree.

We observe from Columns (1) to (4) that the relationship between competition and stability is positive. The significant positive coefficients of the Boone indicator confirm this result. Specifically, an increase in the level of competition by one percent is associated with 0,514 percent increase in the financial health of non-life insurers (in Column 4). The endogeneity test rejects the null of the exogeneity of the Boone indicator, confirming the choice of the two–stage estimator. Two additional tests for the relevance and validity of instruments were performed. First, is the Anderson correlation statistic, which checks the relevance of excluded instrumented variables.[201] As already mentioned, a rejection of the null hypothesis would indicate that the model is identified. Second, the Hansen J-test for 2SLS (Hayashi, 2000) is used to test whether instruments are valid, in other words uncorrelated with the error term. The joint null hypothesis of this test is that instruments are valid. Under the null hypothesis, the test-statistic is chi-squared with the number of degrees of freedom equal to the number of over-identification restrictions. A rejection would cast doubt on the validity of the instruments. Lastly, is a weak identification test, which test the null hypothesis that excluded instruments are weakly correlated with the endogenous variables. The test for the weak identification is an F version of Cragg-Donald Wald statistic. Results of Anderson correlation statistic, Hansen J-test and the F-test show that instrumental variables are relevant, valid and strongly correlated with Boone estimates.

[201] Hayashi (2000).

With regard to control variables, we observe a negative relationship between Z-score and the concentration ratio indicating that in highly concentrated markets the probability of solvency is lower. We also find that the size of the insurer (total assets) and the efficiency of the insurer's accounts receivable management (the ratio of invested assets to total assets) are positively related to Z-scores. Moreover, the insurer leverage ratio (the ratio of net premiums to equity capital) is significant and negatively related with Z-score. The variable that controls for the size of the market (total non-life premiums) enters the regression positively and assumes significance. As expected, GDP growth positively affects the insurer soundness. However, the real interest rate seems to have a negative effect on the insurer's solvency.

Further, Panel B in Table 3.5 provides evidence of the effects of competition on the three components of Z-score: profitability (ROA), capital ratio (equity to assets) and volatility of profitability (standard error of ROA). Results are shown in Columns (5), (6) and (7) respectively. This analysis is undertaken in order to better understand whether the positive effect of competition on soundness is attributable to the impacts of competition on profitability, capitalization or on the volatility of profits. Findings show that the coefficient of Boone indicator is positive and significant in the ROA and capital ratio analyses. The first result provides support that competition positively affects profitability.

The result regarding the Capital Ratio equation indicates that competition incentivizes Italian non-life insurers to hold more capital, which is consistent with recent literature on financial institutions, particularly banks (Allen et al., 2011;

Schaeck and Cihák, 2012) but in contrast with the findings of Cummins et al. (2017), which shows that competition incentivizes EU life insurers to hold less capital. On the other hand, estimates show a moderate negative effect of competition in reducing the volatility of profits since the coefficient of the Boone indicator is negative and insignificant in the analysis of the standard error of ROA. Overall, findings indicate that competition increases the financial soundness of Italian non-life insurers through an increase in profitability and higher capital ratio.

Table 3.5: The effect of competition on non-life insurers soundness

	Panel A: Main Results				Panel B: Z-score Components		
	Basic Equation		All Controls				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable	Z-score	Z-score	Z-score	Z-score	ROA	Capital Ratio	S.D. ROA
Boone Indicator	16,956***		15,192***		0,523**	0,591*	-0,054
	(3,754)		(3,267)		(0,231)	(0,332)	(0,132)
Boone Indicator[a]		0,735***		0,514***			
		(0,140)		(0,126)			
Insurer Size	0 .295***	0,266***	0,166***	0,166*	0,020***	-0,065***	-0,011***
	(.098)	(0,097)	(0,017)	(0,100)	(0,005)	(0,002)	(0,002)
IAR	0 .497*	0,355*	0,419	0,386	-0,004*	0,103***	0,0004
	(0,283)	(0,293)	(0,265)	(0,289)	(0,002)	(0,033)	(0,016)
Leverage	-0,400***	-0,399***	-0,407***	-0,407***	-0,004***	-0,073***	0,002
	(0,055)	(0,055)	(0,031)	(0,000)	(0,003)	(0,006)	(0,002)
Concentration			-1.132***	-0,918**	0,013	0,020	0,024***
			(0,503)	(0,451)	(0,024)	(0,032)	(0,014)
Market Size			0,704*	0,200***	-0,101**	0,030	-0,046***
			(0,527)	(0,647)	(0,039)	(0,046)	(0,024)
GDP Growth			0,078	0,072	0,458**	0,140	0,097
			(0,810)	(0,647)	(0,133)	(0,139)	(0,060)
Real Interest Rate			-0,440*	-0,467**	-0,077**	-0,047*	-0,092
			(0,231)	(0,266)	(0,020)	(0,026)	(0,011)
Crisis Dummy	-0,381***	-0,467***	-0,311***	-0,367***	0,004***	0,017**	0,009***
	(0,.072)	(0,071)	(0,075)	(0,076)	(0,006)	(0,008)	(0,003)
R-squared	0,098	0,065	0,152	0,157	0,067	0,551	0,067
Endog Test (p-value)	0,018	0,000	0,002	0,002	0,000	0,125	0,004
Hansen J-Test (p-value)	0,000	0,003	0,509	0,731	0,018	0,757	0,402
Anderson Corr (p-value)	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Wald F-Test (p-value)	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Observations	1749	1749	1749	1749	1749	1749	1749

Note: The table presents the regression results of the Z-score and its components (ROA, Capital Ratio and S.D. ROA) on the Boone indicator, and additional independent variables. In order to facilitate the interpretation of the results, I employ the absolute value of the indicator. Further, to make the results more presentable, I use its logarithmic transformation in Columns (2) and (4). I use the Two-Stage Least Square (2SLS) estimator and instrument the Boone indicator with the Institutional Development Index, and an interaction term of GDP per capita with the market share of foreign insurers. GDP growth and Real Interest Rate are lagged by one period. Robust standard errors are in parenthesis. The ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

Further Analyses

In this section, additional analyses are presented. First, we explore whether financially weaker insurers respond differently to competition than stronger insurers. In order to address this question, quantile regression is used because it

provides information about the effect of independent variables conditional upon the distribution of the dependent variable - the soundness measure.

The conjecture that there may be differences in the way weak and strong insurers respond to competition is confirmed by the quantile regressions results. Table 6 presents Boone coefficients for the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} quantiles of the distribution of Z-score. The coefficient of the indicator is positive in all quantiles and significant in the 10^{th}, 50^{th}, 75^{th}, and 90^{th}. Further, we perform an *F*-test to determine whether coefficients of the Boone indicator are equal across all quantiles. This test rejects the null hypothesis for the equality of coefficients, suggesting heterogeneous responses of the Z-score to competition. Also, we observe an increasing magnitude of the Boone (2008) indicator from the 10^{th} quantile till the 90^{th} quantile. Since the higher quantiles of the Z-score identify the more financially sound insurers, findings suggest that the positive effect of competition on soundness is larger for stronger insurers than for those that are less financially healthy.

Secondly, we examine the nexus between competition and financial soundness in the life insurance market in Italy. Table 3.7 in Appendix reports the regression results of Z-scores and its components on the Boone (2008) indicator of competition controlling for insurer-specific, market-pecific and macro-economic variables. Z-scores and all control variables are calculated in the same way as in the regression analysis of competition and soundness for non-life insurers.

Table 3.6: The effect of Boone indicator on soundness: quantile regressions

	(1)	(2)	(3)	(4)	(5)
Variables	10th Quan.	25th Quan.	50th Quan.	75th Quan.	90th Quan.
Boone Indicator	0,115***	0,168	0,249**	0,342***	0,439***
	(0,139)	(0,143)	(0,117)	(0,114)	(0,123)
Insurer Size	0,109***	0,069***	0,032*	0,043*	0,005
	(0,034)	(0,022)	(0,019)	(0,023)	(0,021)
IAR	1,329***	0,909***	0,622***	0,622***	-1,179***
	(0,214)	(0,232)	(0,174)	(0,174)	(0,190)
Leverage	-0,454***	-0,408***	-0,389***	-0,317***	-1,196***
	(0,044)	(0,031)	(0,029)	(0,019)	(0,032)
Concentration	-0,363	0,132	0,267	0,222	-0,992
	(1,364)	(0,609)	(0,719)	(0,684)	(1,015)
Market Size	0,157	0,969	-0,383	-0,128	-0,208
	(0,745)	(0,745)	(0,655)	(0,675)	(0,564)
GDP Growth	10,073***	10,402***	8,622***	7,332***	0,016***
	(2,901)	(2,543)	(2,197)	(2,896)	(2,626)
Real Interest Rate	-1,706***	-1,451***	-1,059***	-0,817**	-0,163
	(0,408)	(0,392)	(0,392)	(0,401)	(0,515)
Crisis Dummy	-0.601**	'-0.510**	'-0.362**	'-0.288***	'0,172***
	(0,197)	'(0.150)	'(0,099)	'(0,097)	(0,138)
Pseudo R-sq	0,143	0,126	0,109	0,104	0,052
F-stat for the equality of quantile coefficients					5,64***
Observations	1525	1525	1525	1525	1525

Note: This table reports quantile regressions of the Z-score on the Boone indicator and other control variables. The equation specification is the same as in Column (4) in Table 5. Robust standard errors are in parenthesis. The ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

The positive sign and high significance of the indicator proves the positive link between competition and the financial soundness of life insurers. The size of insurers (total assets) and the size of market (total life premiums) are positively related to the Z-score. While, the efficiency of the insurer's accounts, the leverage ratio and concentration level enter the regression negatively. As expected and similar to the non-life insurance regression, GDP growth is positively associated with the soundness, while interest rates have the opposite effect.

Consistent with previous studies in the EU life insurance market (Cummins et al., 2017), there is a positive and significant correlation between competition and profitability. Also, the findings suggest that increases in competition increase the level of capital and decrease the volatility of profits. However, competition has a moderate impact on the capital ratio due to its lower significance and stronger effect on the volatility of profits due to its high significance. All in all, results suggest the same effect of competition on profitability and capital ratio of life insurers as in the case of non-life insurers: competition increases their financial soundness through higher profitability and capitalization.

3.7 Conclusions

This chapter aimed at investigating: i) whether the deregulation and liberalization generated by the EU Third Non-Life Insurance Directive and followed by national reforms led to enhanced competition in the Italian non-life insurance sector; and ii) whether competition improved the soundness of the non-life insurers. It applied the Boone indicator, a new measure of competition, which estimates the relationship between performance, in terms of profits, and efficiency measured by marginal costs. This indicator was further explored to assess the relationship between competition and insurers' financial soundness.

With regard to the first objective, the findings show that: i) over the period 1998-2013, an increase in the non-life insurers' marginal costs was negatively and

significantly associated with profits. The estimated relationship was robust to several estimation methods, and specifications of dependent and independent variables; ii) the level of competition in the Italian non-life insurance market declined during 1999-2002, and slightly increased during 2003-2007. During 2008-2013, the degree of competition improved as compared to that of the previous period (the magnitude of the Boone indicator coefficients was on average slightly higher than the average of the preceding years). iii) additional tests in the motor insurance segment suggest that during the sample period, the motor third-party liability insurance was relatively more competitive that the other two business lines: the land vehicle insurance and marine third-party liability. Further investigations in the motor third-party liability imply an improvement of competitive pressure in this market after the implementation of a major national reform (the Decree 223/2006) in 2007. iv) the comparison between the non-life and life insurance markets indicates that during 1998-2013, the non-life insurers were relatively less competitive than life insurers.

As for the second purpose of this paper, results indicate that: i) competition positively affected the financial soundness: higher levels of competition, measured by the new indicator were found to significantly increase the soundness of non-life insurers in Italy during the period 1998-2013; ii) additional analysis that aimed at understanding the driving forces behind this association show that insurers' profits and capital increased as a result of intensified competition. These results imply that the soundness-enhancing impact of competition is driven essentially via an increase

in profitability and capitalization; iii) the positive effect of competition on soundness was larger for financially stronger non-life insurers than for those that were less financially healthy; iv) the same effect of competition on soundness was also found in the life insurance segment.

Findings may offer insights to policymakers. The fact that in the period 1998-2013 the competition in the Italian non-life insurance market followed an unstable trend, and did not remarkably improve (as measured by the Boone indicator), may raise concerns about the mechanisms/effectiveness of the harmonization of the provision of non-life insurance services and the creation of the common market.

Promoting competition has benefits for efficient insurers and their financial soundness. This is in line with the existing insurance literature (Cummins et al., 2017), which shows that competition positively affected the soundness of EU life insurers during 1999-2011. However, financially sounder non-life insurers benefited more from higher competition as compared to the less sound insurers. This calls for attention from the policymakers when drafting new competition policies. They may take into account that insurers respond differently to increased competition pressure based on their level of financial health.

Lastly, since the Italian government has recently introduced a series of competition reforms focusing on particular business lines of the non-life insurance market, further research is indispensable in order to understand how competition has evolved in these markets, and whether the introduced reforms have had the expected impact.

3.8 Appendix

Table 3.7: The effect of competition on life insurers soundness

	Panel A: Main Results		Panel B: Z-score Components		
	All Controls				
	(1)	(2)	(3)	(4)	(5)
Dependent Variable	Z-score	Z-score	ROA	Capital Ratio	S.D. ROA
Boone Indicator	9,312***		0,029**	0,075	-0,068***
	(1,493)		(0,028)	(0,074)	(0,133)
Boone Indicator[a]		0,951***			
		(0,157)			
Insurer Size	0,066	0,06	0,003**	-0,043***	-0,003***
	(0,075)	(0,074)	(0,001)	(0,009)	(0,000)
IAR	-0,209	-0,152	-0,001*	0,094***	0,008**
	(0,304)	(0,310)	(0,006)	(0,032)	(0,004)
Leverage	-0,195***	-0,184***	-0,000	-0,035***	-0,000
	(0,042)	(0,041)	(0,001)	(0,006)	(0,000)
Concentration	-1.414***	-0,997**	-0,015	-0,052	0,018***
	(0,577)	(0,689)	(0,024)	(0,040)	(0,006)
Market Size	1,653***	1,142***	0,003	0,037**	-0,008**
	(0,348)	(0,296)	(0,006)	(0,017)	(0,003)
GDP Growth	11,929***	6,942***	-0,025	0,168	-0,071***
	(1,724)	(1,805)	(0,031)	(0,125)	(0,018)
Real Interest Rate	-1,617*	-0,127**	-0,005	-0,012	0,004***
	(0,048)	(0,051)	(0,003)	(0,009)	(0,001)
R-squared	0,166	0,139	0,043	0,426	0,140
Endog Test (p-value)	0,002	0,000	0,113	0,955	0,001
Hansen J-Test (p-value)	0,001	0,000	0,005	0,072	0,051
Anderson Corr (p-value)	0,000	0,000	0,000	0,000	0,000
Wald F-Test (p-value)	0,000	0,000	0,000	0,000	0,000
Observations	1133	1133	1133	1133	1133

Note: The table presents the regression results of the Z-score and its components (ROA, Capital Ratio and S.D. ROA) on the Boone indicator, and additional independent variables. In order to facilitate the interpretation of the results, I employ the absolute value of the indicator. Further, to make the results more presentable, I use its logarithmic transformation in Column (2). I use the Two-Stage Least Square (2SLS) estimator and instrument the Boone indicator with the Institutional Development Index, and an interaction term of GDP per capita with the market share of foreign insurers. GDP growth and Real Interest Rate are lagged by one period. Robust standard errors are in parenthesis. The ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

Chapter 4

Bank Competition and Stability Nexus Reassessed: New Evidence from Italy

4.1 Introduction

The nexus between bank competition and stability has often been at the center of policy debates between researchers and policymakers.[202] The occurrence of the recent financial crisis somehow recalled that additional research is still required on

[202] See for instance, Beck et al. (2013) and Diallo (2015). Also, a number of papers use the term 'stability'. Others opt for alternative terms such as 'soundness' or 'bank risk-taking'. In this chapter, I use both 'soundness' and 'stability' interchangeably. A bank is financially 'stable' and/or 'sound' when it is profitable and has adequate assets and liquidity to meet its financial obligations towards the customers.

this topic. Nevertheless, the theoretical and empirical results on the impact of bank competition on soundness continue to remain ambiguous.

Theoretical models develop contrasting predictions due to different ways of modeling competition. Some of them take into account the competition on the deposit side, while the rest consider also the asset side of the balance sheets of banks. Keeley (1990) argues that an increase in competition can cause charter values of banks to drop, which in turn encourages banks to increase default risk via both rises in asset risk and decreases in capital. Models by Allen and Gale (2004), Matutes and Vives (1996), De Nicoló and Lucchetta (2009), Matsouka (2013) confirm this prediction. Still, according to Boyd and De Nicoló (2005), bank competition increases bank stability. Similarly, the empirical work provides divergent findings.

Since the current literature points to unclear results, the purpose in this paper is to provide new evidence on the interplay between bank competition and stability. For this reason, the focus is on a sample of Italian banks and an examination of the competition-stability nexus during the period 2006-2014. A novel approach to the competition is used, namely the Boone indicator that captures the impact of competition on the performance of firms. The main idea behind this approach is that competition rewards efficiency. More efficient firms attain better performance at the cost of their less efficient rivals, and this outcome is greater in more competitive markets.

There are several applications of the Boone approach to banking. For instance, van Leuvensteijn et al. (2011) uses the Boone indicator to measure competition in five main European banking markets as well the US, the UK and Japan over the period 1994-2004. De Bonis et al. (2015) use the same indicator to assess how the competitive pressure evolved in Italy during the recent 120-years (1890-2013). Clerides et al. (2015) estimate the degree of competition, by using the Boone indicator, in banking markets for 149 countries during the 1997-2010 period.

Other papers use it to gauge competition, while investigating the nexus between competition and bank soundness, financial reforms, and risk-taking. Delis (2012) investigates the interplay between bank competition and financial reforms with data from BankScope over the period 1987-2005. Tabak et al. (2012) exploit the Boone approach to study the relationship between bank competition and the risk-taking behavior of banks in ten Latin American countries during the 2003 - 2008 period. Kick and Prieto (2013) use data on German banks that cover the period from 1994 to 2010, and find out that an increase in competition, measured by the Boone indicator, lowers the risk level of banks. Schaeck and Cihák (2014) use a sample of ten European banks to assess the effects of competition on financial soundness during 1995 -2005. Diallo (2015) investigates the bank competition-stability link for 145 countries during the period 1997-2010, using also the Boone indicator (besides the Lerner and adjusted Lerner indices) as a measure of competition.

The Italian banking sector is an appropriate market in which to examine the link between competition and stability. First, it is an important sector of the domestic economy. In 2014, its total assets accounted for 203 percent of the overall GDP. It is also one of the major markets in the EU. With its 2,7 trillion euro assets, the Italian banking sector ranks fourth after respective sectors in France, Germany and Spain. Secondly, it is one of the banking markets, which did not receive major government interventions such as state aid or bailout policies during the recent financial crisis as was the case in other main EU banking markets.[203] Thus, the competitive environment has not been subject to significant distortions observed in other EU banking markets, in which extensive government interventions have taken place.

The remainder of the chapter is organized as follows: Section 4.2 describes the structure of the Italian banking market, the legal environment and institutional set-up. Section 4.3 presents the related literature. Section 4.4 presents the empirical methodology, variables and the data. Section 4.5 reports estimates of the Boone indicator and the results about the bank competition-soundness nexus. Finally, Section 4.6 summarizes the findings.

[203] Except for the Banca Monte dei Paschi di Siena, which in January 2013 received from the Bank of Italy (the central bank) a bailout of Euro 3,9 billion.

4.2 Italian Banking Sector

This section provides an overview of the legal environment and institutional set-up of the banking market in Italy followed by anti-competitive behavior recently investigated by the anti-trust authorities. Lastly, it describes main features of the market.

The Legal Environment and Institutional Set-up

Since the 1980s the Italian banking system has experienced significant developments, induced as a result of the EU legislation and national reforms.

The First Banking Coordination Directive (the 'First Directive') adopted in 1977 created the foundation of banking laws in each Member State of the European Union.[204] This was the first step toward the harmonization of rules and regulations that aimed at enhancing the competitiveness of the European banking sector. The harmonization process called for the enactment of certain legal provisions that would eliminate barriers between Member States with respect to the provision of banking services, ensure the freedom of EU banks to establish branches throughout the EU, provide standard requirements for the authorization and supervision of banks. Further, *t*he First Directive established for the first time the principle of

[204] First Council Directive 77/780/EEC of 12 December 1977 on the Coordination of Laws, Regulations and Administrative Provisions Relating to the Taking-up and Pursuit of the Business of Credit Institutions.

home country control with the least harmonization of national regulations.[205] In fact, this was an overall program, which demanded further legislative action.

In 1985, the European Commission approved the White Paper on The Completion of the Internal Market (the 'White Paper'), which established the free movement of persons, goods, and capital in the EU. In the banking setting, the White Paper commanded a single banking licence, home country control, and mutual recognition. These principles were incorporated into the Second Banking Directive (the 'Second Directive').[206] According to the Second Directive, each bank authorized in a Member State would be able to establish branches or freely supply cross-border financial services to individuals and businesses throughout the EU without further authorization. The Second Directive called for harmonized capital adequacy standards, large exposure rules, and supervisory control of banks.

Following the aforementioned changes imposed by the EU legislation, the Italian authorities introduced two additional important reforms. The first was related to the banking supervision and financial stability control. Until 1985, the central bank of Italy – the Bank of Italy, which was in charge of the control of the

[205] The responsibility for the supervision of banks operating in two or more Member States was transferred to the home country of the bank.

[206] Second Council Directive 89/646/EEC of 15 December 1989 on the Coordination of Laws, Regulations, and Administrative Provisions Relating to the Taking-up and Pursuit of the Business of Credit Institutions and Amending Directive 77/780/EEC.

banking market structure, could decide whether to authorize a new bank based upon the assessment that the activity of the new bank activity was necessary for the market and would satisfy consumers' needs. Consequently, banks were not allowed to independently decide on their branch expansion or geographical growth.

The second reform was the privatization of the banking sector that began with the Law 218/1990 (also, called the 'Amato Law'). Until that time, the major Italian banks were under public control (directly or indirectly). The Amato Law allowed banks to issue bonds, operate as universal banks, invest in non-financial stocks, and removed restrictions between short and long-term operations. Apparently, the privatization process aimed at rendering the Italian system more competitive at both national and international levels.

In the subsequent years, the banking market continued to undergo significant changes. For instance, it has abolished the prohibition on banks attaining shareholdings higher than certain levels in companies operational in commercial sectors. Currently, the basis of the Italian supervisory model is Basel II, and the Bank of Italy has simplified the administrative proceedings that regulate banking activities. In addition, in order to enhance competition in the financial services sector, a sanction on the 'interlocking directorships' among banks, insurers and other financial intermediaries has been implemented.

The supervisory approach of the Italian authorities, which is based on a strict supervision of banking groups and other financial intermediaries, helped the banking system to cope with the financial crisis of 2007-2008, and lately, with the

sovereign debt crisis. In the aftermath of these shocks, the Bank of Italy has supported all reforms undertaken at the international level. In particular, in 2008, based on the four European Commission Communications on State support for financial institutions, several additional measures were adopted. These measures consist of: a) the possibility for the Italian government to subscribe special securities in order to avoid liquidity issues; b) financial support for bank recapitalization; c) the state security on banks' short-term liabilities; d) the emergency liquidity assistance mechanism, and e) the state security in favor of depositors.

Despite a series of extensive reforms at the international level, the Italian banking regulation proved to be effective. The only case where the new international reforms were put in place, concerns the bailout of Banca Monte dei Paschi di Siena. Back then, the government evaluated special bank securities in order to comply with the new EU rules on State aid. In April 2016, the government facilitated the creation of a 5 billion euro bank rescue fund named 'Atlante' to help bank capital increases and sales of non-performing loans (bad debt). The government made sure that the private fund did not violate the EU rules against State aid.[207]

[207] According to the Economy Minister Pier Carlo Padoan the creation of the fund was not a 'bailout' but a 'private sector' initiative aimed at 'jump starting' the market for non-performing loans. At http://www.ansa.it/english/news/politics/2016/04/14/unicredit-to-invest-1bn-in-atlante-2_7ada9761-c3da-4641-8ae9-fe6684daa862.html.

Currently, the Bank of Italy supports the re-regulation contained in the Basel III framework, and the introduction of the SSM managed by the European Central Bank. In particular, Basel III provides for a higher quality and quantity of capital, more comprehensive risk coverage, stronger supervision, stringent risk management and higher disclosure standards.

The main authorities in charge of the regulation of the banking activity are the Inter-departmental Committee for Credit and Savings (CICR), the Ministry of Economy and Finance, and the Bank of Italy.[208] The latter is the supervisory authority for banks and other entities operating in the banking system. In its role as the prudential regulator, the Bank of Italy focuses on the safety, soundness of banks, and overall stability of the financial system. Prior to 2005, the Bank of Italy was the sole anti-trust authority in charge of the enforcement of competition rules in the banking sector. Since then, this responsibility has been shared with the Italian Competition Authority.

Anti-trust Cases and the Italian Approach

Banks often cooperate in order to provide common services such as payment systems, exchange information via credit bureaus and strengthening public

[208] The CICR is comprised of the following members: the Ministry of Finance (in the capacity of the chairman); the Ministry of Agriculture, Food and Forest, the Ministry of Economic Development, the Ministry of Infrastructure and Transports, and the Ministry of European Union Affairs. The Governor of the Bank of Italy participates in the CICIR meetings but has no voting right.

confidence in the financial system.[209] Therefore, it is not unusual that they may also attempt to collude and engage in anti-competitive behavior. As a matter of fact, several collusive practices have occurred in the Italian banking sector, particularly in the aftermath of the recent financial crisis.

One of the early cases is that of the CartaSì and American Express Services Europe (AESEL). In September 2003, the ICA and the Bank of Italy opened a joint investigation into the two companies to establish whether an agreement on the credit card market had infringed Article 101 TFEU. One year later, the ICA noticed that the setting up of a production and distribution joint venture of the two biggest operators would have led to the coordination of the main segment of the credit card market. In order to allay such concerns, the parties introduced important amendments to the agreement. Hence, the ICA closed the proceeding and authorized the agreement for a three-year period.

In November 2010, the ICA ruled that the Mastercard company and eight banks (Banca Monte dei Paschi di Siena, BNL, Banca Sella Holding, Barclays Bank, Deutsche Bank, Intesa Sanpaolo, ICBI and Unicredit) had established agreements which restricted competition by maintaining high inter-bank fees for payments done through credit or debit cards. The competition authority concluded the investigation with over 6 million Euros in fines.

[209] Hasan and Marinč (2016).

Another case is that of the Bancomat Consortium. In February 2014, the ICA started an investigation in order to assess whether the decision of the Bancomat Consortium to apply a commission for bills payment services constituted an infringement of Article 101 TFEU. [210] Since January 2014, the Bancomat Consortium had applied a 0,10 euro commission to all bill payments made through a PagoBancomat debit card.[211] The ICA found that the conduct raised anti-competitive concerns because it hampered competition in the bill payment services sector to the detriment of business and consumers. In November 2014, the ICA closed the proceeding after noting that the Bancomat Consortium had committed to reduce commissions for every transaction from 0,10 to 0,07 euro.

In May 2014, the ICA started an investigation into six banks (Cassa di Risparmio di Bolzano, Banca Popolare dell'Alto Adige, Cassa Raiffeisen di Brunico, Cassa Rurale Bolzano, Cassa Rurale Renon and Cassa Raiffeisen Valle Isarco), which were operating in the Province of Trento and Bolzano for an alleged infringement of Article 2 of the Italian Law 287/1990 and Article 101 TFEU. The case stemmed after a complaint filed by the consumer association Centro Consumatori Utenti Alto Adige alleging the existence of an anti-competitive agreement aiming at setting a minimum

[210] The Consortium Bancomat consists of the Italian Bank Association, Italian banks, financial consultants, payment institutes and other institutions authorized by Italian and EU laws to operate in the payment service market.

[211] In essence, the mechanism is that the bank enters into an agreement with the issuer of the relevant invoice and pays commission for each payment made by the debtor through the PagoBancomat card to the entity that issued the card.

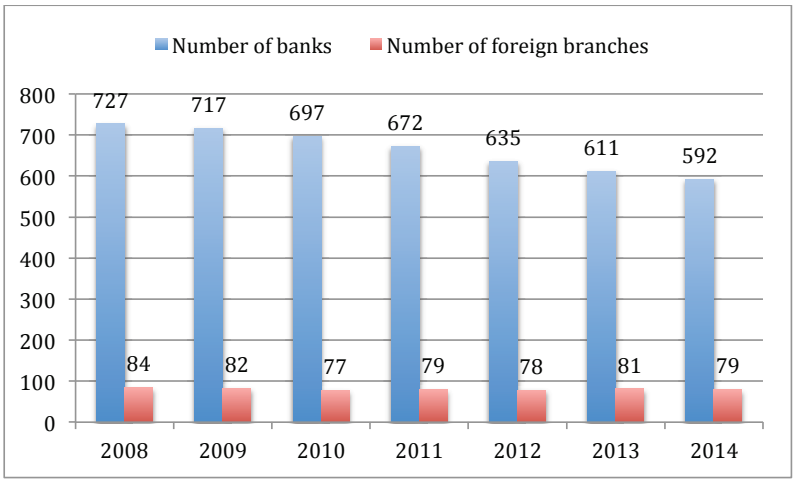
mortgage interest rate. The ICA found that all banks had set a 'rate floor', which was a minimum mortgage interest rate of 3 percent. According to the Authority, this conduct had infringed Article 101 TFEU as the territory of Trento and Bolzano borders Austria, another EU Member State. The collusion therefore caused damage to commercial trade between two Member States.

Since January 2016, the ICA has been undertaking a new investigation that involves the Italian Banking Association (the 'IBA') for an alleged infringement of Article 101 TFEU. The focus of the proceedings is related to an inter-bank agreement on the service called Sepa Compliant Electronic Database Alignment (the 'SEDA'). The SEDA is an optional service established by the agreement in which all the banks that are members of the IBA would offer to the businesses/companies important information about the financial soundness of their competitors. The ICA alleged that conduct was incompatible with Article 101 TFEU, as the agreement concerned a major segment of the Italian market. The investigation is still on-going.

Overview of the Market

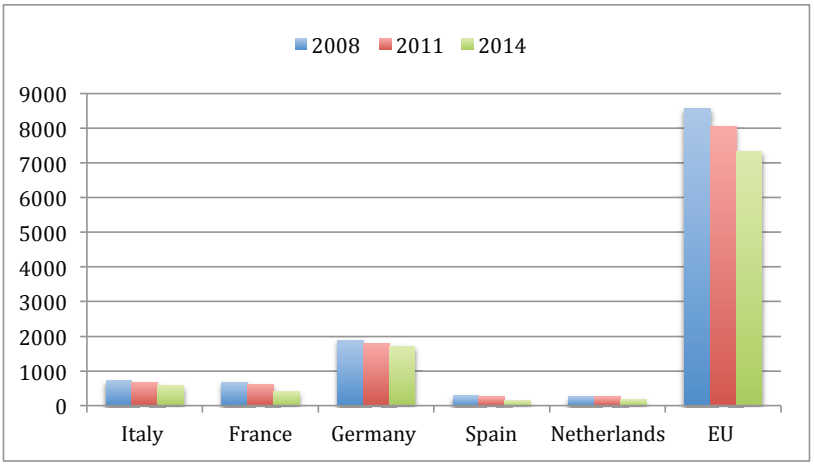
The consolidation process that started in the 1990s is still continuing partly due to pressures to achieve lower costs and reorganization. The recent financial crisis set additional pressure on banks to consolidate. Consequently, at the end of 2014, the total number of banks in Italy declined to 592 from 611 at the end of 2013 (Figure 4.1). By comparison, at the end of 2008 there were 727 banks. The number of foreign branches has declined as well from 84 in 2008 to 79 in 2014.

Figure 4.1: Number of banks and foreign branches



The decrease of 37 banks between the end of 2011 and the beginning of 2012 was the largest decrease since the start of the 2007-2008 financial crisis. However, such a declining trend in the total number of banks was also observed in other major EU markets (Figure 4.2).

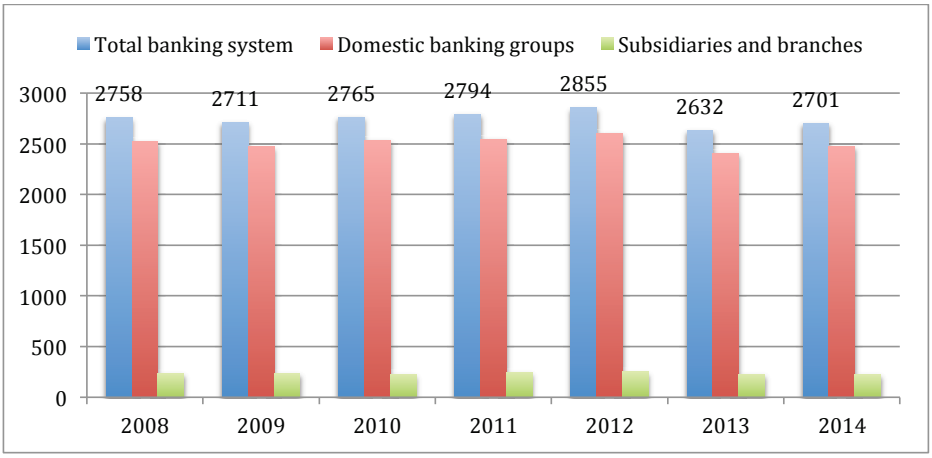
Figure 4.2: Number of banks in major European banking markets



Regarding the resizing process, total assets of the Italian banking sector, including foreign subsidies and branches, stood at 2,701 trillion euro at the end of 2014, representing a decline of 2 percent compared with 2008 and an increase of 2,62 percent compared with 2013 (Figure 4.3).

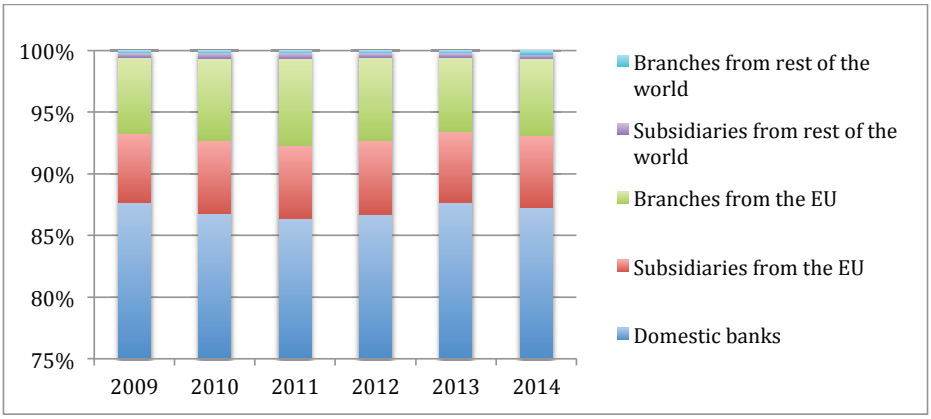
Overall, in 2014, the Italian banking market ranked fourth in the EU after France, Germany and Spain whose banking sectors assets totalled 7,2 trillion euro, 7,1 trillion euro, and 3,6 trillion euro, respectively.

Figure 4.3: Total assets of domestic groups and foreign subsidiaries/branches (in EUR billions)



In terms of the composition of foreign banks, measured by their share of assets in the total banking sector assets, foreign branches from the EU continued to prevail over subsidiaries in 2014, reaching the same level as in 2008 of 6,5 percent of overall banking assets. Meanwhile, total subsidiaries amounted to 6,2 percent. Domestic banks maintained the greatest share of 87 percent, lower by 1 percent at the end of 2013 (Figure 4.4).

Figure 4.4: Composition of banking sector assets by type of banks

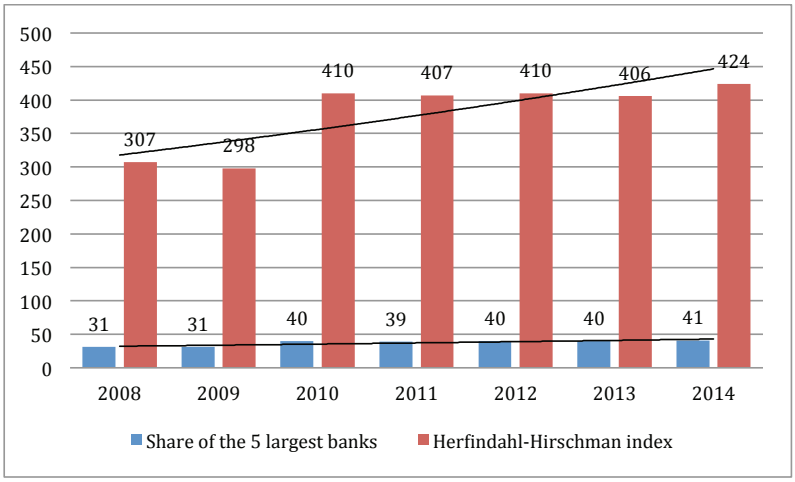


The total merger and acquisition (M&A) activity has increased since the post-crisis period, particularly in terms of the number of transactions. In 2008, the number of announced and completed deals was 24, while in 2014, deals increased to 34. During 2015, this number jumped to 66, reaching the peak since the start of the crisis. M&A deals also increased in terms of volumes with around 11,5 billion euro against 7,6 billion euro previous year (2014).

The concentration level, measured by the share of total assets held by the five largest banks or by the Herfindhal-Hirschman Index (HHI) has followed an increasing trend since the post-crisis period. The increase in market concentration indicates mainly a decrease of the number of banks (noted earlier) and an intensified M&A activity. During the period 2008 - 2014, the market tended to become more concentrated. Concentration increased from 31 percent in 2008 to 41

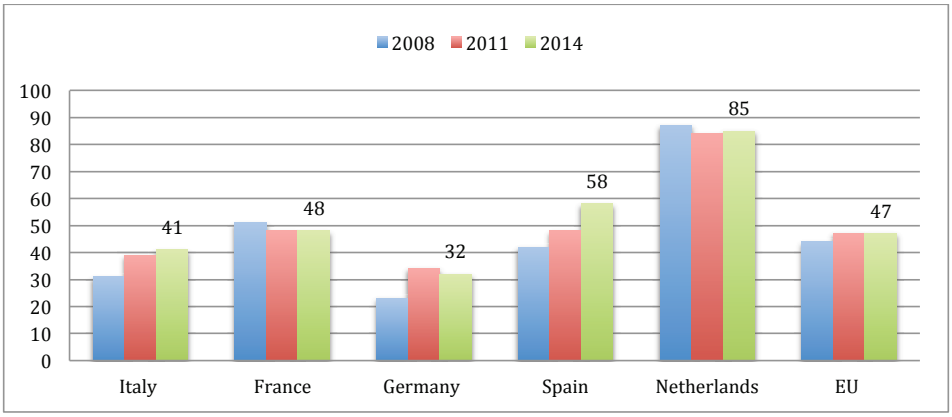
percent in 2014. In the same trend, the HHI increased from 307 in 2008 to 404 in 2014 (Figure 4.5).

Figure 4.5: Market structure (in total assets)



Ac compared with other key EU markets, the concentration ratio continued to rise also in Germany and Spain, but decreased in France and the Netherlands. However, the share of the five largest banks in Italy in 2014 remained lower than the share of the five largest banks in most of the other major markets such as in France, Spain, and the Netherlands, except that of Germany. It can also be noted that the concentration level in Italy still remains lower than the average level of the EU banking market (Figure 4.6).

Figure 4.6: Share of the five largest banks of major EU markets (in total assets)



4.3 Related Literature

There is an existing body of literature, which has focused on the effects of competition in banking sector. The following section presents a review of related literature. The main findings of the current studies show that bank competition has a positive effect on efficiency and growth, but its effect on soundness is ambiguous.

4.3.1 Competition in Banking

Competition affects banking markets and the real economy in different ways; it enables markets to achieve productive and cost efficiency, increase credit allocation

and bank monitoring and improve the branch orientation. Also, bank competition has a positive effect on the real economy promoting growth.

There exist a number of papers, which show that higher competition positively affects banking markets. For instance, Stiroh and Strahan (2003) examine the impact of competition from the deregulation on the dynamics of the U.S. banking industry. The authors find that the link between a bank's relative performance and its subsequent market share growth strengthens significantly after the deregulation since assets were transferred to better performers. Evanoff and Ors (2008) evaluate whether the competition affects the productive efficiency of non- merging banks confronted with new entry in their local markets. Their findings suggest that the incumbent banks respond by improving cost efficiency.

A strand of literature shows that competition can increase credit allocation, bank monitoring and could transform the nature of banking by stimulating banks to become more relationship oriented. Boot and Thakor (2000) show that competition incentivizes banks to shift their business focus to activities that are less prone to price competition, such as relationship banking. The authors find that as inter-bank competition increases, banks make more relationship loans, but each of them has lower added value for borrowers. Dell'Ariccia and Marquez (2004) analyze how the information captured by borrowers affects the loan portfolio allocation. Their results indicate that competition increases sector specialization. Degryse and Ongena (2007) study the effect of inter-bank competition on bank branch orientation. The authors show that bank branches facing rigid local competition are

more involved in relationship lending.

Additional studies provide evidence that higher bank competition positively affects the productivity of the real economy. For example, Jayaratne and Strahan (1998) assess how competition in the U.S. was affected by the removal of bank-branching restrictions. Their findings show that longstanding branching restrictions in banking served as entry barriers that prevented more efficient banks from expanding at the expense of their less efficient rivals. Further, the authors show that the deregulation of the banking sector triggered an increase in the per capita growth in output.

There are several studies that investigate the effects of bank competition in Italy, particularly in the aftermath of the deregulation and liberalization process that took place in the 1980s and 1990s. For instance, Focarelli and Panetta (2003) assess the effects of bank mergers that occurred in the 1990s. Their findings suggest a positive effect of the consolidation process in the long run, even though the initial short-run effect was a decline in the interest rates of deposits. Angelini and Cetorelli (2003) estimate the Lerner index using the conjectural variations method for the period 1984 till 1997. Their results indicate an increase in competition after 1992, and provide evidence that it was due to the deregulation process.

Other studies attempt to investigate the multi-market hypothesis - more contacts between firms facilitate collusion – for the Italian banking sector. De Bonis and Ferrando (2000) and Coccorese and Pellecchia (2013) attain different results. The first paper rejects the multi-market hypothesis; but the second one accepts it.

Most likely, the fact that the authors find opposing results may be related to estimation specification, dissimilar measures of competition, and also different sample periods. Coccorese (2009) argues that concentration and competition in banking can co-exist. The author finds that banks, which operated as monopolists during 1988 and 2005, did not take full advantage of their market power, which was measured by the Lerner and H indexes.

4.3.2 Competition and Soundness

The economic literature on the relationship between bank competition and soundness show that the relationship is complex, and does not provide a definite conclusion: competition can have both positive and negative effects on the financial soundness of the banking markets.

Theoretical models develop contrasting predictions due to different ways of modeling competition. Some of them take into account the competition on deposit side, while the rest consider also the asset side of the balance sheets of banks. Similarly, the empirical work provides divergent findings mainly due to various indicators employed to measure competition. The following section reviews the theoretical and empirical studies that investigate the relationship between bank competition and stability.

The Theory: Competition Reduces Soundness

The theoretical literature advances several arguments/views that support the negative association between bank competition and financial soundness. The traditional view, known as the 'charter value' view, envisages that more concentrated and less competitive banking systems are sounder, as higher profits can safeguard the stability. Marcus (1984), Chan et al. (1986), Keeley (1990), and Matsouka (2013) argue that more entry and more intense competition lead to more fragility. When there is tougher competition for deposits, and consequently for profits, banks are more encouraged to take excessive risks, causing greater fragility. On the contrary, when there is less competitive pressure and limited bank entry, banks have less incentives to take risks. This leads to positive impacts of competition on the financial soundness.

Another argument is that higher competitive pressure impairs the coordination problem of investors and accelerates the probability of a crisis. Vives (2010) argues that an intensification of competition will increase excessive risk taking and the likelihood of a bank's default. The inter-bank market and the payment system are considered as additional sources through which competition can negatively affect the overall financial stability. Allen and Gale (2000) discuss that perfect competition may induce banks to not offer liquidity to another bank that faces liquidity shortages. According to the authors, in perfect competitive markets banks are not willing to provide liquidity to a distressed bank, leading to potential failures. As a result, the whole system can be negatively affected.

In addition, there are two more arguments related to the market structure. The first argument regards the number of banks supervised by the regulators. In more concentrated banking markets the number of banks is smaller than in the less concentrated markets. A smaller number of banks may lessen the supervisory burden, and therefore increase the soundness of the whole market. Allen and Gale (2000) supports this view, and show that the occurrence of financial instabilities in the U.S. can be related to the large number of banks operating in the market relative to a lower number of banks dominating markets in the UK and Canada during the same period.

The second view refers to a better diversification of portfolios by larger banks, which operate in more concentrated banking markets.[212]Nevertheless, recent theoretical studies argue that though improving individual banks' soundness, such diversification can have undesirable consequences on the entire market if banks become too inter-connected.[213]

The Theory: Competition Increases Soundness

The contrasting view is that, indeed, more competition increases the soundness of banking markets. In a seminal paper, Boyd and De Nicoló (2005) study two bank models. The first model embeds the traditional 'charter value' view; while the

[212] See Ramakrishnan and Thakor (1984), Boyd and Prescott (1986), and Allen (1990).

[213] See Wagner (2008).

second model allows for competition in both lending and deposit sides. The authors argue that the orthodox view – that market power increases profits and consequently, the financial stability of individual banks does not take into account the potential influence of market power on the borrowers' conduct. Further, they discuss that banks do not face only an asset allocation problem but also, a contracting problem - the interest rates they charge affect borrowers' conduct. Thus, the models predict opposing relationships between banks' risk of solvency and concentration. The first model suggests a positive relationship, indicating a trade-off between competition and stability. On the contrary, the second model envisages that banks may engage in excessive risk-taking, and face larger financial fragility in more concentrated and less competitive banking markets.[214] However, according to Berger et al. (2009) competition can still enhance soundness if banks manage to increase their equity capital enough to counter-weigh the high risk taking originated by more competitive pressure.

As discussed by Beck et al. (2010), proponents of the positive nexus between competition and stability contend that in concentrated markets, bank's insolvency poses more serious concerns for policymakers. First, in such competitive environments, banks usually manage to receive large subsidies through the implicit 'too big to fail' policies. This is turn enhances excessive risk-taking incentives, and

[214] Nevertheless, Martinez-Miera and Repullo (2008) shows that higher interest rates imply also greater interest income that may result in a U-shaped association between competition and bank instability.

can result in less sound markets.[215] Secondly, large banks may increase the contagion risk, resulting in a positive link between concentration and financial instability.

Empirical Evidence

Like the theoretical literature, the empirical findings on bank competition and soundness/stability nexus are ambiguous. For instance, Keeley (1990) and Jimenez et al. (2010) provide evidence for the 'charter value' argument. The first paper shows that higher competition in the 1980s in the U.S., increased risk premiums, and led to more bank instability. Similarly, Jimenez et al. (2010) using a sample of Spanish banks for the period 1988 - 2003, find that banks with greater market power have lower non-performing loans, thus lower risks. Recently, Diallo (2015) provided evidence that bank competition is harmful to stability using a sample of 145 counties over the period 1997-2010.

A recent stream of empirical studies has attempted to investigate the validity of various theoretical models. Carlson and Mitchener (2006) show that competition positively affects stability in banking. Their findings suggest that the impact of branching on competition was quantitatively more important than the geographical diversification for bank stability. In contrast, Beck et al. (2006), using a sample of developing and developed countries, investigated the effect of national bank

[215] See Mishkin (1999).

concentration, national institutions and regulations on the probability that a country faces a systemic crisis. They show that crises are less likely to occur in countries with more concentrated banking systems. Thus, the concentration does not necessarily indicate a lack of competition.

In a later study, Berger et al. (2009) show that higher bank competition corrodes market power, and leads to lower franchise value that encourages bank risk-taking. According to the authors, higher loan market power may result in higher bank risk since higher interest rates make it more difficult for customers to pay back loans, worsening both moral hazard and adverse selection problems. Their findings suggest that higher market power is associated with less risk exposure**.**

Schaeck et al. (2009) show that less competitive activity increases the crisis probability. Their findings indicate that competition and concentration capture distinctive traits of banking systems, thus, concentration is not a proper indicator of competition. Further, their results imply that policies stimulating bank competition may strengthen the systemic stability. Recently, Schaeck and Cihák (2014) using a sample of European banks from ten major markets over the period 1995-2005 find that bank competition enhances soundness, and that this effect is greater for sounder banks than for less sound ones.

A number of papers investigate the impact of market structure and competition on bank soundness, by studying the effect of mergers. Benston et al. (1995) and Craig and Santos (1997) find stability gains from bank mergers in the U.S. However, Hughes and Mester (1998) indicate that bank consolidation tends to

increase the risk of bank portfolios. Jimenez et al. (2010) examine the empirical nature of market power and stability. They find that standard measures of market concentration do not affect the ratio of non-performing loans, which is used as a measure of bank risk. However, using Lerner indexes, they find a negative relationship between loan market power and bank risks.

Schaeck and Cihák (2007) argue that one of the channels through which competition positively affects stability is bank capitalization. Their findings provide evidence that banks have higher capital ratios in more competitive markets. This is consistent with Berger et al. (2009) who show that banks in higher competitive markets assume higher lending risks, but this is counteracted by greater capital ratio, leading to lower risk. The key role of capitalization at explaining the relationship between bank competition and risk-taking was also confirmed by the findings of Tabak et al. (2012). The authors further argue that higher capital ratio is beneficial for banks, which operate in collusive markets. Meanwhile, in the conditions of high and average competition, capitalization improves the soundness of larger banks.

Finally, studies covering a number of countries show that regulatory policies that aim at limiting bank entry and scope of activities are negatively related to bank stability. Barth et al. (2004) and Beck at al. (2006) show that banking systems with higher activity restrictions and entry barriers are more prone to systemic concerns, while capital regulations are not significantly related to the likelihood of a crisis. Therefore, reducing the contestability of banking markets may weaken rather than

strengthen bank soundness. In contrast, Boot and Marinč (2009) argue that increasing capital requirements leads to more entry into banking, essentially by reducing the competitive strength of lower quality banks. Beck et al. (2013) provides evidence that increased competition has a larger effect on banks' fragility in countries with more severe activity limitations, lesser systemic instability, developed stock exchanges, and more effective credit information infrastructures. Also, Agoraki et al. (2011) find that higher activity restrictions combined with more market power decrease both bank credit and default risks.

4.4 Methodology, Data, and Variables

4.4.1 Methodology

The empirical strategy undertaken in this chapter is similar to the strategy carried out in Chapter 3. It consists of two steps: a) in the first step, we estimate how the bank competition has evolved in Italy during the period 2006-2014 by applying the Boone indicator. As already mentioned, this indicator reflects that competition improves the performance of efficient firms and reduces the performance of inefficient ones; ii) in the second stage, the nexus between bank competition and soundness is examined. The Boone indicator is estimated through a similar equation as Equation (9) described in Chapter 3**.** It is determined by the parameter β_k, given by the following equation:

$$\pi_{it} = \alpha_{it} + \sum_{k=1}^{T} \beta_k \, d_k ln(ac_{it}) + \sum_{k=1}^{T-1} \gamma_k d_k + \varepsilon_{it} \quad (12)$$

where π_{it} measures profit of bank i at time t, ac_{it} denotes average costs, d_k are dummy variables for years 1 to T, and ε_{it} is the error term. This indicator is an estimate of the $\beta_k/100$ units decrease in profits resulting from a one percent increase in the average costs. Similarly, as in Equation (9), the average costs are used as a proxy of marginal costs since marginal costs cannot be directly observed.[216] Higher competition implies a higher negative value of β_k. A large β_k in absolute value would reflect more competition, whilst a small value would indicate a less competitive banking sector.

In a similar way to the estimation of the insurance competition-soundness nexus presented in the previous chapter, the relationship between bank competition and soundness is estimated through following equation:

$$Z_{it} = \alpha + \beta_1 B_t + \beta_2 F_{it} + \beta_3 M_t + \varepsilon_{it} \quad (13)$$

where Z_{it} is the measure of the bank soundness for bank i at time t. B_t is the absolute value of the Boone indicator that is estimated from Equation (12). F_{it} is the vector of bank-specific variables, M_t is the vector of the overall banking market characteristics and macro-economic variables, similar to all banks. A negative sign

[216] See Schaeck and Cihák (2014) and De Bonis et al. (2015).

of the coefficient β_1 would indicate a positive link between competition and the bank soundness. The motive for using the absolute value of the Boone indicator is to make it proportionate to competition level. Also, similar to the estimation of Equation (10) in Chapter 3, specifications are added in which the logarithmic transformation of the Boone estimates is included. The reason is to achieve results that are robust, and easier to interpret. Finally, since the dependent variable is observed at the bank-level, and some of the independent variables are at market/macro level, Equation (10) is estimated using robust standard errors (in order to correct for potential serial correlation between error terms).

However, endogeneity issues may be present in the estimation of Equation (13). If endogeneity is confirmed, we follow the current banking literature (Schaeck and Cihák, 2014) and use Two-Stage Least Squares (2SLS). Several variables are considered as potential instruments for the β_k estimates. Similar to the analysis in Chapter 3, the Institutional Development Index is used as a measure of the overall quality of institutions and governance (Cummins et al., 2017). The Index is obtained from the 2014 World Bank database on governance indicators. It is measured as an average of the political stability, government effectiveness, regulatory quality, rule of law, voice and accountability, and control of corruption; it ranges from approximately -2,5 (weak) to 2,5 (strong) quality of institutions.

Also included is an interaction term of the loan growth with the bank's market share.[217] This term increases when both or either the loan growth or market share increase. Such an increase would indicate more aggressive competitive conduct. Thus, it directly affects the competitive environment of the market. The information of loan growth and market share is obtained from the BankScope database.

4.4.2 Data

In order to calculate the Boone indicator and estimate the relationship between bank competition and soundness, data from the BankScope is used. The sample covers the period 2006-2014 and comprises information about commercial, savings and cooperative banks.

The dataset is limited in several ways. Due to the data requirements for the construction of the dependent and independent variables in Equation (12), observations with non-positive personnel expenses are removed, as are administrative and other operating expenses. Secondly, banks for which we do not have a minimum of three continuous years of data are excluded. The final sample comprises 4122 bank year observations. Of the total observations, 3345 are for cooperative banks, 281 for savings banks, 496 for commercial banks. The final sample is an unbalanced panel with a minimum of 425 banks for each year

[217] As in Schaeck and Cihák (2014).

Table 4.1: Summary statistics

Variable		Mean	Std. Dev.	Min	Max
Bank Level					
ROA		0,004	0,007	-0,145	0,085
Z-score		4,060	0,973	2,283	5,932
Average Costs (Specification 1)		0,652	0,156	0,164	3,879
Average Costs (Specification 2)		1,097	0,290	0,429	7,309
Bank Size		13,223	1,651	9,719	20,768
Asset Growth		0,080	0,153	-0,999	0,380
LLP		0,007	0,007	-0,007	0,105
Country Level					
HHI		358,98	66,29	220	424
Market Size		22,236	0,147	21,925	22,406
GDP Growth		-0,007	0,023	-0,055	0,020
GDP per Capita		27060,38	1257,51	25031,33	28884,52
Real Interest Rate		3,660	0,440	2,745	4,251
Instruments					
Institutional Development Index		0,526	0,048	0,457	0,617
Market Share		0,001	0,012	0,0001	0,268
Loan Growth		0,080	0,214	-0,999	6,054
Number of observations per year					
2006	*425*	2009	*449*	2012	*476*
2007	*432*	2010	*457*	2013	*471*
2008	*458*	2011	*480*	2014	*474*
				Total	*4122*

Note: ROA is the ratio of total profits before taxes to total assets; Bank size is the natural logarithm of total assets; Market size is the natural logarithm of the total assets of the banking market; LLP is the ratio of loan loss provisions to total loans; Average Costs (Specification 1) is the ratio of operating costs to total income; Average Costs (Specification 2) is measured as the ratio of average costs to total income; HHI is the Herfindhal-Hirschman index; Real Interest Rate is the lending interest rate adjusted for inflation; Institutional Development Index is the average of political stability, government effectiveness, regulatory quality, rule of law, voice and accountability, control of corruption; Market Share is the share of each bank in terms of total assets; Z-score is the sum of ROA and Capital Ratio to the standard deviation of ROA. The Z-score is calculated for each of three years and it is expressed in logarithm.

Table 4.1 provides summary statistics for the key variables used in Equations (12) and (13). The average return of assets (ROA) is 0,4 percent.

The ratio of average costs to total income is on average 1,097 while the ratio of operating costs to total income is 0,652. The HHI index ranges from 220 to 424. The number of commercial, cooperative and savings banks in Italy was 425 in 2006 and 474 in 2014.

4.4.3 Variables

Boone Indicator

The variables of interest in Equation (12) are measured in the following ways: First, as suggested by Schaeck and Cihák (2014) and De Bonis et al. (2015), the ROA is used as a measure of profits. Secondly, there are two proxies of average costs: i) the ratio of operating costs to total income (*Specification 1)* and ii) the ratio of average costs to total income (*Specification 2).* The cost constituents are the interest and personnel expenses, administrative and other operating expenses. The total income is comprised of commission and trading income, interest income, fees income, and other operating income.

Financial Soundness of Banks

The dependent variable of interest in Equation (13) is the bank stability/soundness. It is measured by the Z-score, which is calculated in the same way as in Equation (11) described in Chapter 3. The Z-score is a commonly used measure of the

financial stability in banking[218] and captures the distance from default of a particular bank. Similar to the estimation of the Z-score for insurers (Chapter 3), and consistent with the existing literature, a three-year rolling time window is used for $S.D.ROA$ to permit for variation in its denominator, and use its natural logarithm to control for non-linear effects and outliers.[219]

Control Variables

In Equation (13) we control for bank characteristics, overall banking market characteristics and macro-economic variables that can affect the financial soundness. In particular, we employ the natural logarithm of total assets (*Bank Size*) to control for the differences in banks' size.[220] Large banks are likely to be more able to set higher profit margins, and can also be more frequently subject to 'too big to fail' policies. In addition, the growth rate of assets (*Asset Growth*) is used to account for differences in risk preferences and the ratio of loan loss provisions to total assets (*LLP*) as a measure of asset quality. Further, we include the HHI and the total banking system assets (*Market Size*) to measure the effect of the market structure. Recent work by Claessens and Laeven (2004) and Schaeck et al. (2009) shows that concentration is not an appropriate measure of bank competition. Therefore, whilst the Boone indicator measures the competitive pressure, HHI is

[218] See Demirgüc-Kunt et al. (2008), Tabak et al. (2012) and Schaeck and Cihák (2014).

[219] See Dermigüç-Kunt et al. (2008) and Pasurias and Gaganis (2013).

[220] See Pasurias and Gaganis (2013) and Scaheck and Cihák (2014).

used to control for market structure. The natural logarithm of the total banking system assets measures the size of the market.[221] With regard to the macro-economic variables, the growth of the real GDP (*GDP Growth*), the per capita GDP (*GDP per Capita*) and lending interest rate adjusted for inflation (*Real Interest Rate*) are used. Finally, we include a crisis dummy variable (*Crisis Dummy*) to control for the period since the financial crisis started (2008-2013).

The data on the macro-economic indicators: the GDP Growth, the GDP per capita, and the Real Interest Rate are obtained from the World Development Indicators of the World Bank. The information on the rest of variables is obtained from the BankScope database.

4.5 Empirical Results

4.5.1. Boone Indicator Estimates

Main Results

In this section, we present the findings from the Boone indicator regression. Table 4.2 provides $\beta_k$estimates based on the Equation (12). The relation between profits and average costs is estimated two times - using two different proxies of average costs: i) the ratio of operating costs to total income (*Specification 1);* and ii) the ratio of average costs to total income (*Specification 2).* The results of the endogeneity test show that average costs are endogenous when they are measured

[221] See for instance, Bresnahan (1989) and Schaeck and Cihák (2014).

by the first specification and exogenous when the second specification is used. Thus, the two-step GMM estimator is used together with one year-lagged values of independent variables as instruments when regressing Equation (12) with the first specification of average costs. Otherwise, the fixed-effects estimator is used.

Columns (1) and (2) show estimates of β_k coefficients and their standard errors based on the first specification of average costs, while Columns (3) and (4) report β_k and respective standard errors from the estimation, based on the second specification. Findings show that all β_k coefficients are negative and significantly different from zero in both cases. The test for the relevance of instruments (the Anderson correlation statistic) implies that instruments are relevant.

Table 4.2: Boone indicator estimates for the Italian banking market

Year	Specification 1		Specification 2	
	(1)	(2)	(3)	(4)
	Coefficient	Std.Error	Coefficient	Std.Error
2006			-0,0177***	(0,021)
2007	-0,0240***	(0,003)	-0,0132**	(0,001)
2008	-0,0227***	(0,002)	-0,0122***	(0,002)
2009	-0,0136***	(0,003)	-0,0187***	(0,001)
2010	-0,0164***	(0,003)	-0,0168***	(0,003)
2011	-0,0159***	(0,003)	-0,0199***	(0,002)
2012	-0,0127***	(0,003)	-0,0176***	(0,002)
2013	-0,0119***	(0,002)	-0,0179***	(0,002)
2014	-0,0132***	(0,001)	-0,0192**	(0,003)
Intercept			0,0105***	(0,000)
Overall R-squared	0,4272		0,3592	
Within R-squared			0,4319	
Between R-squared			0,1786	
Endog Test (p-values)	0,000			
Anderson Corr (p-value)	0,000			
Observations	4122		4122	

Note: This table presents coefficients of the Boone indicator. The estimation methods are the two-step GMM (Columns 1 and 2) and fixed effects for the panel data (Columns 3 and 4). All equations include bank specific time effects. The ***, **, * denote statistical significance at 1%, 5% and 10% level respectively.

However, since the number of instruments is equal to the endogenous variables, we cannot perform additional tests for the over-identification and validity of instruments. Therefore, the second measure of average costs in the estimation of the Boone indicator is preferred.

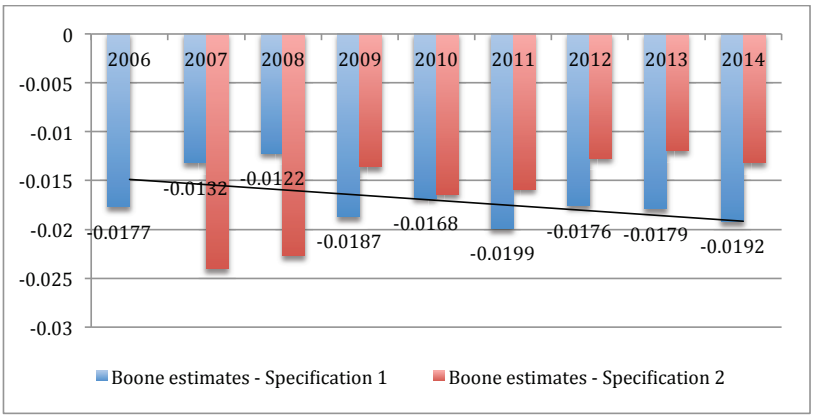
Results presented in Column (3) infer a declined competitive pressure in 2007 and 2008 and an improvement in 2009, implying that the recent financial

crisis has had some effect on the level of competitive behavior of the Italian banks. For the rest of the sample period, competition has fluctuated reaching the maximum level in 2011 (See Figure 4.7).

In order to evaluate the relative competitiveness of the banking market, the β_k estimates are compared with those of life insurance and non-life insurance. Table 4.5 in Appendix reports the β_k coefficients measured for the period 2006-2014 for banking, life and non-life insurance sectors.

Findings suggest that during the period 2006-2014, the Italian banking market was less competitive than the non-life and life insurance sectors. The average value of β_k estimates for the banking sector was (-0,0148); those of non-life and life insurance were (-0,0380) and (-0,0619), respectively.

Figure 4.7: Boone indicator estimates for the Italian banking market



Robustness Tests and Further Analyses

To investigate the robustness of the estimation results, alternative equations were run compared to Equation (12). In the first alternative equation a set of control variables, which capture bank-specific characteristics, was added. The total assets were introduced to account for the size of banks, the ratio of total assets to capital (an indicator of leverage) and the ratio of non-performing loans to total loans to capture the quality of loans. Table 4.6 in Appendix reports β_k scores and their standard errors. Results are consistent with the main results reported in Column (3) in Table 4.2, Section 4.5.1.

The second alternative way is to estimate Equation (12) with a log-log specification. The reason for this is to check whether the Boone indicator is sensitive to different econometric specifications. Thus, we introduced the logarithmic transformation of the profits instead of the level used in the baseline model. In addition, the set of control variables used in the previous alternative regression to control for bank-specific characteristics were added. Table 4.7 in Appendix reports the findings. Coefficients are all negative and significant, even though higher in magnitude as compared to estimates of the baseline model. The difference is due to the fact that observations with non-positive profits are excluded when applying the log-log specification. However, β_k coefficients are similar to those obtained from

previous studies that estimate the Boone indicator with the same econometric specification.[222]

Overall, it is found that for all alternatives, the Boone indicator coefficients are negative for the entire sample period and highly significant. The main results presented in Section 4.5.1 are robust to various econometric specifications.

4.5.2 Competition and Soundness

Main Results

The estimation results of Equation (13) are reported in Table 4.3, where the bank soundness is regressed on the Boone indicator and a number of control variables. Positive coefficients would imply a positive relationship between the corresponding variables and the bank soundness. In Columns (1) and (3) the absolute value of the Boone indicator is used in order to assume direct association with the soundness measure (as noted earlier, this indicator is in inverse proportion to competition: the more negative the indicator, the more competitive the banking market is.[223] In addition, in Columns (2) and (4) the logarithmic transformation of the Boone indicator is used in order to make the results more robust and easier to interpret.

One can note from Columns (1) to (4) that the relationship between competition and soundness is positive. The significant positive coefficients of the Boone indicator confirm this result. In particular, an increase in the level of

[222] See van Leuventeijn et al. (2011) and Delis (2012).

[223] Tabak et al. (2012).

competition by one percent is associated with 0,747 percent increase in the bank solvency (in Column 4). The result of the endogeneity test rejects the null of the exogeneity of the Boone indicator in all four regressions. Hence, the choice of the Two-Stage Least Square (2SLS) estimator is confirmed. Further, we perform tests for the relevance and validity of instruments. The Anderson correlation statistic is used to test the relevance of instruments.[224] As already mentioned, a rejection of the null hypothesis would indicate that the model is identified. Also, the Hansen J-test (Hayashi, 2000) is used to check whether instruments are valid. The joint null hypothesis is that instruments are valid. The Wald F-test is performed to check whether instruments are strong (i.e. strongly correlated with the Boone indicator estimates). The results of the Anderson correlation statistic, Hansen J- test and the Wald F-test show that instrumental variables are relevant, valid and strong.

With regard to control variables, a positive relationship can be observed between the Z-score and the HHI indicating that in more concentrated markets the bank soundness is greater, and the probability of insolvency is lower. As expected, we find that the loan loss provisions ratio *(LLP)* is negatively related to the Z-score. Higher loan loss provisions signal poorer quality of assets and larger exposure to risk. Also, results show that higher market size decreases the bank soundness. On the contrary, the bank size and the asset growth are positively related to stability, but only the bank size assumes significance. This is in line with expectations since

[224] See Hayashi (2000).

better credit quality systems and more rigorous corporate governance usually characterize large banks. This is also consistent with findings by Jimenez et al. (2010) and Delis (2012). Further, the GDP growth, GDP per capita and real interest rate lower credit risk and increase bank soundness.[225]

In addition, Panel B in Table 4.3 reports evidence of the bank competition association with the three components of the Z-score: profitability (ROA), capital ratio (equity to assets) and volatility of profitability (standard error of ROA). Results are shown in columns (5), (6) and (7), respectively. This analysis was run in order to understand the driving forces behind the positive effect of competition on stability. Findings show that the coefficient of the Boone indicator is positive in all equations, but assumes significance only in ROA and capital ratio equations. The positive coefficient of the Boone indicator in the analysis of ROA implies a positive effect of competition on profits, and is in line with the current literature.[226] The result regarding the capital ratio analysis indicates that competition incentivizes Italian banks to hold more capital, which is consistent with the recent banking literature. [227] Overall, the findings indicate that during the sample period, competition has increased the soundness of the Italian banks via an increase in profitability and a higher capital ratio.

[225] The crisis dummy variable dropped due to collinearities with several control variables.

[226] For instance, Stiroh and Strahan (2003).

[227] See Allen et al. (2011) and Schaeck and Cihák (2012).

Table 4.3: The effect of bank competition on soundness

	Panel A: Main Results				Panel B: Z-score Components		
	Basic Equation		All Controls				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable	Z-score	Z-score	Z-score	Z-score	ROA	Capital Ratio	S.D. ROA
Boone Indicator	20,625**		52,545***		0,315***	1,601***	0,004
	(8,274)		(17,817)		(0,081)	(0,252)	(0,051)
Boone Indicator[a]		0,321**		0,747***			
		(0,128)		(0,252)			
Bank Size	-0,039	-0,039	0,308***	0,294***	0,004***	-0,035***	-0,003***
	(0,093)	(0,093)	(0,115)	(0,113)	(0,009)	(0,002)	(0,000)
Asset Growth	0,152	0,151	0,079	0,077	-0,0001	-0,003	0,0003
	(0,135)	(0,135)	(0,155)	(0,154)	(0,001)	(0,004)	(0,000)
LLP	-0,315***	-0,316***	-0,292***	-0,297***	-0,004***	-0,003***	0,001***
	(0,027)	(0,027)	(0,031)	(0,030)	(0,003)	(0,000)	(0,000)
HHI			6.160***	5,946***	-0,005***	-0,047***	-0,013***
			(1,093)	(1,084)	(0,006)	(0,007)	(0,003)
Market Size			-7,267***	-6,893***	-0,015**	0,014	0,014***
			(1,339)	(1,286)	(0,007)	(0,019)	(0,004)
GDP Growth			0,085***	0,087***	0,0005***	0,0001	-0,0001***
			(0,009)	-0,009	(0,000)	(0,000)	(0,000)
GDP per Capita			18,268***	17,012***	-0.031	-0.161**	-0.043**
			(5,336)	(5,248)	(0,030)	(0,082)	(0,018)
Real Interest Rate			0,791***	0,828***	-0,003**	-0,015**	-0,002**
			(0,275)	(0,267)	(0,001)	(0,004)	(0,001)
R-squared	0,033	0,032	0,216	0,227	0,488	0,341	0,187
Endog Test (p-value)	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Hansen J-Test (p-value)	0,176	0,177	0,166	0,167	0,172	0,052	0,102
Anderson Corr (p-value)	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Wald F-Test (p-value)	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Observations	4122	4122	4122	4122	4122	4122	4122

Note: This table presents the regression results of the Z-score and its components (ROA, Capital Ratio and S.D. ROA) on the Boone indicator and a number of independent variables. In order to facilitate the interpretation of the results, I employ the absolute value of the indicator. Further, to make the results more presentable, I use its logarithmic transformation in Columns (2) and (4). I use the two-stage least squares (2SLS) estimator and instrument the Boone indicator with the Institutional Development Index, and an interaction term of market share with loan growth. GDP growth, GDP per Capita and Real Interest Rate are lagged by one period. Robust standard errors are in parenthesis. The ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

Robustness Tests

Various robustness tests were performed. Table 4.4 reports the results. First, the ratio of non-performing loans to total loans (NPL ratio) was used as the dependent variable. The NPL ratio is another measure of financial stability.[228] The reason for this analysis is to check whether measurement issues drive the positive association of the Z-score with the Boone indicator. The analysis produces a negative correlation of the Boone indicator and the level of non-performing loans; a one percent increase in the Boone indicator is associated with 0,18 percent decrease of bad loans. This confirms the conjecture that competition contributes to bank stability (Column 1).

In order to examine whether different categories of banks respond similarly or differently to competition, separate regressions for commercial, cooperative and savings banks were run. Columns (2), (3) and (4) report the findings. The coefficient of the Boone indicator remains positive and significant in all three equations implying a positive relationship between the level of competition and the stability for each group of banks.

[228] See for instance, Jimenez and Saurina (2006).

Table 4.4: Robustness tests for the effect of bank competition on soundness

Model Specification	(1) NPL Equation	(2) Cooperative Banks	(3) Commercial Banks	(4) Savings Banks
Boone Indicator	-0,180***	0,766***	0,251*	1,453*
	(0,064)	(0,004)	(0,734)	(1,000)
Bank Size	0,197***	0,626***	-0,322	-0,376*
	(0,093)	(0,014)	(0,200)	(0,289)
Asset Growth	-0,172***	0,100	0,464	-0,242
	(0,086)	(0,176)	(0,299)	(0,175)
LLP	0,278***	-0,249***	-0,538***	-0,261*
	(0,019)	(0,032)	(0,100)	(0,149)
HHI	0,923*	6,372***	5.536*	0,985
	(0,478)	(1,167)	(3,070)	(5,433)
Market Size	1,282**	-7,745**	-4.665	-3,921
	(0,581)	(1,381)	(3.651)	(6,103)
GDP Growth	-0,024**	0,089***	0,0120	0,188***
	'(0,003)	(0,010)	(0,025)	(0,044)
GDP per Capita	0,296*	19,386**	18,122	-4.654
	(2,381)	(56,42)	(14,78)	(6,577)
Real Interest Rate	0,840***	0,830***	1,123*	-1,128
	(0,097)	(0,294)	(0,661)	(1,303)
R-squared	0,585	0,118	0,179	0,288
Endog Test (p-value)		0,000	0,040	0,003
Hansen J-Test (p-value)		0,007	0,216	0,945
Anderson Corr (p-value)		0,000	0,000	0,000
Wald F-Test (p-value)		0,000	0,000	0,000
Observations	3521	2886	400	233

Note: This table presents robustness checks for the link between bank competition and stability. In Column (1), the dependent variable is the ratio of nonperforming loans to total loans (NPL). Columns (2), (3) and (4) use the Z-score as a dependent variable, and comprise data samples of commercial, cooperative and savings banks, respectively. The equation in Column (1) is estimated with the fixed effects model. The other equations are estimated with the Two-Stage Least Squares (2SLS). In the latter models, I use the same instruments for the Boone indicator as in the estimation of the Equation (13). The Boone indicator and NPL are in logarithm; GDP growth, GDP per Capita and Real Interest Rate are lagged by one period. Robust standard errors are in parenthesis. The ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

4.6 Conclusions

In this chapter, the interplay between bank competition and stability was analyzed. This was tested using the Boone indicator, which captures the relationship between profits and marginal costs. The empirical analysis covered the period from 2006 till 2014 and was conducted on a sample of cooperative, commercial and savings banks in Italy. This work contributes to the literature in several ways: i) it provides new evidence on the relationship between bank competition and stability by employing a new measure of competition and by covering a period of a major external shock (such as the 2007-2008 financial crisis). ii) while the current studies analyze the impact of bank competition on stability across several countries, this paper performed the investigation only at the single country level.

The key conclusions of the chapter can be summarized as follows: Over the sample period 2006-2014; i) an increase in banking marginal costs was negatively and significantly associated with profits. The estimated relationship was robust to several estimation methods, several specifications of both dependent and independent variables; ii) findings indicate a reduced competitive pressure in 2007 and 2008, the period when the recent financial crisis hit the banking sector and real economy. Nevertheless, the intensity of competition turned to the positive trend in the post crisis period reaching the maximum level in 2011; iii) the banking sector was relatively less competitive than the other two financial services sectors; the non-life and life insurance; iv) results show that competition positively affected the

stability of the Italian banking market. Additional analysis provides evidence that competition induced banks to increase their capital and profitability levels. The stability-enhancing effect of bank competition was observed also for the commercial, savings and cooperative banks, separately.

These findings are consistent with the current banking literature,[229] which supports the 'competition-stability' hypothesis. In contrast, this chapter does not find evidence of the 'charter value' view.

[229] For instance, Carlson and Mitchener (2006), Berger et al. (2008) and Schaeck and Cihák (2014).

4.7 Appendix

Table 4.5: Boone indicator estimates for banking, life and non-life insurance

	Banking		Non-Life Insurance		Life Insurance	
Year	Coefficient	Std.Error	Coefficient	Std.Error	Coefficient	Std.Error
2006	-0,0177***	(0,021)	-0,0423***	(0,001)	-0,0539**	(0,012)
2007	-0,0132**	(0,001)	-0,0671***	(0,011)	-0,1401***	(0,012)
2008	-0,0122***	(0,002)	-0,0488***	(0,010)	-0,0622***	(0,011)
2009	-0,0187***	(0,001)	-0,0451***	(0,008)	-0,0685**	(0,013)
2010	-0,0168***	(0,003)	-0,0273**	(0,008)	-0,0337***	(0,012)
2011	-0,0199***	(0,002)	-0,0294***	(0,010)	-0,0331***	(0,016)
2012	-0,0176***	(0,002)	-0,0217**	(0,008)	-0,0501***	(0,007)
2013	-0,0179***	(0,002)	-0,0382**	(0,010)	-0,0544***	(0,015)
2014	-0,0192**	(0,003)	-0,0228***	(0,013)	-0,0611***	(0,014)
Intercept	0,0202***	(0,000)	0,0027***	(0,008)	0,0032***	(0,022)
Overall R-squared	0,3593		0,4502		0,4218	
Within R-squared	0,4517		0,5301		0,4703	
Between R-squared	0,1743		0,1606		0,1814	
Observations	4122		885		631	

Note: This table presents the estimation of the Boone indicator for the banking, non-life insurance and life insurance markets in Italy for the period 2006-2014..The estimator is fixed-effects for the panel data. Robust standard errors are presented in parenthesis. The ***, **, * denote statistical significance at 1%, 5%, and 10% level, respectively.

Table 4.6: Boone indicator estimates controlling for bank-specific variables

	Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	Control Variables			Overall	Obs.
											Size	Leverage	NPL	R-sq	
(1)	Boone	-0,017*	-0,013*	-0,012*	-0,018*	-0,017*	-0,020*	-0,017*	-0,018*	-0,018*	0,003*			0,459	4122
(2)		(0,002)	(0,001)	(0,001)	(0,003)	(0,001)	(0,003)	(0,002)	(0,002)	(0,003)	(0,001)				
(3)	Boone	-0,018*	-0,014*	-0,012*	-0,019*	-0,016*	-0,019*	-0,016*	-0,016*	-0,016*	0,006*	0,0001*		0,440	4122
(4)		(0,002)	(0,001)	(0,001)	(0,003)	(0,001)	(0,003)	(0,002)	(0,002)	(0,003)	(0,001)	(0,000)			
(5)	Boone	-0,018*	-0,014*	-0,013*	-0,019*	-0,016*	-0,020*	-0,015*	-0,016*	-0,018*	0,005*	0,0001*	-0,047*	0,524	4122
(6)		(0,001)	(0,001)	(0,002)	(0,003)	(0,002)	(0,003)	(0,002)	(0,002)	(0,003)	(0,001)	(0,000)	(0,004)		

Note: This table presents the estimates of the Boone indicator. Robust standard errors are in parentheses. The estimation method is the fixed effects for panel data. All equations include bank specific time effects. The * denotes statistical significance at 1% level.

Table 4.7 Boone indicator estimates based on the log-log specification of Equation (12)

	Main Equation		All Controls	
Year	(1)	(2)	(3)	(4)
	Coefficient	Std.Error	Coefficient	Std.Error
2006	-1,533***	(0,187)	-1,603***	(0,165)
2007	-1,145***	(0,147)	-1,229***	(0,129)
2008	-1,376***	(0,124)	-1,523***	(0,120)
2009	-2,357***	(0,175)	-2,493***	(0,173)
2010	-2,311***	(0,245)	-2,417***	(0,254)
2011	-2,385***	(0,221)	-2,533***	(0,210)
2012	-2,469***	(0,223)	-2,394***	(0,206)
2013	-2,117***	(0,272)	-2,286***	(0,252)
2014	-1,659***	(0,244)	-1,986***	(0,264)
Bank Size			0,369***	(0,127)
Leverage			0,0001	(0,000)
NPL			-6,363**	(0,458)
Overall R-squared	0,418		0,169	
Within R-squared	0,517		0,572	
Between R-squared	0,196		0,013	
Observations	3679		3679	

Note: This table presents estimates of the Boone indicator. The estimation method is fixed effects for the panel data. All equations include bank specific time effects. Control variables are the following: Bank size (the logarithm of the total assets); Leverage (the ratio of total assets to equity capital); NPL (the ratio of non-performing loans to total loans). The ***, **, * denote statistical significance at 1%, 5%, and 10% level, respectively.

Chapter 5

Conclusions

This dissertation has considered aspects of current EU competition policy and additional provisions of the Treaty on the Functioning of the European Union (TFEU) relevant for competition in the financial services sector. Primarily, it analyzed the application of Article 101(3) TFEU in the insurance sector and attempted to answer the question of whether this sector should be fully subject to the enforcement of EU anti-trust rules. Afterwards, it investigated the effectiveness of the harmonization measures in the sectors of insurance and banking services at enhancing competition in the internal market. For this purpose, evidence was provided from Italy as a case study.

Traditionally, in the insurance world it has often been claimed that due to its special features the insurance industry should be distinguished from other sectors of the economy with regard to the application of EU competition rules. The

distinctiveness of the insurance sector would stem from the fact that the insurance business faces high risk and uncertainty and, thus, should be principally considered as a risk management instrument. Therefore, horizontal cooperation in the form of joint determination of risk, co-insurance and re-insurance as well as the standardization of policy terms have been represented as measures necessary to deal with the insolvency risk. Additional arguments in favor of the immunity of insurance undertakings from the EU competition rules include the claims that price competition can be harmful for insurers' financial soundness, given that the provision of insurance services is allegedly characterized by excessive capacity, and that competition can damage public confidence and consumers' trust in insurance markets.

Lately, the EU anti-trust regulatory framework for the insurance sector has been on the brink of significant changes. The block regulation exempts, subject to certain conditions: a) agreements between insurers and re-insurers to exchange information in the form of joint compilations, tables and studies; and b) the common coverage of certain types of risk by means of co-insurance and re-insurance pools. This regulation will expire in March 2017, and is currently under scrutiny by the Commission.

Against this setting, this thesis discussed whether the distinctiveness of the insurance business is still a relevant and convincing justification for the reduced scope of EU competition law. Traditional arguments that have been used to depict insurance as a unique industry were discussed by identifying elements of analogy

between insurance and banking. The analysis also took into account the on-going process of convergence between insurance and banking services.

Besides the set of competition law rules, EU law has additional provisions that are relevant for competition in the financial services sector. Among them, the freedom to provide services under Article 56 TFEU remains at the core of the on-going harmonization process of the financial services provision. Such a process aims at facilitating the provision of insurance and banking services and creating more efficient and competitive markets. An additional goal is the enhancement of the financial soundness of insurers and banks and the overall stability of financial markets.

Overall, the analysis conducted in this dissertation leads to the following conclusions:

- The insurance sector cannot be considered 'peculiar', at least vis-à-vis banking, and therefore, can no longer be treated as 'sui generis' for the application of EU competition law. The traditional arguments that have been advanced by insurance associations to justify different treatment from the EU competition rules have lost their relevance since they fail to recognize the similarities and an increasing convergence between the two sectors of the financial services industry.

- The insurance sector is not homogenous. Thus, a blanket exemption for the entire industry is not well justified. The conditions for exemption on the basis of the traditional arguments disregard essential differences with respect to risk calculation among various insurance lines and products. Also, the efficiency of the pro-competitive nature of arrangements with regard to re-insurance and co-insurance pools is not always guaranteed; it highly depends on the type of risks, the extent to which they can be diversified and the frequency of claims.

- Concerns arise about the effectiveness of the harmonization process of non-life insurance services provisions in Italy due to the fact that during the period 1998-2013 the competition level did not remarkably improve but witnessed an unstable trend. Policymakers may consider why the process has not resulted as expected and perhaps take into consideration impending adjustments.

- Same concerns can be extended to the Italian banking sector. Findings indicate that the competition level showed a positive but non-significant trend during the period 2005-2014. Although potential effects due to the recent financial crisis should not be discounted, the fact that competition has witnessed an unstable trend questions the efficacy of the harmonization of banking services provision.

- Competition in the non-life insurance sector is not detrimental to financial soundness. In contrast, promoting competition is beneficial for efficient insurers and their solvency. Findings show that during the period 1998-2013, higher levels of competition significantly increased the soundness of non-life insurers in Italy. The same effect of competition was observed in the life insurance segment. This is in line with the existing insurance literature that shows that competition positively affected the soundness of EU life insurers during 1999-2011.[230] Overall, the empirical work conducted in Chapter 3 does not support the traditional claim that 'unrestrained competition in insurance markets may increase the insolvency risk of insurers and impair their financial soundness'.

- The positive association between competition and soundness was found also for the Italian banking market. The stability-enhancing effect of bank competition was confirmed for commercial, savings and cooperative banks, separately. Additional analysis provided evidence that competition induced banks to increase their capital and profitability levels. Findings are consistent

[230] See for instance Cummins et al. (2017).

with the current banking literature, which supports the 'competition-stability' hypothesis.[231]

- The positive effect of competition on the soundness of insurers and banks casts further doubts about the distinctiveness of insurance business as compared to banks. Empirical findings suggest that insurers and banks are similar even in the way they respond to increased competitive pressure. Thus, maybe it is time for policymakers to reconsider the differential treatment of insurers and banks from the EU competition law.

- Sounder non-life insurers and banks benefit more from higher competition as compared to less sound counterparts. Likewise, results show that the positive effect of competition on soundness was larger for stronger life insurers than for less financially healthy ones. This calls for attention from the policymakers when drafting new competition policies. They make take into account that insurers and banks respond differently to increased competition pressure based on their level of financial health. Thus, particular policies may be designed to target different categories of financial services providers.

[231] Carlson and Mitchener (2006), Berger et al. (2008) and Schaeck and Cihák (2014).

- During 1998-2013, the non-life insurers were relatively less competitive than life insurers. This may imply that the deregulation and liberalization of services in the life insurance sector has been more effective than that in the non-life insurance sector. Policymakers may consider what stands behind these different outcomes in the competition level between the two segments of the insurance sector.

- Over the period 2006-2014, the banking sector was relatively less competitive than the other two financial services sectors; the non-life and life insurance. This may imply that the banking sector was more sensitive to the recent financial crisis and experienced lower competitiveness as compared to the rest of the financial services sector.

This work has contributed to the competition law and economics literature by showing that there are not sufficient grounds to grant a block exemption for the entire insurance sector on the basis of its business characteristics. It is suggested that the similarities and the on-going convergence between insurance and banking need to be taken into consideration when deciding on the future role of the block exemption regulation. Policymakers may reflect on ending the differential treatment of the insurance sector in EU competition law. This seems in line with the current debate, which, as pointed out a few months ago in the preliminary impact

assessment by the European Commission, is contemplating a repeal of the block exemption system for the insurance industry.

Within this work, an effort has been made to contribute to the empirical industrial organization literature by using a relatively new measure of competition-namely the Boone indicator. This indicator, which captures the impact of competition on the performance of firms, was utilized to capture competitive pressure in both insurance and banking markets in Italy over the period 1998-2013 and 2006-2014, respectively.

Further, the empirical work conducted in this dissertation added to the insurance and banking literature. The analysis conducted in Chapter 3 contributed to the insurance literature by applying the Boone indicator to assess the competitive behavior of Italian non-life insurers, and was the first attempt to examine the nexus between competition and soundness in the Italian non-life insurance sector. In the subsequent Chapter, the analysis contributed to banking literature by providing new evidence on the relationship between bank competition and soundness while covering a period of a major external shock (such as the 2007-2008 financial crisis). Also, in contrast to current studies that investigate the impact of bank competition on stability across several countries, this paper performed the investigation only at the single country level.

The thesis leaves several questions for further research. Additional analysis of developments in the insurance sector across EU Member States may provide valuable insights in order to better evaluate the application of EU competition law to

the insurance industry. Also, the investigation of the competition level and its interplay with financial soundness in other EU insurance markets may offer further insights.

Bibliography

Acharya, V. V., Cooley, T. F., Richardson, M. P. and Walter, I. (2011). *Regulating Wall Street: The Dodd-Frank Act And the New Architecture of Global Finance*, In: Acharya, V. V., Cooley, T. F., Richardson, M. P. and Walter, I, Wiley, J. & Sons, Inc, ed. 2011.

Agoraki, M-E. Delis, M. D., and Pasiouras, F. (2011). Regulations, competition and bank risk-taking in transition countries, *Journal of Financial Stability* 7: 38-48.

Aigner, D. J., Lovell, C. A. K., and Schmidt, P. (1977). Formulation and estimation of stochastic frontier production functions. *Journal of Econometrics* 6:21–37.

Allen & Overy, (2012), The Future of Credit, 14-17.

Allen, F. (1990). The market for information and the origin of financial intermediation, *Journal of Financial Intermediation* 1: 3-30.

Allen, F., and Gale, D. (2000). *Comparing Financial Systems*. MIT Press, Cambridge, MA.

Allen, F., and Gale, D. (2004). Competition and financial stability, *Journal of Money, Credit and Banking* 36:453-480.

Allen, F., Carletti, E. and Marquez, R. (2011). Credit Market Competition and Capital Regulation, *Review of Financial Studies* 24: 983-1018.

Amador, J. and Soares, A. C. (2012). Competition in the Portuguese Economy: Insights from a profit elasticity approach. *Working Papers 201217, Banco de Portugal, Economics and Research Department*.

Angelini, P. and Cetorelli, N. (2003). The Effects of Regulatory Reform on Competition in the Banking Industry, *Journal of Money, Credit and Banking* 35(5): 663-684.

Associazione Nazionale fra le Imprese Assicuratrici (2015). *L'Assicurazione Italiana 2014-2015. Technical Report.* Rome: ANIA.

Avraham, R. (2012). The Law and Economics of Insurance Law-A primer, *The University of Texas School of Law*, *Law and Economics Research Paper 224.*

Bachis, E., Diacon, S., and Fenn, P. (2007). Measuring Competition in the UK Motor Insurance Markets, *Centre for Risk & Insurance Studies Discussion Paper Series IV.*

Bain, J. S. (1951). Relation of Profit Rate to Industry Concentration: American Manufacturing, 1936-1940, *Quarterly Journal of Economics* 65(3): 293-324.

Bain, J. S. (1956). *Barriers to New Competition*, Cambridge: Harvard Press.

Baluch, F., Mutenga, S. and Parsons, C. (2011). Insurance, Systemic Risk, and the Financial Crisis, *The Geneva Papers* 36: 126-163.

Barrieu, P. and Albertini, L. (2009). Introduction, The Handbook of Insurance-Linked Securities, 1-7.

Barth, J. R., Caprio, J. R., Levine, R. (2004). Bank regulation and supervision: what works best? *Journal of Financial Intermediation* 13: 205-248.

Beck, T. Demirgüc-Kunt, A., and Levine R. (2006). Bank concentration, competition and crises: first results. *Journal of Banking and Finance* 30: 1581-1603.

Beck, T., D. Coyle, M., Dewatripont, X., Freixas, and Seabright, P. (2010). Bailing out the banks: Reconciling Stability and Competition. An analysis of State-Supported Schemes for Financial Institutions. *Center for Economic Policy Research Report*, London, UK.

Beck, T., De Jonghe, O. and Schepens, G. (2013). Bank Competition and Stability: Cross-country heterogeneity. *Journal of Financial Intermediation* 22(2): 218-244.

Bell, M. and Keller, B. (2009). Insurance and Stability: The Reform of Insurance Regulation, *Zurich Financial Services Group*, Zurich.

Benston, G., Hunter, C., and Wall, L. (1995). Motivations for bank mergers and acquisitions: Enhancing the deposit insurance put option versus earning diversification. *Journal of Money, Credit and Banking* 27: 777-788.

Berger, A. and Hannan, T. (1998). The efficiency cost of market power in the banking industry: a test of the quiet life and related hypothesis*. The Review of Economics and Statistics* 80: 454-465.

Berger, A. N., Demirgüc-Kunt, A., Levine, R., and Haubrich, J. G. (2004). Bank Concentration and Competition: An Evolution in the Making. *Journal of Money, Credit and Banking* 36(3): 433-451.

Berger, A., Klapper, L., and Turk-Ariss, R. (2009). Bank Competition and financial stability, *Journal of Financial Services Research* 35: 99-118.

Berry-Stölzle, T., Weiss, M. A. and Wende, S. (2011). Market Structure, Efficiency and Performance in the European Insurance Industry, *University of Georgia Working Paper.*

Bikker, J. A. and Haaf, K. (2002). Competition, concentration and their relationship: an empirical analysis of the banking industry, *Journal of Banking and Finance* 26(11): 2191-214.

Bikker, J. A. and Spierdik, L. (2008). How banking competition changed over time? *DNB Working Paper No. 167*, De Nederlandsche Bank, Amsterdam.

Bikker, J. A., and Popescu, A. (2014). Efficiency and competition in the Dutch non-life insurance industry: Effects of the 2006 health care reform, *DNB Working Paper 438,* De Nederlandsche Bank, Amsterdam.

Bikker, J. A., and van Leuvensteijn, M. (2008). Competition and efficiency in the Dutch Life Insurance Industry, *Applied Economics* 40(16): 2063-2084.

Bikker, J.A. (2012). Performance of the life insurance industry under pressure: efficiency, competition and consolidation, *DNB Working Paper 357*, De Nederlandsche Bank, Amsterdam.

Boone , J., van Ours, J., and van der Wiel, H. (2007). How (Not) to Measure Competition. *CEPR Discussion Papers 6275.*

Boone , J., van Ours, J., and van der Wiel, H. (2013). When is the Price Cost Margin a Safe Way to Measure Changes in Competition? *De Economist* 161(1): 45-67.

Boone, J. (2000). Competition, *CEPR Discussion Papers 2636*, C.E.P.R. Discussion Papers.

Boone, J. (2008). A New Way to Measure Competition, *Economic Journal 118*: 1245-1261.

Boone, J., Griffith, R. and Harrison, R. (2005). Measuring Competition, *Advanced Institute of Management Research Working Paper* 22.

Boot , A. W. A. and Marinč, M. (2009). Competition and Entry in Banking: Implications for Capital Regulation, *ACLE Working Paper*.

Boot, A. W. A. and Thakor, A. V. (2000). Can Relationship Banking Survive Competition? *Journal of Finance* 55(2): 679-713.

Boyd, J. H. and De Nicoló, G. (2005). The theory of bank risk-taking and competition revisited, *Journal of Finance* 60: 1329-1343.

Boyd, J. H. and Prescott, E. C. (1986). Financial Intermediary-Coalitions, *Journal of Economic Theory* 83: 211-232.

Braila, C., Rayp, G., and Sanyal, S. (2010). Competition and Regulation, Belgium, 1997 to 2004, *Federal Planning Bureau Working Papers 1003*, Belgium.

Bresnahan, T.F. (1982). The oligopoly solution concept is identified. *Economic Letters* 10(1-2): 87-92.

Bresnahan, T.F. (1989). *Empirical Studies of Industries with Market Power, Handbook of Industrial Organization,* In: R. Schmalansee and R.D. Willing, ed. 1989. Amsterdam: Elsevier Science Publishers. Vol.2, Ch.17.

Caiazza, S., Carletti, E., Giannetti, C. and Spagnolo, S. (2008). Bank Competition in Europe: The View of Competition Authorities, unpublished manuscript, University of Rome Tor Vergata and European University Institute.

Carletti, E., and Vives, X. (2009). Regulation and Competition Policy in the Banking Sector, In X .Vives, ed. *Competition Policy in Europe, Fifty Years of the Treaty of Rome*, Oxford: Oxford University Press, pp. 260–283.

Carlson, M. A., and Mitchener, K. J. (2006). Bank Branching and Financial Stability, *Journal of Money, Credit and Banking* 38(5): 1293-1382.

Chan, Y. S., Greenboum, S. and Thakor, A. (1986). Information Reusability, Competition and Bank Asset Quality, *Journal of Banking and Finance* 10: 243-253.

Charnes, A., Cooper, W. and Rhodes, E. (1978). Measuring the efficiency of decision-making units, *European Journal of Operational Research* 2: 429–444.

Claessens, S. (2009). Competition in the financial Sector: Overview of Competition Policies, *IMF Working Paper WP/09/45*, IMF, Washington DC.

Claessens, S., and Laeven, L. (2004). What Drives bank Competition? Some International Evidence, *Journal of Money Credit and Banking* 36(3): 563-583.

Clerides, S., Delis, M.D., and Kokas, S. (2015). A new data set on competition in national banking markets. *Financial Markets, Institutions & Instruments*, New York University Salomon Center and Wiley Periodicals, Inc.

Coccorese, P. (2009). Market power in local banking monopolies. *Journal of Banking and Finance* 33(7): 1196-1210.

Coccorese, P. (2012). Information sharing, market competition and anti-trust intervention: a lesson from the Italian insurance sector, *Applied Economics* 44(3): 351-359.

Coccorese, P. and Pellecchia, A. (2013). Multimarket contact, competition and pricing in banking, *Journal of International Money and Finance* 37(C): 187-214.

Craig, B., and Santos, J. (1997). The risk effect of bank acquisitions, *Federal Bank of Cleveland Economic Review*, 2: 25-35.

Creusen, H. P. W. A., Minne, B. and van der Wiel, H.P. (2006). Measuring and Analyzing Competition in the Netherlands, *De Economist* 154(3): 429–441.

Cummins, J. D. and Rubio-Misas, M. (2006). Deregulation, Consolidation and Efficiency: Evidence from the Spanish Insurance Industry, *Journal of Money, Credit and Banking* 38 (2): 323-355.

Cummins, J. D. and Turchetti, G. (1996). Productivity and technical efficiency in the Italian insurance industry. *Center for Financial Institutions Working Papers 96-10,* Wharton School Center for Financial Institutions, University of Pennsylvania.

Cummins, J. D. and Weiss, M. A. (2004). Consolidation in the European Insurance Industry: Do mergers and Acquisitions Create Value for Shareholders? *Brookings-Wharton Papers on Financial Services,* pp. 217-258.

Cummins, J. D. and Weiss, M. A. (2009). Convergence of Insurance and Financial Markets; Hybryd and Securitized Risk-Transfer Solutions, *The Journal of Risk and Insurance* 76: 483-495.

Cummins, J. D. and Weiss, M. A. (2014). Systemic Risk and U.S. Insurance Sector, *The Journal of Risk and Insurance* 81(3): 489–527.

Cummins, J. D., and Xie, X. (2013). Efficiency, productivity, and scale economies in the U.S. property-liability insurance industry, *Journal of Productivity Analysis* 39 (2): 141-164.

Cummins, J. D., Rubio-Misas, M., and Vencappa, D. (2017). Competition, efficiency and soundness in European life insurance markets, *Journal of Financial Stability* 28: 66-78.

Cummins, J. D., Rubio-Misas, M., and Zi, H. (2004). The effect of organizational structure o efficiency: Evidence from the Spanish insurance industry, *Journal of Banking and Finance* 28(12): 3113-3150.

Cummins, J. D., Rubio-Misas, M., and Zi, H. (2013). Integration and Efficiency Convergence in European Life Insurance Markets, *Universidad de Málaga Working Paper.*

Das, U. S., Davies, N., and Podpiera, R. (2003). Insurance and Issues in Financial Soundness, *IMF Working Paper* 3(138).

De Bonis, R., and Ferrando, A. (2000). The Italian banking structure in the 1990s. Testing the multimarket contact hypothesis, *Economic Notes* 29(2): 215-241.

De Bonis, R., Marinelli, G. and Vercelli, F. (2015). The long journey of bank competition: New evidence on Italy from 1890 to 2013. *Banca d'Italia Working Paper.* Banca d'Italia, Rome.

De Nicoló, G. and Lucchetta, M. (2009). Financial Intermediation, competition and risk: a general equilibrium exposition, *IMF Working Paper 105,* International Monetary Funds, Washington D.C.

Degryse, H. and Ongena, S. (2007). The impact of competition on bank orientation, *Journal of Financial Intermediation* 16(3): 399-224.

Degryse, H., Kim, M. and Ongena, S. (2009). *Microeconometrics of Banking: Methods, Applications and Results*, Oxford University Press, USA.

Delis, M. D. (2012). Bank competition, financial reforms and institutions: The importance of being developed. *Journal of Development Economics*, 97(2): 450-465.

Dell'Ariccia, G. and Marquez, R. (2004). Information and Bank Credit Allocation, *Journal of Financial Economics* 71: 185-214.

Demirgüc-Kunt, A., Detragiache, E. and Tressel, T. (2008). Banking on the principles Compliance with Basel core principles and bank soundness, *Journal of Financial Intermediation* 17: 511-542.

Demsetz, H. (1973). Industry structure, market rivalry and public policy. *Journal of Law and Economics* 16: 1-10.

Diallo, B. (2015). Bank competition and crisis revisited: New Results, *Economic Letters* 129: 81-86.

Dutang, C. Albrecher, H and Loisel, S. (2013). Competition among non-life insurers under solvency constraints: A game theoretic approach. *European Journal of Operations Research* 231(3): 702-711.

Edey, M and Hviding, K. (1995). An Assessment of Financial Reforms in OECD countries, *OECD Economics Department Working Paper 154*.

Eling, M and Luhnen, M. (2010). Efficiency in the international insurance industry: A cross-country comparison, *Journal of Banking & Finance 34*: 1497–1509.

European Central Bank (2011), *Financial Stability Review*. Frankfurt: ECB.

Evanoff, D.D. and Ors, E (2008). The Competitive Dynamics of Geographic Deregulation in Banking: Implications for Productive Efficiency. *Journal of Money, Credit and Banking* 40(5): 897-928.

Faull, J. and Nickpay, A. (2007). The EC Law of Competition. OUP 2007.

Faure, M. and Van den Bergh, R. (1990). Liability for nuclear accidents in Belgium from an interest group perspective, *International Review of Law and Economics*, pp. 241-254.

Faure, M. and Van den Bergh, R. (1995). Restrictions of Competition on Insurance Markets and the Applicability of EC Anti-trust Law, *Kyklos* 48(1): 65-85.

Faure, M. (2002). Insurance and Competition Law: Balancing the conflicts, In: Conference: Global Issues in the Insurance Regulation, London, 17-18 April 2002.

Fenn, P., Vencappa, D., Diacon, S., Klumpes, P., and O'Brien, C. (2008). Market structure and the efficiency of European insurance companies: A stochastic frontier analysis, *Journal of Banking and Finance* 32: 86-100.

Fernandez, F. M. and Graells, A. S. (2009). Some Preliminary Views on the Revision of the Insurance Block Exemption Regulation, *European Competition Law Review* 30(10): 475-481.

Finsinger, J. (1989). European Integration of Insurance Markets: Preliminary but Novel Perspectives. Universität Lüneburg Working paper 75: 72-75.

Focarelli, D. and Panetta, F. (2003). Are mergers beneficial to consumers? Evidence from the Market for Bank Deposits. *American Economic Review* 93: 1152-1172.

French, A. and Vital, M. (2014). Insurance and financial stability, Bank of England.

Geradin, D., Layne-Farrar, A. and Petit, N. (2012). *EU Competition Law and Economics,* Oxford: Oxford University Press.

Grosskopf, S. (1993). Efficiency and Productivity. In: H.O. Fried and S.S. Schmidt, ed. 1993. *The Measurement of Productive Efficiency: Techniques and Applications*, Oxford: Oxford University Press. pp. 160-194.

Group of Ten (2001), *The G10 Report on Consolidation in the Financial Sector*. Bassel: G10.

Harrington, S. E. (2005). Capital Adequacy in Insurance and Reinsurance. In: H. Scott, ed. *Capital Adequacy beyond Basel: Banking, Securities and Insurance*, Oxford: Oxford University Press.

Hasan, I., and Marinč, M. (2016). Should Competition Policy in Banking be Amended during Crises? Lessons from the EU, *European Journal of Law & Economics*, 42(2): 295-324.

Havens, X. and Theisen, R. M. (1986). The application of the United States and EEC Antitrust Laws to Reinsurance and Insurance Pooling Agreements, *The Antitrust Bulletin*, p. 1301..

Hay, D.A. and Liu, G.S. (1997). The efficiency of firms: what difference does competition make? *The Economic Journal* 107: 597-617.

Hayashi, F. (2000). *Econometrics*. Princeton: Princeton University Press.

Hendricks, D. (2009). Defining Systemic Risk, *The Pew Financial Reform Project*.

Huertas, T. F. and Silverman, J. L. (1933). The Banking and Insurance Holidays of 1933.

Hughes, J. P., and Mester, L. J. (1998). Bank Capitalization and Cost: Evidence of Scale economies in risk management and signaling, *The Review of Economics and Statistics* 80: 314-325.

Hughes, M. and Florian, P. (2014). An Economic Perspective on EU and UK Competition Policy in the Insurance Sector, *The International Comparative Legal Guide to: Insurance & Reinsurance*.

Insurance Europe (2014). *Why Insurers differ from Banks*. Brussels: IE

Iwata, G. (1974). Measurement of conjectural variations in oligopoly. *Econometrica: Journal of Econometric Society* 42(5): 947-966.

Jayaratne, J., and Strahan, P. E. (1998). Entry Restrictions, Industry Evolution and dynamic efficiency. *Journal of Law and Economics* 41: 239-274.

Jimenez, G., and Saurina, J. (2006). Credit Cycles, Credit Risk and Prudential Regulation, *International Journal of Central Banking* 2: 65-98.

Jimenez, G., Lopez, J. A. and Saurina, J. (2010). How Does Competition Impact Bank Risk-Taking? *Banco de Espana Working Paper 1005,* Banco de Espana, Madrid.

Jones, A. and Sufrin, B. (2010), *EU Competition Law. Text, Cases and Materials*, Oxford: Oxford University Press.

Kaufman, G. and Scott, K. E. (2003). What Is Systemic Risk, and Do Bank Regulators Retard or Contribute to It? *The Independent Review* 8(3): 1086-1653.

Kaufmann, D., A. Kraay and Mastruzzi, M. (2009). Governance matter VIII. Aggregate and Individual Governance Indicators 1996-2008, *Policy Research Working Paper 4978*, The World Bank.

Keeley, M. C. (1990). Deposit Insurance, Risk and Market Power in Banking. *American Economic Review* 80(5): 1183-1200.

Kick, T. and Prieto, E. (2013). Bank risk taking and competition: Evidence from regional banking markets. *Discussion Papers 30, Deutche Bundesbank, Research Center.*

Kindleberger, C. P. and Aliber, R. (2005). *Mania, Panics and Crashes: A History of Financial Crisis*, 5th Edition.

Knight, M. (2005). Meeting Worlds? Insurance and Banking, *Speech delivered at the Geneva Association 32nd General Assembly*, June 2nd.

Koetter, M., J.W. Kolari, and Spierdijk, L. (2012). Enjoying the Quiet Life Under Deregulation? Evidence from Adjusted Lerner Indices for US Banks, *Review of*

Economics and Statistics 94, 462-480.

Krafft, J. (2000). Introduction to the process of competition. The process of competition, Edward Elgar, pp. 1-10.

Lau, L. (1982). On identifying the degree of competitiveness from industry price and output data. *Economic Letters* 10(1-2): 93-99.

Leon, F. (2014). Measuring competition in banking: A critical view of methods. *Serie Etude du CERDI* 12.

Lista, A. (2013). *EU Competition Law and the Financial Services Sector,* Taylor & Francis.

Maes, S. and Kiljanski, K. (2009). Competition and the Financial Markets, Financial Sector Conditions and Competition Policy, *Competition Policy Newsletter* 1: 12-16.

Mahlberg, B and Url, T. (2010). Single Market effects on productivity in the German insurance industry, *Journal of Banking & Finance* 34: 1540–1548.

Maliranta, M., Pajarinen, M. Rouvinen, P., and Yl-Anttila, P. (2007). Competition in the Finland: Trends across business sectors 1994-2004. *Technical report 13, Ministry of Trade and Industry.*

Manwaring, R. (1977). Insurance and banking: Two sides of the same coin. The Banker.

Marcus, A. J. (1984). Deregulation and bank financial policy, *Journal of Banking and Finance* 8: 557-565.

Matsouka, T. (2013). Sunspot bank runs in competitive versus monopolistic banking systems, *Economic Letters* 118(2): 247-249.

Matutes, C. and Vives, X. (1996). Competition for deposits, fragility and insurance, *Journal of Financial Intermediation* 5: 184-216.

Mishkin, F. S. (1999). Financial Consolidation: Dangers and Opportunities. *Journal of Banking and Finance* 23:675-691.

Mishkin, F. S. (2013). *The Economics of Money, Banking and Financial Markets*, 10th Edition, 25-27.

Mueller, D.C. (1977). The persistence of profits above the norm. *Economica* 44(176): 369-380.

Mueller, D.C. (1986). *Profits in the long run*. Cambridge: Cambridge University Press.

Nurullah, M. and Staikouras, S. K. (2008). The Separation of Banking from Insurance: Evidence from Europe, Multinational Financial Journal 12(3/4): 157-184.

Organisation for Economic Co-operation and Development (1998), *Competition And Related Regulation Issues in the Insurance Industry.* Paris: OECD

Organisation for Economic Co-operation and Development (2009), *Competition and Financial Markets. Key Findings.* Paris: OECD.

Panzar, J. and Rosse, J. (1987). Testing for "monopoly" equilibrium. *The Journal of Industrial Economics*, XXXV(4): 443-456.

Pasiouras, F. and Gaganis, C. (2013). Regulations and soundness of insurance firms: International evidence. *Journal of Business Research* 66: 632-642.

Peltzman, S. (1977). The gains and losses from industrial concentration. *Journal of Law and Economics* 20: 229-263.

Peroni, C. and Ferreira, I. (2012). Competition and innovation in Luxembourg. *Journal of Industry, Competition and Trade* 12(1): 93-117.

Polder, M., Veldhuizen, E., Bergen, D. and Pjill, E. (2009). Micro and macro indicators of competition: Comparison and relation with productivity change, *Statistics Netherlands Discussion Paper 09024.*

Ramakrishnan, R. T. S. and Thakor, A. V. (1984). The Valuation of assets under moral hazard. *Journal of Finance* 39: 229-238.

Rees, R., Gravelle, H. and Wambach, A. (1999). Regulation of Insurance Markets. *Geneva Papers on Risk and Insurance Theory* 24(1): 55-68.

Reinhart, C. and Rogoff, K. S. (2009). This time is different: Eight Centuries of Financial Folly.

Roth, W.E. (1999). European Competition Policy for the Insurance Market, Presented at the Antitrust and Unfair Competition Conference at the Collage of Management – Academic Studies Law School, Rishon Lezion, Israel.

Schaeck, K. and Cihák, M. (2007). Banking Competition and Capital Ratios, *IMF Working Paper 07/216*. IMF, Washington DC.

Schaeck, K. and Cihák, M. (2012). Banking competition and capital ratios. *European Financial Management* 18: 836-866.

Schaeck, K. and Cihák, M. (2014). Competition, Efficiency and Stability in Banking, *Financial Management*, pp. 215-241.

Schaeck, K., Cihák, M., and Wolfe, S. (2009). Are competitive banking systems more stable? *Journal of Money, Credit and Banking* 41(4):711-734.

Schich, S. (2009). Insurance Companies and the Financial Crisis, OECD Journal 2.

Schiersch, A. and Schmidt-Ehmcke, J. (2010). Empiricism meets theory: Is the Boone indicator applicable? DIW Discussion Papers 1030, DIW Berlin, German Institute for Economic Research.

Schwarcz, D. (2011). Reevaluating Standardized Insurance Policies, University of Chicago Law Review *Working paper*.

Shim, J. (2011). Merger and acquisitions, diversification and performance in the US Property-liability insurance industry, *Journal of Financial Services Research* 39:119-144.

Stigler, G. J. (2008). Competition. In: S.N. Durlauf and L. E. Blume. ed. *The New Palgrave Dictionary of Economics*. . Second Edition. London: Palgrave Macmillan, Vol. 2, pp. 50-56.

Stiroh, K. J. and Strahan, P. E. (2003). Competitive Dynamics and the Performance of the US Banking Industry, *Federal Reserve Bank of New York Staff Report 98.*

Stock, J. H. and Yogo, M. (2005). Testing for weak instruments in linear IV regressions. In: D.W. Andrews and J.H. Stock, ed. *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg*, Cambridge: Cambridge University Press, pp. 80-108.

Swiss Re (2014). *Business Report*.

Tabak, B. M., Fazio, D. M. and Cajueiro, D. O. (2012). The relationship between banking market competition and risk-taking: Do size and capitalization matter? *Journal of Banking & Finance* 36: 3366-3381.

Thimann, C. (2015). Systemic features of Insurance and Banking, and the Role of Leverage, Capital and Loss Absorption, *The Geneva Papers*, 40: 359-384.

Tirole, J. (1988). *The Theory of Industrial Organization: Jean Tirole*. MIT Press.

Tridimas, T (1999). Searching for the Appropriate Standard of Scrutiny. In: E. Ellis. ed. *The Principle of Proportionality in the Laws of Europe*, Oxford: Oxford Hart Publishing.

Turchetti, G and Dariao, C. (2004). How deregulation shapes market structure and industry efficiency: the case of the Italian motor insurance industry, *The Geneva Papers on Risk and Insurance* 29(2): 202-218.

Turk, M. C. (2015). The Convergence of Insurance with Banking and Securities Industries, and the Limits of Regulatory Arbitrage in Finance, *Columbia*

Business Law Review.

United Nations (2008). International Standard Industrial Classification of All Economic Activities (ISIC), Rev.4.

van Leuvensteijn, M., Bikker J. A., van Rixtel, A. A. R. J. M. and Sorensen, C. K. (2011). A New Approach to Measuring Competition in the Loan Markets of the Euro Area, Applied *Economics* 43: 3155-3167.

Vaughan T. M. and Calabria, M. A. (2015). International Developments in the Insurance Sector: The Road to Financial Instability? *CATO Working Paper*, 30(5).

Vives, X. (2008). Innovation and Competitive Pressure. *The Journal of Industrial Economics* 56(3): 419-469.

Vives, X. (2010). Competition and Stability in Banking, *CESifo Working Paper Series 3050*, CESifo Group, Munich.

Wagner, W. (2008). Diversification at Financial Institutions and Systemic Crises. *Tilburg University mimeo*.

Wallison, O.J. (2009). Convergence in Financial Services Markets: Effects on Insurance Regulation, in the *Future of Insurance Regulation in the United States*, 167: 184-85, Brooking Institution Press.

Weiβ, G. N. F. and Mühlnickel, J. (2013). Consolidation and systemic risk in the international insurance industry, *Dortmund University Working paper*, Dortmund, Germany.

Official Documents

Commission Communication of 26 June 1997 on the financial services: enhancing consumer confidence, COM(97) 309 final.

Council Directive 2002/13/EC of the European Parliament and of the Council of 5 March 2002 amending Council Directive 73/239/EEC as regards the solvency margin requirements for non-life insurance undertakings.

Council Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance.

Commission MEMO/10/434. Financial Supervision Package - Frequently Asked Questions. Press Release, 22 September 2010.

Commission MEMO/13/1176. Commissioner Barnier welcomes agreement between the European Parliament and Member States on Deposit Guarantee Schemes. Press Release, 17 December 2013.

Commission Regulation 267/2010 of 24 March 2010, on the Application of Article 101(3) of the Treaty to Certain Categories of Agreements, Decisions and Concerted Practices in the Insurance Sector.

Commission Regulation 358/2003 of 27 February 2003, on the Application of Article 81(3) of the Treaty to Certain Categories of Agreements, Decisions and Concerted Practices in the Insurance Sector.

Commission Regulation 3932/92 of December 1992, on the Application of Article 85(3) of the Treaty to Certain Categories of Agreements and Concerted Practices in the Insurance Sector.

Council Directive 2000/26/EC of 16 May 2000 on the approximation of the laws of the Member States relating to insurance against civil liability in respect of the use of motor vehicles and amending Council Directives 73/239/EEC and 88/357/EEC.

Council Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2002 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market.

Council Directive 2002/83/EC of the European Parliament and of the Council of November 2002 concerning life assurance.

Council Directive 2006/48/EC of the European Parliament and of the Council of 14 June 2006 relating to the taking up and pursuit of the business of credit institutions.

Council Directive 2006/49/EC of the European Parliament and of the Council of 14 June 2006 on the capital adequacy of investment firms and credit institutions.

Council Directive 92/49/EEC of 18 June 1992 on the coordination of laws, regulations and administrative provisions relating to direct insurance other than life assurance and amending Directives 73/239/EEC and 88/357/EEC.

Council Regulation 1/2003/EC of 16 December 2002, on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty.

Council Regulation 1024/2013/EU of 15 October 2013 conferring specific tasks on the European Central Bank concerning policies relating to the prudential supervision of credit institutions.

Council Regulation 1419/2006/EC of 25 September 2006 repealing Regulation 4056/86/EEC laying down detailed rules for the application of Articles 85 and 86 of the Treaty to maritime transport, and amending Regulation No 1/2003/EC as regards the extension of its scope to include cabotage and international tramp services.

Council Regulation 411/2004/EC of 26 February 2004 repealing Regulation 3975/87/EEC and amending Regulations 3976/87/EEC and 1/2003/EC, in connection with air transport between the Community and third countries.

European Commission (1972) Second Commission Report on Competition Policy. Brussels: EC

European Commission (2011), EU Competition Law, Rules Applicable to Antitrust Enforcement. Brussels: EC

European Commission (2014), Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Report on Competition Policy 2013. Brussels: EC

European Commission, (2007), Inquiry into the European Business Insurance Sector Pursuant to Article 17 of Regulation 1/2003, Interim Report, DG Competition. Brussels: EC.

First Council Directive 77/780/EEC) of 12 December 1977 on the Coordination of Laws, Regulations and Administrative Provisions Relating to the Taking-up and Pursuit of the Business of Credit Institutions.

Second Council Directive 89/646/EEC of 15 December 1989 on the Coordination of Laws, Regulations, and Administrative Provisions Relating to the Taking-up and Pursuit of the Business of Credit Institutions and Amending Directive 77/780/EEC.

Summary Report of the Replies to the Public Consultation on the Review of the Insurance Block Exemption Regulation, available at http://ec.europa.eu/competition/sectors/financial_services/KD0414707ENN.pdf (accessed 1st August 2015).

Case Law

Case 56/65, Société Techique Minière v. Maschinenbau Ulm GmbH (1966) ECR 235, 249

Case C-234/89, Delimitis v. Henninger Bräu (1991) ECR I-935.

Case C-41/90 Höfner and Elser v. Macroton GmbH (1991) ECR I-1979.

Case C-45-172/80 Zuchner v. Bayerische Vereinsbank AG (1981) ECR 2021, 20130.

Case C-45/68 Verband der Sachversicherer (1987) ECR 405.

Case C-67/96, Albany International BV v. Stichting Bedfrijfspensioenfond Textielindustrie (1999) ECR I-671.

Fire Insurance (1985) OJ L35/20.

Nuovo CEGAM (1984) OJ L99/29.

English Summary

This dissertation considers aspects of current EU competition policy and additional provisions of the Treaty on the Functioning of the European Union (TFEU) relevant for competition in the financial services sector.

Traditionally, in the insurance world it has often been claimed that due to its special features the insurance industry should be distinguished from other sectors of the economy with regard to the application of EU competition rules. Chapter 1 discusses whether the distinctiveness of the insurance business is still a relevant and convincing justification for the reduced scope of EU competition law. Traditional arguments that have been used to depict insurance as a unique industry are discussed by identifying elements of analogy between insurance and banking. The analysis takes also into account the ongoing process of convergence between insurance and banking services.

Besides the set of competition law rules, EU law has other provisions that are relevant for competition in financial services sector such as the rules on free movement of services and capital, which remain at the core of the ongoing harmonization process of the financial services. Such a process aims at facilitating the provision of insurance and banking services and creating more efficient and

competitive markets. Also, the enhancement of the financial soundness of insurers and banks and the overall stability of financial markets is an additional goal.

The effectiveness of the harmonization measures at increasing competition in the sectors of insurance and banking is analyzed in Chapters 3 and 4. Initially, Chapter 3 assesses the competitive behavior in the non-life insurance sector in Italy during the period 1998 - 2013. The level of competition is assessed by applying a relatively new measure of competition - the Boone indicator, which captures the effect of competition on the performance of firms. Afterwards, the analysis focuses on another relevant aspect for competition in insurance markets – its interplay with financial soundness.

A similar analysis follows in Chapter 4, but this time the focus is on the Italian banking sector. The Boone indicator is applied to measure competition in this market during the period 2006-2014, and same empirical strategy is employed to provide new evidence on the bank competition - soundness nexus. Lastly, Chapter 5 discusses the main findings and concludes.

Samenvatting

In dit proefschrift wordt stilgestaan bij aspecten van het huidige mededingingsbeleid van de EU en aanvullende bepalingen van het Verdrag betreffende de werking van de Europese Unie (VWEU) die relevant zijn voor de concurrentie in de financiële dienstensector.

Van oudsher wordt in de verzekeringswereld vaak gesteld dat de verzekeringssector vanwege zijn bijzondere kenmerken moet worden onderscheiden van andere sectoren van de economie als het gaat om de toepassing van de mededingingswetgeving van de EU. In hoofdstuk 1 wordt gekeken of de onderscheidende kenmerken van de verzekeringssector nog steeds een relevante en overtuigende rechtvaardiging zijn van het beperkte toepassingsgebied van de mededingingswetgeving van de EU. Argumenten die gewoonlijk worden gebruikt om de verzekeringswereld af te schilderen als een unieke sector, worden afgezet tegen elementen die wijzen op een analogie tussen de verzekeringssector en de bankensector. In de analyse wordt het huidige convergentieproces tussen verzekerings- en bankdiensten ook in aanmerking genomen.

Naast het geheel aan mededingingsregels kent de EU-wetgeving ook andere voorzieningen die relevant zijn voor de concurrentie in de financiële dienstensector, zoals de regelgeving over vrij verkeer van diensten en kapitaal, die nog steeds de

kern vormt van het lopende harmonisatieproces van de financiële diensten. Een dergelijk proces is bedoeld om de verstrekking van verzekerings- en bankdiensten te vergemakkelijken en te zorgen voor efficiëntere en meer concurrentiegerichte markten. Een aanvullend doel is de versterking van de financiële soliditeit van verzekeraars en banken en de algehele stabiliteit van de financiële markten.

In hoofdstuk 3 en 4 wordt geanalyseerd hoe doeltreffend de harmonisatiemaatregelen zijn wat betreft het versterken van het concurrentievermogen in de verzekerings- en bankensector. Hoofdstuk 3 begint met een beoordeling van het concurrerend gedrag in de schadeverzekeringsbranche in Italië gedurende de periode 1998-2013. Het concurrentieniveau wordt beoordeeld aan de hand van een betrekkelijk nieuwe concurrentiemaatstaf - de Boone-indicator, waarmee het effect van concurrentie op de prestaties van bedrijven wordt gemeten. Daarna richt de analyse zich op een ander relevant aspect van concurrentie op de verzekeringsmarkt: de wisselwerking met financiële soliditeit.

In hoofdstuk 4 volgt een vergelijkbare analyse, maar nu gericht op de Italiaanse bankensector. Aan de hand van de Boone-indicator wordt de concurrentie op deze markt tijdens de periode 2006-2014 gemeten en er wordt een empirische strategie gehanteerd om te komen tot nieuw bewijs voor de samenhang tussen concurrentie en soliditeit in de bankensector. In hoofdstuk 5, tot slot, worden de belangrijkste bevindingen besproken, wordt stilgestaan bij mogelijk onderzoek in de toekomst en worden de conclusies beschreven.

European Doctorate in Law & Economics

Curriculum vitae

Etleva Gjonça
etleva.gjonca@edle-phd.eu

Education	
M.Sc., Economics, University of Nebraska-Lincoln, U.S.	09/2008
M.Sc., Business Economics and Management, CIHEAM-Chania, Greece	09/2002
B.Sc., Finance, University of Tirana, Albania	06/1999
Main Work Experience	
Adviser to the Governor, The Governor's Office, Bank of Albania (the *central bank of Albania*), Tirana, Albania	02/2006 - 02/2012
Adviser, Albanian Association of Banks, Tirana, Albania	02 – 09/2004
Spokeswoman and Public Relations Adviser to the Minister, Ministry of Economy, Tirana, Albania	01 – 12/2003
Prizes and Awards	
Erasmus Mundus Scholarship	10/2013 - 09/2016
Graduate Research Scholarship, University of Nebraska-Lincoln, U.S.	10/2004 – 06/2006
Graduate Fellowship, CIHEAM-Chania, Greece	10/2000 – 09/2001
Publications	
Patent characteristics and patent ownership change in agricultural biotechnology, 2016, *AgBioForum*, *19*(1): 10-24 (*with A. Yiannaka*)	2016
Assessing country risk using multi-criteria classification approaches, in P. Pardalos, A. Migdalas and G. Baourakis (eds), 2004, *Supply Chain and Finance, World Scientific, Imperial College Press*, 49-67, (*with M. Doumpos, G. Bourakis, and C. Zopounidis*)	2004
Other Work Experience	
Research Associate, University of Nebraska-Lincoln, U.S.	10/2004 – 06/2006
Research Assistant, CIHEAM-Chania, Greece	10/2001 – 09/2002

European Doctorate in Law & Economics

EDLE PhD Portfolio

Name PhD student : Etleva Gjonça
PhD-period : 2013 – 2017
Promoters : Prof.dr. E. Argentesi and Prof.dr. R.J. Van den Bergh

PhD training

Bologna courses	***year***
Introduction to the Italian legal system	2013
European Securities and Company Law	2014
European Competition Law and Intellectual Property Rights	2013
Game Theory and the Law	2013
Economic Analysis of Law	2013
Behavioural Law and Economics I	2013
Behavioural Law and Economics II – Enforcement Mechanism	2014
Experimental Law and Economics Topics	2014
Specific courses	***year***
Seminar 'How to write a PhD' (Bologna)	2013
Academic Writing Skills for PhD students (Rotterdam)	2014
Seminar Series 'Empirical Legal Studies'	2015
Seminars and workshops	***year***
Bologna November seminar (attendance)	2013
BACT seminar series (attendance)	2015
EGSL lunch seminars (attendance)	2015
Joint Seminar 'The Future of Law and Economics' (attendance)	2016
Rotterdam Fall seminar series (peer feedback)	2014
Rotterdam Winter seminar series (peer feedback)	2015
Presentations	***year***
Bologna March seminar	2014
Hamburg June seminar	2014
Rotterdam Fall seminar series	2014
Rotterdam Winter seminar series	2015
Bologna November seminar	2015
Joint Seminar 'The Future of Law and Economics'	2016
Attendance (international) conferences	***year***
Mid Term EMLE Meeting Bologna	2014
Joint Seminar 'The Future of Law and Economics'	2015
EALE Annual Meeting Bologna	2016
IVASS International Conference on Insurance Research	2017