

Urbanization and Growth:

A Law and Economics analysis of migration patterns
in the People's Republic of China

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in de Volksrepubliek China

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Chapter 1

Introduction

1.1 Thesis topic and research question

This thesis examines the issue of rural-to-urban migration in the People's Republic of China (PRC) and addresses two related research questions; the first research question is: “ Are the current legal frameworks and regulatory policies governing and affecting migration efficient in terms of long-run urban growth? ”. The second research question is: “ Which is the impact exercised by migration on the urbanization level of urban areas? ”. Rural-to-urban migration constitutes a common issue for most developing countries, given the profound social and economic repercussions that this phenomenon entails. Nonetheless, the main legal tool regulating migration in China, the *hukou* system, represents a particular juridical case, due to its unique and peculiar characteristics. In addition, the administrative subdivision of the PRC and the different levels of competence between the central and local governments in terms of migration regulation are rather articulated; therefore, the latter constitute further elements which complicate the definition of clear regulatory policies of migration. The origins of the *hukou* and of the first migration regulatory policies go back

to the period just after the communist revolution of 1949, in conjunction with the demographic changes which started to develop during the same period. Indeed, starting from the 1950s, and throughout the 1960s, life expectancy in China increased remarkably, followed by a partial decrease in fertility rates in the urban areas during the late 1970s (Wei, 2009). Conversely, rural areas did not experience a notable drop in fertility rates, so that after the reform period initiated in 1978, a substantial rural surplus emerged in the country sides. Historically, since the establishment of the PRC, it is possible to detect different phases of rural-to-urban migration, which differ from one another in terms of magnitude of migratory flows. Nowadays, large proportions of migrants are present in most of Chinese urban areas and are mainly found in low-skilled jobs such as the construction industry, the transport industry, the cleaning industry, and so on. Ultimately, the legal and institutional frameworks regulating rural-to-urban migration, and the impact exercised by the latter on urbanization and city growth represent particularly complicated issues, which will all be thoroughly examined in this thesis.

1.2 Brief survey of literature review and methodology

A wide strand of economic literature has examined the consequences of rural-to-urban migration and of the *hukou* system on the well-being of both rural and urban workers, especially in terms of comparative income and wage analysis (see, e.g., Gersovitz, 2016; Zhang, 2010; Zhao, 1999; Peng, 1992), education (see, e.g., Brauw, 2006; Wang and Yao, 1999; Li et al., 2011; Zhao, 1997) and labor market outcomes (see, e.g., Tunon, 2006;

Meng, 2001; Wang, 1999). However, so far, important aspects such as the effect of migration on human capital accumulation, urbanization and long-run growth still remain unclear. Moreover, a limited contribution remains with respect to a complementary analysis of the other important legal frameworks affecting rural-to-urban migration, such as the *household responsibility system* (HRS) and property rights. A limited contribution to the literature also involves the investigation of the decentralization reforms which decentralized the *hukou* management procedures at the local level. This thesis intends to contribute to the literature by filling these important gaps, in order to provide a more comprehensive understanding of the complex phenomenon of Chinese rural-to-urban migration and its related legal frameworks. Firstly, the analysis evaluates which is the direct impact of rural-to-urban migration on human capital accumulation in urban areas, and consequently the effect that human capital exercises on urbanization and city growth. Secondly, the analysis focuses on the main legal tools governing and affecting rural migration, with the aim of finding out some important flaws which result to be detrimental for rural migrants. Finally, the effect of the *hukou* decentralization reforms on the trends of rural-to-migration is carefully analyzed.

With the aim of carrying out an exhaustive and complete analysis of the effect on growth and urbanization exercised by rural-to-urban migration, both a theoretical and an empirical approach are adopted.

1.3 Structure of the dissertation

The structure of the thesis is organized into three main chapters. The second chapter introduces the topic of rural-to-urban migration in China, analyzing its causes and dynamics, and providing a careful legal and in-

stitutional investigation of this phenomenon. In particular, the analysis focuses on the main legal frameworks impacting on rural-to-urban migration: the *hukou* system, the *household responsibility system* and property rights. The research question here involves the detection and investigation of all the most important flaws affecting these regulatory frameworks. The examination of the *hukou* system is crucial since, as mentioned above, it represents the main legal tool regulating rural-to-urban migration. More specifically, the *hukou* is a household record document which classifies citizens of the PRC as “ agricultural ” or “ non-agricultural ”. This legal tool, although it does not restrict the freedom of movement of urban citizens, does limit considerably that of rural dwellers; indeed, the latter, if they wish to relocate to the urban area, have to go through a series of heavy bureaucratic steps and procedures, as well as satisfying a long list of requirements. Moreover, the quality and quantity of social benefits provided by the state vary depending on this dual classification. Because of all this, the *hukou* has attracted much criticism in China and internationally, both from the media and the academic world, especially during recent years. Nonetheless, the position of the Chinese government on this matter still remains rather unclear, and so far no relevant amendments of the *hukou* system have been made. As a result of all this, a remarkable disparity of treatment remains today between urban and rural citizens. Nonetheless, the HRS and property rights also represent important legal frameworks to be analyzed, since they also impact on the quality of life of rural dwellers, thus influencing their decision to migrate. Specifically, the HRS is a legal code that was adopted after the economic reforms, which regulates the socio-economic condition of rural citizens in the countryside; it was enacted with the aim of improving the standard of living of peasants as well

as agricultural productivity. From the one hand it proved to be successful in raising the overall quantity of agricultural production bringing benefits to farmers; on the other hand, however, it still presents some flaws which hinder an efficient functioning of the rural market, thus resulting to be sub-optimal for rural workers. Analyzing the *hukou* system is crucial to understand the dynamics of rural-to-urban migration; nonetheless, evaluating the impact exercised by the HRS framework on the rural economy constitutes a step of fundamental importance in order to determine some of the main causes which push rural workers to leave the countryside and move to the urban areas. Besides the HRS, property rights also exercise a determinant role in affecting the decision of rural workers to migrate; the certainty of property rights over real estate or land is crucial for the long-term economic decisions of an individual (Avila, 2016). China represents one of the few countries worldwide in which property rights are embedded in both market economy and socialist principles; this peculiarity has often created confusion and distortions in the development and interpretation of laws inherent property rights. After the economic reform period, many efforts have been undertaken by the authorities to redefine property rights in the urban areas to meet the requests of the expanding industry; indeed, the latter was demanding more certainty and clearer rules to operate better in the market. Conversely, in the rural areas, where the economic environment remained considerably more static, no significant reforms were made. As a consequence, nowadays rural workers still remain in a condition of uncertainty for what concerns ownership rights, besides being plagued by the severe issue of land expropriation. This fact represents one of the main reasons why, nowadays, the number of Chinese rural dwellers leaving the countryside to find better opportunities in urban areas remains high. The

second chapter proceeds to the analysis by reviewing the various historical phases of rural-to-urban migration. Finally, it concludes with a detailed description of some important economic drivers of rural-to-urban migration (such as rural rents, urban productivity spillovers, etc.). Ultimately, from chapter 2, it emerges how all the inefficiencies related to these legal frameworks contribute to reducing the well-being of rural citizens in the country sides; this creates in turn an incentive for them to migrate to the cities in order to enjoy a better quality of life. However, severe legal obstacles to migration are set by the authorities through the *hukou* system, and this makes it difficult for migrants to relocate to the cities; even those who succeed in this process still have to face a disparity of treatment between them and regular urban citizens. The third chapter provides a theoretical basis for the second chapter, with the aim of analyzing the economic repercussions of migration on the urban economy; specifically, in the third chapter a theoretical dynamic model of rural-to-urban migration is developed, in order to study the consequences of migration on human capital accumulation, urbanization, and long-run growth in the urban area. In this analysis, the spatial economic drivers beneath rural migration related to rural rents and urban productivity spillovers introduced in the second chapter are utilized; these variables are proved to exercise a crucial role in determining the optimal city size. Eventually, rural migrants relocating to the urban area contribute to raise the level of investments in human capital, which entails accumulation of technology and hence long-term city growth. In this process, a trade-off for the urban planner, between congestion costs related to an excessive degree of urbanization and growth emerges. In the end, it appears that regulatory policies intended to restrict migration, such as the current *hukou* legislation, have

a detrimental effect on the long-term economic growth of the city, since they hinder the process of human capital accumulation; as stressed, rural migrants relocating to the city invest in human capital, and the role exercised by the latter turns out to be crucial in terms of sustained city growth. In the literature, the effect of human capital on economic development has acquired increasing attention since the seminal contributions provided by Becker and Mincer during the late 1950s; the latter started to consider it as a major input factor to explain the consistent growth registered by many developed countries during the XX century, as well as to overcome the *impasse* of the Solow residual. In his famous article of 1957, Solow, using data from 1909 to 1940 for the United States, showed that the contribution of physical capital to gross output per man was just 12.5%, whereas the residual (i.e., the unexplained factor of growth which cannot be explained by accumulation of physical capital and labor) turned out to be 87.5%. Several other studies subsequently reached similar results in examining other developed countries, since the contribution of the sole physical capital to output always remained remarkably reduced (see, e.g., Lucas, 1988). Many scholars, among which Mincer and Becker, hence started to attribute a large share of this hidden contribution factor to some intangible features embodied in the workers' ability, such as education, experience and personal skills; in other words, the human capital. To use the words of Mincer, human capital can be defined as “ *the stock of knowledge, skills, and personal attributes which human beings acquire from education, work and experience and that continue to develop throughout the course of their lives* (Mincer, 1958). ” After the mid-1960s, it has become common in the classical literature to use the augmented Solow model to explain the dynamics of output growth; in other words, scholars started

to insert human capital as an input factor along with physical capital in the aggregate production function (see, e.g., Kendrick, 1976; Mankiw et al., 1992). In countries such as the United States, the contribution of the Solow residual net of human capital accumulation to output growth has declined by approximately 20 percentage points between the very beginning of the XX century and the 1980s (Goldin and Katz, 1999), whereas the contribution of human capital has been increasing consistently. This trend can be easily explained by the fact that in the last decades it has become easier for individuals to get an education compared to the past; particularly, the average number of years of education within the American population has been increasing since World War II. Human capital is thus expected to play an even more pronounced role on output growth in the near future (Fraumeni, 2015), and not only in Western Countries, but also, and especially, in emerging economies such as China; as a matter of fact, the Chinese government has started to increase public expenditure in education remarkably since the beginning of the new century (Figure 1.1).

Finally, the fourth chapter, using a spatial econometric perspective, completes the theoretical analysis of the third chapter, trying to quantify the impact of both human and physical capital accumulation on Chinese urban growth in the last twenty years. Given the heterogeneity of capital endowment and GDP per capita among Chinese provinces, the adoption of a spatial strategy can be useful in detecting a precise magnitude of growth spillovers, both at intra- and inter-provincial level; indeed, the possibility of using a spatial matrix in the analysis allows for the provision of different weights to each province. One of the principal aims of this empirical investigation is to detect the presence of a potential gap between the two

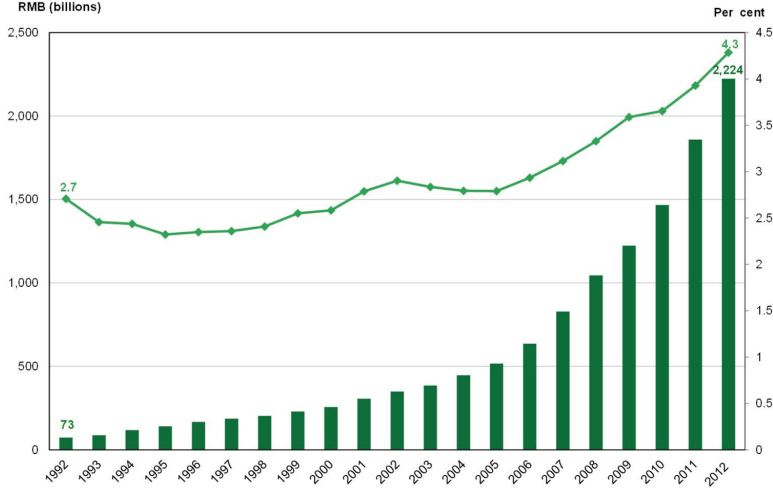


Figure 1.1: Government expenditure on education and its percentage of GDP (1992-2012) (source: China Statistical Yearbook 2013).

input factors in terms of spatial spillovers and quantify their respective magnitude.

In China, the dynamics of the effect of input factors on growth has followed a different path compared to the United States (and in general, compared to other Western countries); indeed, a proper modern industrialization process in the PRC only began after the economic reforms of 1978, with decades of delay with respect to the Western world. Many economists have not yet reached a common view on the relative contribution to growth exercised by factor inputs and total factor productivity (TFP). The PRC presented and still presents remarkable degrees of heterogeneity among provinces with respect to output production, income level and productivity. Recent studies (see, e.g., Tian and Yu, 2012) demonstrate how, on average, the contribution to growth exercised in China by the Solow residual net of human capital accumulation has been declining

since 1978; conversely, the contribution of input factors has been increasing considerably (Figure 1.2). Increases of physical capital have been driven in China by an astonishing industrial development; at the same time, the government efforts to improve the education level of the population have led to an increase in the average number of years of education within the labor force.

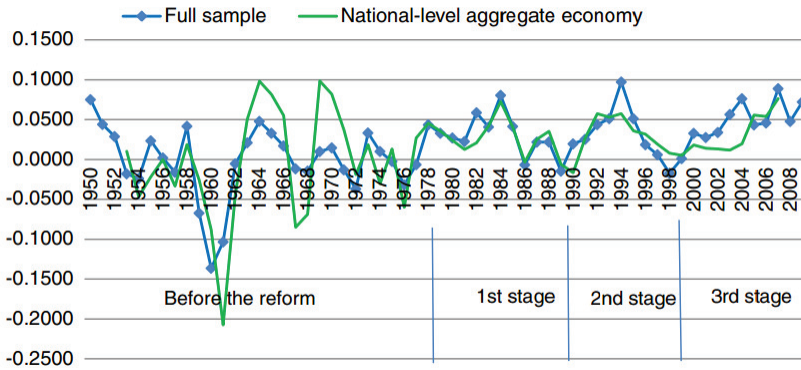


Figure 1.2: TFP growth rates in China (1950-2008) (source: Tian and Yu, 2012).

As a matter of fact, the process and speed through which human capital is accumulated within a population does not solely depend on social and cultural aspects, but also, and above all, on the role and capacity of the institutions. Particular relevance, with this purpose, is exercised by the form of government, the level of technology, the degree of corruption and, also, by the law; indeed, without a proper legal setting stimulating the development of human capital accumulation as well as its diffusion, the long-run growth can have negative downturns (Cao et al., 2012). In China, the government has successfully implemented a series of reforms

which fostered the creation and enhancement of human capital (for instance, through massive investments in education, construction of new schools, increasing the recruitment of new professors and free access to education). Nonetheless, some rigidities persist with reference to human capital diffusion, the main one being constituted by the *hukou* system. Indeed, the *hukou*, in restricting rural-to-urban migration, creates many obstacles to both students and workers coming from the countryside; for instance, the former encounter difficulties in enrolling or completing their education in schools located in urban areas; as for rural workers, they face many restrictions in improving their labor skills through the enrollment in training and/or technical programs in cities. Eventually, because of the current *hukou* system, the inter- and intra-provincial mobility of both workers and students turns out to be remarkably restricted; as a consequence, this limitation contributes to curtail the magnitude of the positive human capital spatial spillovers on GDP. The empirical results of the fourth chapter support the findings of other studies which confirm that, because of the current *hukou* legislation, the rate of growth of human capital accumulation has proceeded at a remarkably slower pace with respect to physical capital accumulation; this has clearly led to significant negative consequences in terms of long-run aggregate growth in Chinese cities (see, for instance, Ying, 2003; Bai et al., 2012; Huang and Chand, 2015).

The last chapter of the thesis finally concludes, summarizing the main results achieved in the analysis and providing policy recommendations for policy makers. Suggestions for future research are also provided.

Chapter 2

Rural-to-urban migration in the People's Republic of China (PRC): an institutional and legal investigation

This chapter introduces the object of study of this thesis: the rural-to-urban migration phenomenon in the People's Republic of China, providing a legal and institutional analysis of the three main legal frameworks affecting rural-to-urban migration: the *household responsibility system*, property rights and the *hukou* system. From the analysis, important flaws emerge with reference to each of these regulatory frameworks. Firstly, despite the notable benefits brought to rural workers, the HRS still presents many economic and legal inefficiencies which hinder the increase of the standard of living in the countryside. Secondly, although having undergone major and important changes, nowadays the definition of property rights still remains rather blurred with reference to the rural context, leaving rural workers in a state of uncertainty. The latter additionally have to face the issue of land expropriation. Finally, the *hukou* system has had

a particularly detrimental effect on rural migrants, generating an uneven socio-economic treatment between the latter and urban citizens. To complete the investigation, the historical excursus of rural-to-urban migration and the main economic drivers behind the phenomenon are also examined. From the analysis, it emerges that a series of equity-oriented legal reforms might help in providing a solution to these issues, in this way reducing the inequality gap between urban and rural dwellers.

2.1 The issue of rural-to-urban migration in China

Rural-to-urban migration represents for China a long-term issue, whose origins can be traced back already to the initial years following the Communist revolution of 1949¹. Starting from the implementation of the economic reforms in the late 1970s, the Chinese government has begun to pay increasing attention to this phenomenon; particularly, in the light of the consistent increase in the number of rural migrants moving to the urban areas, and the resulting consequences. The PRC registered an impressive economic growth over these last decades, together with an increase in the congestion levels of many big cities linked to consistent arrivals of rural migrants from the country sides². This has further contributed to widen the discussion on the topic of rural-to-urban migration, awareness of which amongst the population has started to become more and more widespread. As already mentioned above, this chapter introduces the is-

¹Clearly, the relocation of rural dwellers to urban areas has much more ancient origins, basically representing a constant in the whole history of Chinese civilization (and as well for other civilizations in broad terms). However, it was only from the second half of the XX century that the magnitude of rural-to-urban migration started to experience a notable increase, and this was due to the significant technological and health improvements which enabled a remarkable population growth.

²Despite the implementation of birth control policies, the urban population has nonetheless kept growing since 1978.

sue of Chinese rural-to-urban migration, placing a particular emphasis on the investigation of the legal and institutional frameworks affecting and regulating this complex phenomenon. Section 2.2 provides an historical description of the various phases of migration in China, starting from the initial years following the establishment of the PRC until recently. Section 2.3 analyzes the principal legal instrument adopted by the Chinese government to regulate migration: the *hukou* system. Section 2.4 performs an historical examination of the institutional framework in rural areas, from 1949 to the present day. Section 2.5 provides a subsequent and detailed examination of the HRS. Section 2.6 explores the institutional framework affecting the urban areas. Section 2.7 encompasses a necessary legal analysis of property rights, which prove to exercise a key role in affecting the rural-to-urban migration phenomenon. Section 2.8 completes the analysis providing a detailed examination of some important economic drivers behind migration. Finally, Section 2.9 summarizes and concludes.

2.2 An historical excursus of the rural-to-urban migration phenomenon in the PRC

In order to provide a better understanding of the overall framework, an analysis of the various phases of rural-to-urban migration in the history of the PRC becomes necessary. The process of Chinese rural-to-urban migration has been divided into different phases in the literature (see for instance, Cao et al., 2012; Liang and White, 1996). For the sake of correctness and chronological updating, it becomes appropriate to divide the whole process into six different stages, starting from the period immediately after the Communist revolution. The first period can be framed

from 1949 until 1952. In this initial stage, and especially a few years later with the entry into force of the new constitution of 1954, the state granted for the first time in the history of China exceptional freedoms and rights to its citizens, including, for instance, the freedom of residence choice. Indeed, according to art. 90 of the constitution: “ *Citizens of the People’s Republic of China enjoy freedom of residence and freedom to change their residence.* ”. Particularly, starting from the beginning of the 1950s, Chinese citizens could freely move in and out of any urban area, as well as throughout the rural areas. This consequently facilitated the recovery of the post-war economy and restored trade, thanks to the ease of movement of people who were extremely flexible in relocating from one working place to another. Because of this possibility of free movement granted by the constitution, the major urban areas (such as Shanghai, Shenzhen and Guangzhou) started to fill up, little by little, with an increasing number of citizens. However, at that time, job opportunities offered by cities were limited, due to the bad economic conditions and insufficiency of capital endowment. The result was therefore an increase in the level of urban congestion costs. Because of this, the government eventually decided to elaborate a relocation plan for many urban residents towards the rural areas. However, relocation was on a voluntary basis, and mandatory only for “ doubtful dissidents ” or for cases of “ ideological re-education ” (Cheng and Selden, 1994). In any case, if someone was relocated to the countryside, he/she was provided with land, subsidies and various basic necessities. These factors, ultimately, together with no transport costs (people who were relocated were transferred at the expense of the state) attracted a significant portion of young unemployed citizens and poor urban dwellers to the rural areas; here, contrarily to the urban areas which

were suffering remarkably high unemployment rates, a piece of land could be granted easily. What is relevant, in this phase, is that there were no barriers of any kind if someone wanted to re-enter the city (Chan and Buckingham, 2008).

The second period, from 1953 to 1960, saw for the first time in Chinese history a massive episode of rural-to-urban migration. This phase took place in conjunction with the implementation of the first Five-Year Plan in 1953 and with the subsequent Great Leap Forward (beginning in 1958). Particularly, after the government's decision to embrace the Soviet model of development, the main priority became that of transforming the PRC from a rural marginal country into an industrialized world power. Accordingly, to accelerate the industrialization process, disproportionately large investments in heavy industries were made during this time. Furthermore, with the purpose of financing the industrial sector by setting up a forced exchange of goods, the state increased artificially the price differential between industrial and agricultural products, at the expense of the latter. To this aim, movement of the labor force had to be restricted as well. As a consequence, after a massive relocation of peasants in many urban areas, a stricter enforcement of the *hukou* was then put into place, in order to preserve such a setting. At the end of 1953, the government officially stated that from that point forward, all the future flows of workforce and people from the rural areas to the urban areas would be decided by the authorities (Cheng and Selden, 1994). In 1955, the state decided that the provision of welfare benefits would have to be provided to urban residents only. In 1958, the *hukou* system saw its full implementation. On January 9, 1958, the Standing Committee of the National People's Congress (NPC) issued the *hukou Dengjii Thiaoli*, a corpus of administrative guide-

lines inherent in the household registration system that has remained in force up to the present day. Whilst officially it was intended to “ *protect the rights and interests of citizens in the name of socialist ideals* ”, one of the main purposes behind it was to preserve social order. At the same time, freedoms of residence and movement were remarkably restricted in this legislation from the list of rights safeguarded by the state (Chan and Buckingham, 2008). As a consequence of this policy of forced relocation, in the end, by the early 1960s, around the 20 percent of the population was living in urban areas, compared to the 13 percent of 1953 (National Bureau of Statistics of China, 2014).

The following third phase, from 1961 to 1977, witnessed ironically a harsh countertrend. Indeed, because of the complete failure of the Great Leap Forward, agricultural production in the countryside had drastically fallen, provoking famines in many parts of the country which caused the death of millions of peasants. Consequently, governmental officers understood that the country’s agricultural production would be insufficient to provide enough food for sustaining the urban population, even when the latter only constituted the 20 percent of the total population (130 million of urban citizens in 1960). In the end, with the aim of reducing the urban population, they redirected around 25 million city workers (most of whom were former peasant migrants) to the countryside (Chan and Buckingham, 2008). From 1966 onwards, the level of urbanization continued to decline at a slower but constant path, also in the light of the implementation of the Cultural Revolution, which contributed to set up a state of chaos in the cities. In addition, there was a massive relocation of many intellectuals and young urban residents to the countryside for “ re-educational purposes ”. At the end of this third stage, the share of the urban population in the

PRC was approximately 17 percent.

In the fourth period, from 1978 to 1983, at the dawn of the economic reforms era, the state still forbade migration (Cao et al., 2012). Not only that, but it started to adopt even stricter measures; indeed, freedom of residence and change of residence (granted by art. 90 of the constitution of 1954) were suppressed in the constitution of 1978. In the same year, the State Council further issued a law which brought additional restrictions, prohibiting rural workers who were married to non-agricultural *hukou* citizens from relocating to urban areas. Moreover, the same law specified that the *hukou* had to be issued to a baby depending on his/her mother's status; this clearly prevented a baby holding an agricultural *hukou* from living with his/her father, in case the latter was holding a non-agricultural *hukou*. On the other hand, however, the sustained economic development of cities, facilitated by the new economic policy which remarkably increased the creation of new urban jobs, provoked an increase of the urban population rate; the latter, also thanks to a massive relocation of irregular rural workers, reached and slightly surpassed the former 20 percent level of 1960.

The fifth phase can be defined from 1984 to the late 1990s. In this stage, the government committed itself to meet the needs of the expanding urban industrial sector³. Therefore, the permission to migrate offered to determined groups of rural dwellers rose significantly, with the inclusion of workers belonging to an extensive range of professions. During this entire period, until the end of the 1990s, the urban population growth rate was approximately 7.9 millions per year (Liang and White, 1996). Therefore, in this stage, the state facilitated rural-to-urban migration, allowing

³Particularly, during this stage, it is possible to observe an astonishing development and output increase of the manufacturing industry, which provided a high number of jobs to rural migrants.

rural migrants to relocate to cities more easily (with the sole requirement that they had to be auto-sustained in terms of food provision). This was also the period in which the rural-to-urban migration phenomenon started to gain significant social relevance and consequently began to attract increasing attention from the media and among the people. The expression “ *rural migrant wave* ”, for instance, was used in 1989 to define the huge number of rural migrants who left their rural areas during the Chinese New Year period of the same year (Cao et al., 2012). In 1994, the overall share of the urban population in the PRC was around the 30 percent.

The sixth period is from the late 1990s onwards (thus currently in place). Since 1998, in conjunction with the *hukou* decentralization reforms, many cities have started to tighten their control on migration, especially in the light of the increasing protests of urban residents. Starting with the beginning of the new century, the government has been working on new legal measures on migration and devolved consistent regulatory power to local authorities in order to cope better with the migration issue. The degree of urbanization in the PRC at the end of 2013 had reached the 53 percent. Nowadays, many Chinese cities are implementing additional legal and institutional barriers to hinder the entrance of rural workers into their jurisdiction (also due to the increasing congestion costs which are affecting numerous urban areas). Rural workers suffer deep discrimination in their civil rights concerning the provision of welfare benefits, as well as a disparity of social treatment compared to the urban residents. Despite all this, migratory flows originating from the rural areas in these last years have been registering an increasing rate, and this is particularly due to the poor socio-economic conditions of citizens in rural areas. As a matter of fact, the present institutional frameworks in China remain

detrimental to rural workers; the main legal tools affecting both rural and urban workers, as well as rural-to-urban migration, are the object of analysis in the following sections of this chapter.

2.3 An analysis of the *hukou* system

As already stressed, the *hukou* constitutes the most important legal instrument adopted by the authorities to control and regulate rural-to-urban migration. The *hukou* system is a household record document which was approved by the government in 1951 in the urban areas and later extended to the country in 1955. It was promoted as a permanent system in 1958 (Cheng and Selden, 1994). Every citizen of the PRC had to be registered immediately after birth. The *hukou* system was originally introduced for two main reasons: first, as already mentioned before, since the state was based on a Communist model, the centralized economy of the country required rigid labor mobility, with controlled displacements of workers according to the needs of the industrial or rural sectors. Secondly, the *hukou* system provided the government with relevant data which could be utilized for safeguarding social and political stability (as well as other associated purposes).

In practical terms, nowadays a citizen's personal *hukou* status is composed of two interrelated parts: the first is inherent in his/her residential location (*hukou suozhaidi*) and the other is his/her socioeconomic eligibility (*hukou leibiie*, which entails the so-called " agricultural " or " non-agricultural " status) (Cheng and Selden, 1994). The part of the document involving the residential location⁴ provides information on someone's

⁴The *hukou* registration location and status of a Chinese citizen is inherited directly from that of his/her mother. This represents, in other words, a system which is based on birth social conditions.

permanent residence (essentially urban or rural areas). Furthermore, the local regular *hukou* registration delivers to a citizen the right to exercise social and economic activities in a certain location. The second part of the document (representing the “ status ” or type of *hukou* registration) gives information about the “ agricultural ” or “ non-agricultural ” status of the citizen. In rough terms, the latter classification entails a citizen’s eligibility to receive the government subsidized grain and other social benefits provided by the city government (which has the legal duty of being in charge of the sustenance of urban dwellers) in the case of non-agricultural status. These benefits range from retirement, to health care, education, subsidized housing, and other types of welfare benefits (Chan and Buckingham, 2008). If on the one hand the state assumes the obligation for the sustenance of urban dwellers (in particular for what concerns state workers), on the other hand it pushes peasants to carry out collective self-reliance (Cheng and Selden, 1994). Eventually, because of this important conditional provision of welfare benefits, the type of *hukou* registration is more important with respect to the residential location. To summarize, the *hukou leibi* defines the types of services and welfare obtainable by an individual, while the *hukou suozhaidi* indicates where the same individual can obtain them. This dual classification of the *hukou* recording is relevant to the government in order to strengthen its control over rural-to-urban migration, meaning that the *hukou* registration establishes a double bureaucratic barrier for the migrants. With the residence classification, the government restricts the activities of citizens to precise areas. With the “ agricultural/non-agricultural ” classification, it splits society into two parts, creating big barriers for citizens with agricultural *hukou* wishing to change their status into “ non-agricultural ”; this process is called

nongzhuanfei and it proves to be particularly difficult to be obtained from the authorities. A peasant desiring to change his/her agricultural status has indeed to meet a long list of qualifications established by the government and pass through official procedures. The concession of a full urban residence status is virtually reliant on the successful completion of the *nongzhuanfei*, which in the majority of cases further involves an urban residence status (Chan and Buckingham, 2008). The main way to regulate formal rural-to-urban migration under the *hukou* system is therefore to regulate the *nongzhuanfei*, which is furthermore subject to additional policy (*zhengcie*) and quota (*zhibiao*) controls; the former list the qualifications for the citizens wishing to obtain a non-agricultural *hukou*. The latter specify the number of qualified citizens who are entitled to receive a non-agricultural *hukou*. To become eligible for receiving the *nongzhuanfei*, a citizen has to fulfil both the requirements required by the policy control, and the attainment of a space under the quota control. Indeed, if, for instance, the citizen satisfies the former criterion but does not manage to get a space, he/she will not be entitled to obtain the *nongzhuanfei*. Hence, both policy and quota controls constitute powerful tools for the government to determine which people and how many of them will be entitled to enter the urban area each time⁵. Generally, nowadays, citizens who hold an agricultural *hukou* but manage to be employed in a non-agricultural urban job are usually entitled to require the *nongzhuanfei* and eventually obtain a regular urban *hukou* (with the additional condition of having moved their residence to the specific city of interest). For a rural worker

⁵Moreover, according to the *hukou* system, even if a citizen fulfills all the requirements and eventually manages to obtain the *nongzhuanfei*, this does not mean that his/her family members are automatically entitled to obtain in turn an urban *hukou*. On the contrary, they are also required to apply for the change in their *hukou* status (and meeting all the requirements for policy and quotas) at their local administrative unit in charge of the procedure.

who migrated to a city, the attainment of the *nongzhuanfei* is of fundamental importance in order to obtain the same rights as a regular urban dweller inherent in the provision of welfare benefits by the city. Indeed, if a rural worker does not manage to obtain the *nongzhuanfei*, all these benefits are not granted to him/her⁶. To further complicate things, with reference to the obtainment procedures, there are two types of channel through which the *nongzhuanfei* is delivered: the regular and the special channels (Cheng and Selden, 1994). The regular channel encompasses the majority of cases, and it usually includes the proof of a hiring contract by a urban private firm, a state-owned enterprise (*zaogong*)⁷, or an institution of higher education (*zaosheng*). As for the special channel, this is used mainly for certain types of citizens under special circumstances and therefore it provides the government with some flexibility to face unpredicted and special situations (for instance dismissed military officers who have been assigned civil jobs). The special channel eventually applies to a small minority of cases.

A further important aspect of the *hukou* to be examined involves the administrative level at which the bureaucratic procedures are managed. Since the beginning, all the *hukou* bureaucratic procedures were originally conceived to be fully controlled by the central government. However, with the passage of time, the central government eventually decided to dele-

⁶Theoretically, a rural migrant could stay in the city without changing his/her *hukou* status. However, in this case, because of the prohibition in entering the urban job market and in obtaining the welfare benefits that urban citizens enjoy, his/her life in the city would be unsustainable. In addition, also the children of rural migrants without a regular *hukou* status automatically encounter denials and limitations, above all the restriction imposed by the urban authorities on access to regular public education (Chen and Feng, 2011).

⁷Starting from the early 1980s (the booming period of the Chinese industry), the concession of the *nongzhuanfei* to specific categories of people has been increasing considerably, covering a workforce belonging to a diversified range of sectors and professions.

gate most of its power to the cities, according to the belief of local need and responsibility. This action was undertaken in order to meet the needs of the different urban areas, which were requiring more and more diversified policies depending on their different degree of urban development. Specifically, this was carried out with the enactment of two laws by the State Council, respectively in June 1997 and July 2001. With the first law of 1997, the central government enabled a pilot scheme allowing more than 450 cities and towns to authorize the grant of the urban *hukou* to qualified rural workers, and this under the general supervision of the corresponding Provincial People's Governments. Then, with the 2001 law, the state fully decentralized the managing of the household registration procedures to all the remaining cities (at district level⁸ (Wang, 2009)). Because of this, nowadays most of the cities in China hold *de facto* regulatory control over the rural-to-urban migration process affecting their jurisdiction. Nowadays, the management of the *hukou* system is hence based on this decentralized setting; the implementation of the *hukou* bureaucratic procedures is a somewhat cumbersome process, due to the complex administrative subdivision of the PRC⁹, which subsequently allowed a different series of regulatory policies depending on the province. This complex legal framework can nonetheless be decomposed and summarized into details; first of all, the *hukou* system has been decentralized by the State Council “*promoting the transfer of rural labor towards urban areas in an orderly*

⁸Specifically, in China the districts consist of an urban area (the city in the proper sense) and of a rural area (the countryside encompassing the city). Both the areas are subject to the same jurisdiction of the district, whose administrative headquarters are located in the urban area. Towns and villages represent districts of small dimensions, whose urban part is reduced.

⁹The current Chinese constitution establishes 5 different levels of administrative subdivision: the central government level, the provincial level (22 provinces, 5 autonomous regions and the 4 municipalities of Beijing, Tianjin, Chongqing and Shanghai), the prefectural level, the district level and the administrative level of villages. The latter level has very limited political power.

manner... with the aim of sustaining the overall and comprehensive development of urban and rural areas maintaining social stability. ”, as well as specifying that “ *The local People’s Governments and relevant organs shall treat the newly registered residents as the original local residents, and provide them with equal entitlements to education, employment, grain and oil supply, social security and others.* ” (1997 and 2001 laws). The 1997 and 2001 laws further provide a series of general requirements for obtaining a non-agricultural status; for instance, according to the 2001 law, the latter can be granted to rural citizens “ *who come from rural areas to set up a secondary or tertiary industry in the urban city.* ” (art. 3.1) or who are “ *employed by city organs, groups, enterprises or government-affiliated institutions in a managerial personnel or technical staff role.* ” (art. 3.2). In addition to the general requirements, the award of a non-agricultural *hukou* is regulated by quotas whose general characteristics are periodically updated by the “ *National Population and Family Planning Commission, in conjunction with the Ministry of Finance, the Ministry of Public Security, the Ministry of Agriculture and other relevant departments.* ” (art. 4). The implementation of the *hukou* procedures has to be carried out at the local district level, whose local authorities “ *shall submit the implementation opinions to the corresponding People’s Government of province, autonomous region or municipality and implement them after their formal approval.* ” (art. 4). These steps are necessary in order to “ *ensure that the reform of the household registration system can actively and steadily progress by steps and in an orderly manner.* ” (art. 8). Rural citizens wishing to change their *hukou* status “ *shall provide supporting documents that are able to prove his/her living, working and temporary staying period in the urban location, as well as his/her legiti-*

*mate and valid identity documents, and shall make the application at the district household registry of the destination. The household registry of the destination scrutinizes the applications, and submits the qualified ones to the provincial-level (/autonomous region/ municipality) public security organization, which collectively approves the applications according to the annual quotas. ” (art. 5). The latter shall also “ assign sufficient police forces to actually strengthen the management of the household registration system. ” (art. 3). It is a duty of rural district authorities to “ establish and improve the rules for the registrations of matters like permanent residence, temporary residence, birth, death, immigration, emigration, change, correction and others. ” (art. 2). To summarize the whole *hukou* bureaucratic process in different words, the Ministry of Public Security, on behalf of the central government, has provided a series of general requirements and quotas for the conversion of a rural citizen’s *hukou* status from agricultural into non-agricultural. Each of the 22 provinces, 4 municipalities and 5 autonomous regions, following these general guidelines, define their personal requirements and quotas through their corresponding Provincial Departments of Public Security, in conjunction with the Provincial Planning Commissions. Subsequently, the urban district household registries, based on the more detailed guidelines set at the province (/municipality/autonomous region) level, further fix predetermined quotas based on their local needs and send them back to the provincial authorities for approval. In the case of a positive response, the same district authorities can finally proceed in collecting the *hukou* conversions requests of rural citizens satisfying the requirements and provide the conversion of the *hukou* status depending on the available quotas. This process usually requires several months and the timing can vary considerably depending on location.*

To fully implement the 1997 and 2001 laws stipulated by the State Council, each province (/municipality/autonomous region) had in turn to enact and execute a further provincial law, specifying in more detail the requirements, the quotas, etc.. In the end, although the central government has provided general guidelines, each province has enjoyed a large margin of manoeuvre in setting its desired policies so that different additional legal requirements and procedures emerged from province to province. Some provinces have taken advantage of this, imposing further strict controls at the rural district level; for instance, the People's Government of Ningxia has even stated that “ *Before renewing the permanent resident registration forms and household register booklets, there is a need to have a comprehensive check-up on all household registrations. The household registrations shall be checked carefully, door by door, one by one, and item by item. All registrations that should have been registered shall be registered; all registrations that should have been canceled shall be canceled. The remaining problems, like the pending permanent resident household registrations, the separation of registered and actual residences, errors and omissions, shall be properly solved.* ”. Other regions have conversely restricted for rural migrants the relocation to other urban districts; for instance, the municipality of Beijing imposes that a person who has obtained the *nongzhuanfei* “ *is not allowed to migrate to another district of the municipality within 5 years from the date of registration.* ”, and this clearly represents an additional regulatory aspect involving relocation. Finally, some provinces (e.g., Gansu) have further introduced an intermediate bureaucratic step in the *hukou* management process, since after having been fixed at the district level, quotas have further to be examined and approved by prefectural authorities before being sent for final evaluation and approval to

the provincial level. All this clearly contributes to make the *hukou* bureaucratic process more cumbersome. On the contrary, despite these restrictive measures, there are also other provinces which legislated in favor of migrants, enlarging the list of possibilities for migration. For instance, the autonomous region of Guanxi allows the migration of “... *an urban resident’s immediate family members who come to live as dependents of him/her.* ”. Moreover, some other provinces (such as Yunnan) relaxed the requirements for household registrations for students from universities and secondary schools and as well as for recruited personnel; indeed the latter, as stated by the People’s Government of the Yunnan province, “*if they would like to work in township enterprises, private enterprises or other enterprises located in urban cities, they can make permanent resident household registrations in the corresponding jurisdiction once their working positions are confirmed.* ”.

Ultimately, however, many institutional and social barriers hindering the relocation of rural migrants towards the urban areas persist today regardless of the province. The decentralization reforms, besides affecting the well-being of rural dwellers, have also had major repercussions on migration regulatory policies; indeed, before the decentralization reforms, when the relocation management of rural migrants in the urban areas was supervised directly by the central government, local authorities were encountering limited rigidities, in terms of external pressure, when relocating migrants to their urban jurisdictions. Conversely, after the decentralization reforms, the share of migrants allowed to relocate to the urban areas has been set directly by local authorities, so that the latter started to encounter an increasing level of rigidities (such as pressure from local residents, environmental issues, fiscal factors, political convenience,

etc.); this can explain why, after the decentralization reforms (especially after the 2001 law), a remarkable restriction in the migration rate in most of the urban areas was observed (Wu, 2013). The graphs in Figure 2.1 help visualizing this trend; they report the number of rural migrants, from 1996 to 2012, who were allowed, in each year and for each city¹⁰, to have their *hukou* status converted from agricultural into non-agricultural, so that they were consequently permitted to relocate to the urban area.

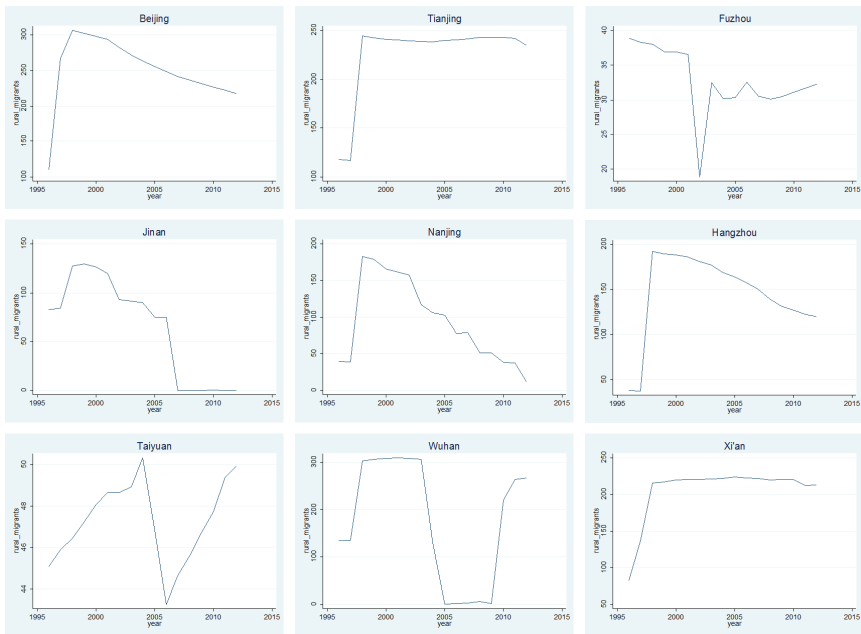


Figure 2.1: Rural migrants allowed to relocate to the urban area (1,000 units) (source: China Data Online, 2015).

From these graphs it is possible to observe how, until approximately 2001, the authorization provided to rural migrants to relocate to these cities has registered a consistently increasing trend for virtually each of

¹⁰Each of these cities was affected by the 2001 law of decentralization.

the cities. Conversely, after 2001 (i.e., after the 2001 law on decentralization was enforced) for most of the cities an overall more restrictive policy of migration was enforced, with a resulting decrease in the number of permitted migrants compared to the pre-reform period. Nowadays, the higher power held by local governments in terms of migration regulation often led to situations of abuse towards rural migrants (Wu, 2013). Among these, it is possible to cite the cost that a rural migrant has to pay to obtain the *nongzhuanfei* and which varies from city to city. This issue might constitute a legal flaw, since the current *hukou* legislation does not impose a maximum limit for this cost; a cost that indeed, although varying from city to city (according to its dimension and level of economic development), remains in most of the cases very high, therefore out of the reach of many rural workers. In Shanghai, for instance, this cost is equivalent to 150 times the average annual salary of a Chinese peasant (Zai and Zhongdong, 2004). Moreover, whereas a relevant share of urban citizens is assisted in certain ways by the local administration to enter the job market, conversely rural migrants who successfully managed to convert their *hukou* status are largely neglected by the city cadres; the latter usually do not help migrants to the same extent they do with urban citizens; moreover, quite frequently, migrants suffer severe marginalization from urban dwellers. Also, it is often the case that urban employers are further obliged to pay an additional tax depending on the number of migrant workers they decide to employ, and this clearly reduces the chances for migrants to get a regular job (Wu, 2013). Because of this, in most of the cases, rural migrants end up getting low paid jobs or get hired in the informal sector, where they cannot be protected by the law. Furthermore, even if, *de jure*, successful rural migrants (i.e., the ones having satisfied

all the legal requirements to become permanent urban residents) should virtually enjoy, ultimately, the same rights of regular urban citizens, *de facto* they still continue to suffer some legal restrictions, especially for what concerns the issue of housing. Indeed, most of them still live in temporary accommodation, since in most urban areas they are still forbidden to buy on the property market (Zhang et al., 2002). A negative consequence deriving from this fact implies an increase in the level of urban congestion costs, since in many cities migrants end up living and sustaining the development of bigger and bigger slums; this consequently raised the levels of criminality and worsening in hygienic conditions. To these factors it must then be added the resistance of city authorities to provide welfare benefits to migrants. Indeed, the central government has largely delegated many responsibilities in terms of migration regulatory power to the cities, but not sufficient funds. As a consequence, local administrations have sometimes been forced to favor native urban residents over migrants in the benefits provision. Furthermore, because of the budget constraint, the inclusion of migrants in the welfare provision would decrease the overall value of the service provided, and this is clearly considered unfair by many urban dwellers. Nonetheless, there is also a political reason beneath this; indeed, the performance of local authorities (especially in terms of efficiency) is regularly evaluated by the central government. Since the benefits provision to migrants is not present in any voice of evaluation, it is clearly in the interest of local bureaucrats to limit this provision to the bare minimum, as it diverts financial resources from other (evaluated) programs (Wang, 2009).

Ultimately, all these issues undoubtedly constitute huge institutional and legal barriers for rural migrants, contributing in turn to widen the so-

cial disparity gap between the latter and urban citizens. Another negative consequence relates to the increase in the number of the floating population (i.e., rural migrants who relocated to a city but did not obtain the *nongzhuanfei*). In 2010, the number of regular rural migrants working in urban areas amounted to approximately 160 million (60 percent of whom moved with their children). In addition to regular migrants, during the same year the overall floating population was found to be approximately 221 million individuals (Chan, 2010). As a matter of fact, the increasing share of floating population, especially starting from the 1980s, can be largely attributed to the growing market economy from one side, and to the current rigid controlling regime set by the *hukou* to the other side. While the Chinese economic boom has stimulated labor mobility across the country, the *hukou* has exercised the opposite effect; particularly, it contributed to cut off a remarkable portion of the increasing demand of labor force required by the growing industry¹¹. In the end, the Deng reform era has expanded remarkably the set of possibilities for rural workers to move and work in the urban areas (particularly in the biggest and more developed cities). However, due to the high number of legal and institutional barriers which are still in force today, their chances of getting an adequate job still remain limited, and even when available, they are mostly reserved for a small minority of rich migrants. Consequently, because of this huge social and economic discrimination towards migrants and the bad conditions that rural workers have to face, the *hukou* system has been largely criticized; strong criticism arose especially during the past few years, when the rural-to-urban migration phenomenon has captured more and more attention and awareness amongst people. However, the

¹¹A detailed empirical analysis of the effect exercised by the *hukou* on human capital accumulation is performed in chapter 4.

attitude of the central government towards the household registration system continues to remain ambiguous: whilst it uses it to intervene when some bad things which happen to migrants capture the attention of the media, and at the same time it tends to avoid discussing a potential plan of a radical *hukou* reform (or to simply abolish it) at a nationwide level.

From a strictly genuine legal standpoint, the *hukou* system constitutes a violation of the PRC's constitution. More precisely, it violates the constitution in two ways: directly and indirectly; indirectly because of art. 37, and directly because of art. 33. According to art. 37 of the constitution, “ *The freedom of person of citizens of the People's Republic of China is inviolable.* ”. However, according to the *jus cogens*, the freedom of person of citizens implies, among other things, the freedom of movement without any sort of restriction; therefore, this represents a first indirect constitutional infringement, since the latter encompasses a customary principle of international law which is, indeed, violated by the current legal framework of the *hukou* system. With reference to art. 33, this states that “ *All citizens of the People's Republic of China are equal before the law. Every citizen enjoys the (same) rights ...* . ”. Yet, in the current legal framework of the *hukou* system, the infringement of this constitutional article appears direct and clear, since only urban dwellers are entitled to be provided with proper welfare benefits. Therefore urban and rural citizens are not equal before the law and do not enjoy the same rights.

2.4 The institutional framework in rural areas

As mentioned, the origins of rural-to-urban migration go back to the period after the Communist revolution of 1949, after which the new government, inspired by the Marxist-Leninist ideology, started to implement a new eco-

conomic system influenced by the Soviet model. With the introduction of the first Five-Year Plan in 1953, and especially further on with the implementation of the Great Leap Forward in 1958, the state abolished private property in the rural areas, and all the lands were subsequently confiscated and collectivized (Putterman and Skillman, 1993). At the same time, the state pushed for a forced and rapid industrialization of the heavy industry at the expense of the rural sector, exploiting the abundant supply of low cost rural workers. To improve the efficiency in the countryside, the scattered new collectivized farms were then gathered in bigger productive units (the so called *people's communes*) in which cattle, means of production and all the facilities were put under collective proprietorship. Rural workers did not hold possession on anything and the state was fixing precise quotas of production (Yao, 1999). Moreover, as previously stressed, since at that time the PRC was based mainly on a rural economy, the government, with the aim of financing the industrial development, decided to under-price agricultural goods while overpricing the industrial ones; this was carried out mainly to create an uneven exchange among the rural and the industrial sectors (Lin and Yang, 2000). In order to maintain such an artificial imbalance, given the setting of a dual economic framework, the government utilized the *hukou* system as the most powerful legal instruments to set up and uphold such a socio-economic configuration. In the end, because of restrictions in crop production and the introduction of harmful agricultural innovations (primarily based on the ideas of the now discredited Soviet agronomist Trofim Lysenko), the Great Leap Forward turned into a failure, provoking bad famines and the death of millions of peasants (Yao, 1999).

Things changed remarkably after the coming to power of Deng Xiaop-

ing in 1978, when China started its economic reforms. In particular, in the countryside the *household responsibility system* was enforced¹², which ultimately replaced the collectivized system of production (Lin, 2008). The HRS was a new system which provided certain degrees of personal freedom to rural workers, and managed to raise rural productivity; indeed, now peasants were allowed to produce crops beyond the imposed quotas and could manage the surplus in the way they preferred (either keeping it for their own consumption or selling it in a free market at unregulated prices). Consequently, this method stimulated the willingness of farmers to increase production and contributed sharply to raise the total agricultural production, increasing as well the standard of living in the rural areas (McMillan et al., 1989). The next section provides a detailed analysis of the HRS.

2.5 An analysis of the HRS legal framework

In 1979, the government started to effectively dismantle the agricultural collectives and to redistribute plots among farmers. From a legal standpoint, under the HRS, rural workers were entitled to stipulate a contract according to which they split the commune's land among the village's households (nonetheless, in doing so, peasants always promised to satisfy the required quota of grain to be delivered to the state). Thanks to the HRS, rural workers became residual claimants and virtually acquired fully control rights over the production belonging to their contract land. However, despite this, they did not enjoy the right to sell (/buy) their land¹³. In technical terms, in 1978, the villages stipulated a 15-year leasing con-

¹²See art. 8 of the PRC's constitution of 1982.

¹³See art. 10 of the new PRC's Constitution of 1982.

tract with farmers, and the latter could enjoy the usufruct of the land (McMillan et al., 1989). On the expiring date of the original 15-year leasing contract, in 1993, households were pushed to renew the same contract for an extra period of thirty years¹⁴. Crop transfers were predicted to take place through administrative reallocation by the village cadres. The starting allocation of land among rural families under the HRS was largely computed depending on household size, rural workers' labor supply, or a combination of these two criteria (Yang, 1997). Land re-adjustments were then effectuated in most villages by referring to a sort of equality index based on the same household size and labor supply factors, so that land could be equally redistributed accordingly¹⁵.

Ultimately the HRS brought important benefits to the rural area. In addition to the remarkable increase in the level of productivity, the HRS was responsible for nearly half of the total growth of agricultural production during the period between the late 1970s and the mid-1980s, and put a definitive stop to the food rationing policy. Then, the recurrent free riding problem (which at the time of the commune system was depriving rural workers of much of the incentive to work hard) was eliminated. Nowadays, the HRS also virtually prevents the emergence of cropless peasants, and this is due to the fact that a peasant is automatically authorized to receive a piece of land by his/her sole status of being a village member. Moreover, in order to prevent the distribution of land from deviating from the starting level set by the equality index, village plots are periodically

¹⁴The current land contract system will therefore expire in 2023.

¹⁵The re-allocation process of households was intended to reassign to each rural worker an equal plot holding. In any case, if on the one hand this land reallocation system established a *de jure* degree of equality within a single village, on the other hand, it turned out that allocations among villages were largely unequal, and this was mainly because of different concentrations of worker per plot, as well as different qualities of soil in different villages.

re-adjusted and subsequently reallocated if the households' shares in a village population change over time because of exogenous factors such as births, deaths, marriages or migrations¹⁶ (Zhao, 1999). All these factors explain why the HRS is still in force nowadays.

Nonetheless, although having been liberalized in many important ways, today the Chinese land tenure system still remains remarkably irreconcilable with a typical market economy. To demonstrate this statement, it becomes necessary to review some relevant legal points of the HRS, with the purpose of bringing out its major flaws in terms of economic efficiency. *In primis*, the HRS legislation remains vague in defining a proper rural tax policy, so that rural workers end up paying significant rural rents (in terms of taxes and fees) to enjoy the usufruct of the land¹⁷. Secondly, under this system, the level of production is principally defined by the households' shares within a village population and peasants do not hold their land. Conversely, it is well known that in a market economy peasants enjoy property rights over their land, which can be freely traded at a market price. Moreover, according to a liberal setting, the rural level of production is affected by the predominant costs of inputs and outputs and efficient rural workers who manage to generate positive profits (given the current market prices) usually expand their level of production by additional land acquisitions (/renting). Conversely, inefficient rural workers, e.g., those who do not succeed in generating positive profits (always given the current market prices), often decide to eventually sell or rent their crops. In China, on the other hand, because of the present land tenure

¹⁶The HRS also produced labor surplus in the country sides. This, and many other factors, undoubtedly facilitated rural-to-urban migration. A detailed analysis of these factors is carried out in the next sections.

¹⁷The analysis of the important role exercised by taxes in rural areas (constituting one of the main driving forces of migration) is provided in section 2.8.

system, it might be the case that inefficient rural workers possess more land per capita than efficient ones (who on the other hand would be able to exploit the land in a more efficient way) and this clearly determines huge economic inefficiencies. Thirdly, due to the fact that land cannot be sold or bequeathed, peasants collectively bear a substantial economic loss. Additionally, contrary to a private land tenure (where village authorities do not have the right to interfere in a land transaction) in the present land tenure system, village authorities are the ones entitled to negotiate the land contracts, while rural workers are kept in the dark throughout the entire negotiation process. Of course, this leads with high likelihood to potential cases of corruption and dishonest behaviour by village authorities. Fourthly, it has been a common practice among peasants to stipulate contracts inherent in the sale of crops verbally, and without excluding the reallocation of crops. In 2004, for example, all over China, only around the 13 percent of these contracts which had been stipulated in the countryside could be seen in a written form. This habit has a double repercussion on transaction costs involving contracts; if from one side it lowers the bargaining costs related to the efforts required to fully specify in detail every single clause of the contract (see for instance, Brown and Potoski, 2003), conversely it inevitably increases the enforcement costs of making sure that the counter-part fulfills the terms of the (oral) contract. The latter issue (of enforcement costs) has indeed been reported as the reason why so many cases of land dispute occurred so frequently during these last years (see, for instance, Brandt et al., 2002). Fifthly, the current HRS legislation remains silent for what concerns access to credit, so that rural workers have remarkably limited access to financial services (see, for instance, Tang et al., 2010). Indeed, given the present

land tenure, there are very few chances that a proper rural financial credit market could be set up in the rural areas. This is the case, mainly because rural workers do not possess the land and hence cannot use it as collateral (in a market economy, conversely, the land often constitutes the main valued asset for a peasant). Clearly, because of this issue, financial intermediaries are reluctant to enter the rural market. The agricultural bank of China was among the few banks which decided to enter the rural market; however, after a short period of activity, it withdrew from it (principally due to the accumulation of non-performing loans). Nowadays, the only proper financial institutions operating in the rural market are the so called rural credit cooperatives (Tang et al., 2010). However, these are facing the same problems mentioned above, and hence no clear solutions can be detected as long as peasants will not be able to utilize their land as collateral. Sixthly, in the majority of the Chinese countrysides the infrastructures are largely neglected. Indeed, always due to a lack in the HRS legislation (mainly concerning a duty of maintenance), the empirical evidence shows how this contributed to a general deterioration in the quality of rural infrastructures, and also because the present land tenure provides the peasants with low incentives to take care of them (Wen, 1995). Finally, rural workers have to face the potential threat of land expropriation, which has provoked a large number of riots in many rural areas of China (Zweig, 2000); land expropriation actually constitutes a main issue in the Chinese countrysides and so is worthy of a detailed examination, especially in the light of the profound consequences it entails on rural-to-urban migration. This practice finds its validity in the legal frameworks of the HRS and *hukou* system; however, the economic repercussions which it has provoked have proven to be largely inefficient

and also detrimental to rural workers. The practice of land expropriation is known among peasants as a form of government behavior (*zhengfuh xingwhei*) that can be expressed as the “ *Use of coercive measures by the authorities for public interest*¹⁸, in order to obtain private land without proper compensation in exchange. ” (Pils, 2009). Given the present legal framework concerning property rights, the interest of the state prevails over that of peasants. Particularly, according to the current legislation, village collectives have the right to utilize (*jiingying*) and supervise (*guan-lyi*) the usage of land, but have no rights to transfer it for compensatory use. The state, conversely, represented by the respective prefectural-level government, “ ... may, in accordance with the law, expropriate land which is under collective ownership, if it is in the public interest. ” (PRCL and Administration Law (1988), Article 2 and PRCL and Administration Law (1999), Article 2). The prefectural-level government is entitled to perform “ ... combined arrangement, combined supervision, combined development and combined expropriation. ”; moreover, it evaluates and approves the procedures for land expropriation, whose enforcement process further relies upon collaboration with the subordinated township government; this has indeed direct jurisdiction over the village administration (*xiingzheng cunn*)¹⁹. The role of the latter (constituting the only representative of the rural collective ownership) is of particular importance during the land

¹⁸The proper definition of “public interest” has always been intentionally vague. However, a sort of official explanation provided by the government (to specify what it actually means) has been delivered to bring some clarifications. According to the Chinese law, potential cases of expropriation for *public interest* include factors such as defense, transportation infrastructure, education and health (Fangda, 2011).

¹⁹Specifically, township governments represent the local governmental authorities administering the rural areas surrounding cities of small dimensions (i.e., towns). For bigger cities, the same local jurisdiction is exercised by district governments. For a detailed explanation of the administrative division of the PRC see, e.g., Guo, 2013.

expropriation procedure, since village cadres are the ones who materially carry out land expropriation according to the directives provided by the prefectural-level government. Compensation fees are paid to the village collective depending on the size of the rural population damaged by land expropriation, in order to compensate the latter for the future loss in crop production. Village authorities are then assisted in relocating the peasants who were affected by land expropriation²⁰.

Both prefectural and township governments affirmed that the principal aim of land development was to benefit the country sides by reaching modernization, and offering increasing business opportunities to farmers. However, none of the official reports indicate that peasants have constituted the principal recipients of land development (see, for instance, Mullan et al., 2008). Conversely, official documents released by county governments show that the large increase in governmental returns deriving from rural land expropriation (since the start of the urbanization process) has been mainly utilized for administrative and institutional upkeep and extension. A quick increase in governmental expenditure has been indeed a constant trend in the reform period of the PRC, mainly deriving from the growing local bureaucratic apparatus. Investments in the public real estate sector have conversely been minimal in comparison with the huge financial resources delivered to the administrative organigramme. In economic terms, this shows how the government has essentially acted in a sort of “predatory behavior”, extracting indiscriminately significant amounts of resources from a productive sector (the rural sector) to boost its unproduc-

²⁰Before January 1999, compensation fees for land expropriation used to be equal between two and five times the value of the average yearly crop production, calculated over the two years before the expropriation. The latest amendment of the Land Administration Law (effective from January 1, 1999) increased the amount to between seven to eleven times the same value.

tive and heavy bureaucratic apparatus (Mullan et al., 2008). In the end, it is possible to affirm that bureaucracy and state institutions have been the two entities which have benefited the most from land development. Also urban citizens have benefited from it; however, if the urbanization process has been improving the urban infrastructures (especially during these last decades), in the rural areas the same contributions have been much less pronounced (Wen, 1995). In addition to the establishment of new administrative buildings in rural villages for the local authorities, overall, in the countrysides, the funds addressed to improve the maintenance of the principal collective facilities (such as schools, hospitals, etc.) have been much less noticeable. This myopic behaviour adopted by the authorities has also ended up damaging the productivity of rural areas. For instance, very few investments were made for the maintenance of irrigation systems, with the consequence that a large number of rice fields dried out, thus provoking huge financial losses for many farmers. Rural workers consequently decided to ask the authorities for higher compensation fees. A lot of peasants remained however dissatisfied, since numerous episodes of land expropriation have often taken place without proper formal approval from the higher cadres. Moreover, many times in which rural land was expropriated in the name of “public interest” (for instance, to build hospitals), it happened that the revenues were on the contrary directly utilized by local officers for their own benefit. At other times, the same revenues also benefited private firms, which used the money to build hotels, resorts, and other types of private facilities, thus totally trampling on the principle of public interest (Ding, 2009). Because of the fact that township authorities own fully jurisdiction over their designated village, rural workers were obliged to make a petition directly to the central government,

often regarded by them as their “last saviour”. However, ultimately, the central government has so far neglected the petitions raised by rural workers, so that in the end the latter have largely experienced a decrease in their income, along with an overall worsening in the level of efficiency of the rural infrastructures and suffered as well frequent abuses of power. All these negative aspects linked to land expropriation have often led to violent protests among peasants, contributing in turn to increase the rate of rural-to-urban migration (Mullan et al., 2008).

In the end, to sum up, it is possible to notice how all these negative factors linked to the HRS contribute to lower the standard of living in the countryside. A redefinition of property rights in rural areas by the authorities would undoubtedly constitute a first main step to improve the economic condition of rural workers.

2.6 The institutional framework in urban areas

The urbanization process in China has represented, throughout its history, one of the most important urbanization processes in the world. Indeed, China counts in all likelihood the highest number of ancient cities compared to any other country worldwide (Tinker, 1980). Historically, the origins of the urbanization process are very ancient and can be traced back to the XVI century BC, when the first proper urban settlement emerged (the city of Ao, in what is now Henan province)²¹. However, despite a following and consistent increase in the level of urbanization throughout the centuries, China never managed to approach the high urbanization levels

²¹The first Chinese urban settlements were established in the same way it happened in other parts of the world, i.e., as a consequence of the aggregation of many small villages, which progressively gave rise to a new form of social organization.

achieved in Europe or North America; this was basically due to a huge technological gap among the Chinese and the Western realities. Indeed, in 1950 the total urbanization level²² in China was just 13 percent, compared to 64 percent in the United States, 55 percent in France, 65 percent in Germany and 79 percent in the UK (Brown, 2009). Only starting from the 1950s did the Chinese urbanization process experience an unprecedented growth, particularly due to the forced urbanization policy implemented by the new Communist government (Edmonds, 1989). In fifty years, the country went through an unprecedented leap forward in the degree of urbanization in history, reaching the final level of 45 percent of the whole population living in urban areas in 2010. It took only 22 years, for China, to switch from 17.9 percent in 1978, to 39.1 percent in 2002. To reach the same level, it took the UK 120 Years, the United States 80 years and Japan more than 30 years (Qian, 2006). In the fifty years just after the revolution, many Chinese cities experienced astonishing increases of their population, above all after the economic reforms in 1978²³. During this period, the new government introduced important amendments in the new constitution of 1982, such as the privatization of many state firms (art. 11: “ *The state permits the private sector of the economy to exist and develop within the limits prescribed by the law. The private sector of the economy is a complement to the socialist public economy. The state protects the lawful rights and interests of the private sector of the economy, and in accordance with the law, exercises guidance, supervision and control over the private sector of the economy.* ”), and the opening to foreign investments

²²A careful analysis and definition of urbanization is carried out in chapter 3.

²³During the late Mao era (in conjunction with the Cultural Revolution), rural-to-urban migration was remarkably limited by the government in a very strict way, and this particularly hindered the urbanization growth of cities. The latter started on the other hand to receive higher number of rural migrants from the beginning of the 1980s, after Deng Xiao Ping’s raise to power.

(art. 18: “ *The People’s Republic of China permits foreign enterprises, other foreign economic organizations and individual foreigners to invest in China and to enter into various forms of economic co-operation with Chinese enterprises and other economic organizations in accordance with the law of the People’s Republic of China. All foreign enterprises and other foreign economic organizations in China, as well as joint ventures with Chinese and foreign investment located in China, shall abide by the law of the People’s Republic of China. Their lawful rights and interests are protected by the law of the People’s Republic of China.* ”). As well, it implemented the switch from heavy industry to light industry²⁴. These factors were proven to positively affect the productivity of cities and their industrial apparatus, in this way enabling the rise of market competition and the creation of many new jobs, which subsequently translated into an increase in the global level of urban population (Jefferson et al., 1992). Finally, an important event which further stimulated investments in physical capital deals with the tax reform of 1994²⁵.

Overall, compared to rural areas, nowadays the standard of living in cities remains remarkably better. Above all, even though the efforts perpetrated by the government in trying to reduce the urban-rural income gap have provided some positive results²⁶, the same gap remains still huge and has been even increasing recently (in 2009, the ratio between the av-

²⁴The output of light industry was vital for the development of a country coming from a low capital base. With a short gestation period, low capital requirements and higher earnings from exports to foreign countries, the profits generated by the light industry could be reinvested in more technologically advanced productions as well as in further important spending and investment.

²⁵A detailed analysis of the consequences of the 1994 tax reform on physical capital accumulation is performed in chapter 4.

²⁶A certain number of governmental policies aimed at lowering the urban-rural income gap have been put in place especially from the 2000s, *in primis* the reduction of agricultural taxes and fees in 2006 (Lu and Song, 2006).

erage urban and rural income was 3.3 (OECD, 2012)). Moreover, in urban areas, citizens enjoy much more efficient education and health care systems (which provide a relatively superior service), have better facilities and hold higher financial resources (Buck, 1986). The better quality of infrastructure in the cities is also another important factor which contributes to make the urban economy more productive than the rural one, thus widening the urban-rural income gap. Another element which remarkably differentiates the urban from the rural context undoubtedly concerns the certainty of property rights. The next section is hence dedicated to a careful legal analysis of property rights in the PRC.

2.7 The issue of property rights in the PRC

The Chinese property law constitutes a *sui generis* form of property law, since it has been embedded, throughout time, by both socialist and liberal features (the latter starting in 1978).

In the former constitution of 1954, different types of ownership were set up (art. 5: “ *The following basic forms of ownership of means of production exist in the People’s Republic of China: state ownership, that is, ownership by the whole people; co-operative ownership, that is, collective ownership by the working masses; ownership by individual working people; and capitalist ownership.* ”). However, the major emphasis was given to the fundamental importance of the public property (art. 101: “ *The public property of the People’s Republic of China is sacred and inviolable. It is the duty of every citizen to respect and protect public property.* ”), enlightening the socialist base of the country (art. 6: “ *The state sector of the economy is a socialist sector, owned by the whole people. It is the leading force in the national economy and the material basis on which the*

state carries out socialist transformation. The state ensures priority for the development of the state sector of the economy. ”). Nevertheless, the state, although formally protecting the rights of capitalists, specified the transition phase to which capitalist ownership (essentially located in urban areas) would have gone through (art. 10: “ *The state protects, according to the law, the right of capitalists to own the means of production and other capital. The policy of the state towards capitalist industry and commerce is to use, restrict and transform them. Through control exercised by organs of state administration ... the state ... encourages and guides their transformation into various forms of state-capitalist economy, gradually replacing capitalist ownership with ownership by the whole people... . ”*).

Ultimately, even if some sort of private property for citizens were provided (art. 11: “ *The state protects the rights of citizens to own lawfully-earned incomes, savings and other means of life. ”* and art. 90: “ *The homes of citizens of the People’s Republic of China are inviolable ”*) as well as for rural workers (art. 8: “ *The state protects farmers’ ownership and other means of production in accordance with the law. ”*) the final level of certainty about property rights in the eyes of citizens remained very fuzzy and in practical terms non-existent, as everything belonged *de facto* to the state (Brandt et al., 2002).

With the coming into force of the new constitution of 1982, the new government promulgated important amendments in order to clarify any doubt (for instance, art. 10 brought an important and clear distinction, stating that: “ *Land in the cities is owned by the state. ”* whereas “ *Land in the rural and suburban areas is owned by collectives. ”*). Subsequently, in 2004, a further step towards more openness was made with the amendment of art. 13 of the constitution, since it was declared for the first time

that “ *The state protects by law the right of citizens to own private property.* ”. However, the definition of “private property” remained vague and it was only a successive law (which also constitutes the most recent one) promulgated by the National People’s Congress on March 17, 2007 (and effective from October 1, 2007) which provided a clearer and more exhaustive legal framework for property rights, as it defined in detail, and for the first time, all the various forms of property in the PRC. This law was enacted “ *with a view to maintaining the national basic economic system and the economic order of the socialist market, clarifying the ownership of property, giving full effect to the meaning of property, and protecting the obligee’s property ownership rights, in accordance with the constitution.* ” (art. 1). The term “property”, here, must be intended as “ *movable and real property* ”, and the term “property rights” as “ *the exclusive rights enjoyed by the obligee to directly control specific properties including ownership, usufructuary and security right in property rights.* ” (art. 2). This law actually represents a step of fundamental importance for the Chinese legal system, since it provides a clear example of how the juridical civil code in the PRC is gradually evolving, above all to satisfy the emerging market needs and the civil rights of people in the urban areas, who demand a clearer and more certain legislation. The main distinction of property rights introduced by this law concerns the specification of ownership rights (art. 39: “ *The owner shall have the right to possess, utilize, dispose of and obtain profits from its real or movable property in accordance with the laws.* ”) and usufructuary and security rights (art. 40: “ *The owner shall have the right to establish usufructuary and security right in property rights with regard to its real or movable property.* ”)²⁷. A crucial point is then

²⁷It is further mentioned, however, that certain state properties cannot be acquired by private indi-

provided in Chapter VI of the 2007 law (*Building Distinction Ownership of the Owner*). Indeed, for the first time in the history of the PRC, Chinese citizens are now entitled to enjoy some sort of ownership over their house (art. 70: “ *The owner shall enjoy the ownership in respect of such exclusive parts within the apartment building as the apartments for residential or commercial purposes, and the co-ownership and common management right with regard to jointly-owned parts other than the exclusive parts.* ”) as well as using it for profit purposes (art. 71: “ *The owner shall enjoy the right to possess, utilize, obtain profits from and dispose of the exclusive parts of the apartment building,* ”). Moreover, they are now also entitled to enjoy usufructuary rights on their real (and movable) property (art. 117: “ *The owner of the usufructuary right shall, within the extent permitted by the law, enjoy the rights to possess, utilize and obtain profits from the real or movable properties owned by others.* ”). However, with reference to the ownership of the urban land on which the house is built, the former always belongs to the state (art. 47: “ *The urban lands are owned by the state.* ”). From articles 70 and 47, it is possible to infer how the ownership of the house enjoyed by citizens is limited to some “ *exclusive parts* ” and restricted from the ownership of the land. As for the normative concerning the use of urban land, this relies on the decree n. 55 of the State Council of the People’s Republic of China of May 19, 1990 (*Provisional Regulations of the People’s Republic of China on Assigning and Transferring the Urban State-owned Land-use Right*). According to art. 12 of the decree, different years of grant for the use of urban land are provided depending on the purpose. For residential purposes, the state grants seventy years; for industrial purposes, fifty years. Fifty years are

viduals (art. 41: “ *No institute or individual shall be allowed to obtain the ownership of real or movable properties that are exclusively owned by the state in accordance with the laws.* ”).

also granted for purposes of education, science, technology, culture, public health or sports. In the case of purposes of commerce, tourism or recreation, the years granted decrease to forty. Ultimately, property rights over the land for urban citizens consist of a form of usufruct whose duration is defined by the state according to different types of usage²⁸.

Coming back to the analysis of the 2007 Property Rights Law of the People's Republic of China, a form of easement is then also introduced (art. 156: “ *The owner of easement shall have the right to improve the benefits of the real property of its own by utilization of real property of others according to the contract terms.* ”), as well as a well-defined system of security rights (art. 171: “ *If any guarantee is necessary for the creditor to enforce its claim in civil activities like accommodation of funds and the circulation of commodities, security interest may be provided in accordance with this Law and other laws.* ” and art. 172: “ *When the security interest is provided, a guarantee contract should be entered into in accordance with this Law and other laws.* ”). Security rights further play, now, an important role in managing the relationship between debtor and creditor, protecting clearly for the first time the interest of the latter (art. 173: “ *The scope of security interest covers the principal creditor's right and his interest, penalty, liquidated damages and expenses for storage of pledged assets and enforcement of security interests, unless otherwise agreed in the contract.* ” and art. 174: “ *In the case of destruction, loss and requisition of the mortgaged property during the period of the suretyship, the holder of security interest shall have priority in satisfying his claim from the guarantee fund, compensation money or compensatory amounts. The holder of security interest may also have such guarantee fund, money compensation*

²⁸In the rural areas, as mentioned before, peasants are subject to the HRS, which provided them with a similar form of usufruct contract for the land (the current one lasting 30 years and expiring in 2023).

or compensatory amounts deposited when the time limit for the performance of the security interest does not expire. ”). As a matter of fact, creditors are now even more protected with the introduction of a mortgage right (art. 179: “ *Where a debtor or a third party, for performance of the mortgaged debt, secures the creditor’s rights with property without transference of its possession, if the debtor defaults, the creditor shall have priority in satisfying his claim from such property.* ”). The evolution in the development of the civil code concerning property rights not only deeply affected citizens, but also firms. In particular, now, according to art. 68: “ *The enterprise as a legal person shall have the right to possess, utilize, obtain benefit from and dispose of its real and movable properties in accordance with laws, administrative regulations and articles of association.* ”. Construction companies have been positively affected by this law concerning property rights, since the ownership over their newly constructed buildings becomes automatic (art. 142: “ *The ownership of the building, structure and their accessory facilities built by the owner of the right to the use of land for construction use shall belong to such owner, unless there is evidence to the contrary sufficient to invalidate that.* ”). As for the land over which buildings are constructed, the former always remains the property of the state, but construction companies can nonetheless exploit it to derive economic profit (art 135: “ *The owner of the right to the use of land for construction use shall, according to law, be entitled to possess, utilize and obtain profits from the state-owned land, and have the right, by utilizing such land, to build buildings and their accessory facilities.* ”).

To sum up, nowadays the Chinese legal codex of property rights has undergone major and important changes, especially with the coming into force of the Property Rights Law of 2007. *De jure*, now, both urban and

rural Chinese citizens, although they do not possess ownership over the land, enjoy the ownership of the house they live in²⁹ with respect to some “ *exclusive parts* ”, and can derive as well profits from it throughout, for instance, forms of usufruct and easement (and as just seen, all these laws apply in a very similar manner to the case of companies and foreign firms investing in the PRC). Moreover, they are protected by the establishment of security rights, which safeguard the creditor’s interest. However, besides all these legal improvements, *de facto* the certainty of citizen’s ownership over their houses remains much lower in the rural areas, and this happens especially because of two main reasons. The first reason involves the length of the usufruct right enjoyed by urban and rural citizens over the land they live in. Indeed, the former were granted for residential purposes a length of seventy years, whereas a shorter amount of time was provided to the latter; as mentioned, an initial length of fifteen years was provided to farmers in 1978, and in 1993 the usufruct right was renewed for another period of thirty years, which is less than half the time granted to urban citizens. The second reason deals with the issue of land expropriation involving land development, since it virtually concerns the sole rural lands. In addition to what was previously exposed, and contrary to what happens in the cities, where potential procedures of expropriation are more transparent (as carried out formally and directly by central governmental authorities), in the countryside it is frequently the case that peasants are subject to abuse and retaliation by often corrupt village cadres. Moreover, it is not uncommon for the latter to regularly enact unfair expropriation policies to the detriment of rural workers, who often lose their assigned

²⁹Even if this ownership for residential purpose is restricted to a temporary period of seventy years, it is nonetheless possible to assume that the same period is long enough to guarantee a valid state of certainty.

plots and houses (the latter can indeed be transferred together with the land). Clearly, all this contributes to weakening the validity of property rights in rural areas, keeping the peasants in a perpetual state of uncertainty. Eventually, this uneven level of certainty related to property rights between urban and rural areas also exercises a relevant role in affecting the decision to migrate of rural dwellers.

2.8 Economic drivers of rural-to-urban migration

As is common in the literature (see, for instance, Harris and Todaro, 1970), the economic driving forces of rural-to-urban migration can be divided into push and pull factors. Table 2.1³⁰, reports the main economic drivers of rural-to-urban migration, which, together with the legal frameworks previously analyzed, deeply affect the decision to migrate of rural dwellers. Among the pull factors, it is possible to find first of all the urban-rural income differential (which could as well be considered as a push factor). Many empirical studies confirm this for the Chinese case. For instance, Zhu (2002), simulating the effect of a variation in the salary gap on the likelihood of migration, detects a strong correlation between these two variables (although with partially different trends depending on gender).

Wei et al. (2009), through an econometric analysis on panel data, find a Kuznets curve pattern between the same two variables. Meng (1994) examines the proportion of rural workers' income of specific rural areas to the average national rural income, and discovers that a rise of the quotient decreases the probability of migration. Zhao (1997) further finds,

³⁰The double arrow indicates the driving forces which can be considered as both push and pull factors of migration.

Pull factors	Push factors
Urban-rural income differential ↔	Land size per household
Level of urban employment	Rural labor supply
Higher urban living standard	Urban productivity spillover ↔
	Rural rents

Table 2.1: Principal driving forces of rural-to-urban migration in the PRC.

for a same level of income gap, that the likelihood to migrate decreases with age (presumably because of lower job opportunities offered to older workers). The level of urban employment intuitively constitutes another pull factor of migration, since an increase in the number of jobs offered in a city naturally attracts more rural workers from the country sides. A proper analysis would anyways differentiate between skilled and unskilled jobs. With reference to rural migrants, most of them usually just hold a junior high school diploma, acquired after the completion of the 9-years compulsory education path (De Brauw and Giles, 2006)³¹. The percentage of them who further continued their studies at college level in 2006 was only 18 percent. Overall, the endowment of human capital owned by rural migrants is much lower compared to the one of urban residents. As previously mentioned, because of this, rural workers deciding to migrate to the city often end up accepting low skilled jobs; the latter require smaller amounts of human capital and are usually remunerated remarkably less compared to the higher skilled jobs taken by urban workers. Nonetheless, nothing prevents rural migrants from making further investments in human capital, for instance through the enrolment in technical programs, training on the job, etc.. Nowadays, among the job positions employing

³¹A detailed description of the Chinese educational system and a subsequent empirical analysis involving human capital is carried out in chapter 4.

rural migrants it is possible to find the sectors of construction (26 percent), manufacturing (25 percent), wholesale and retail (21 percent) and (increasingly) the service industry (19 percent) (Tunon, 2006). Besides the official market, rural migrants are also often inclined to enter the informal urban sector, which seems to offer easier and faster job opportunities. Nowadays the informal economy is highly developed in China, especially in big cities such as Shanghai and Shenzhen (Meng, 2001). Some studies (e.g., Junfeng and Mahmood, 2007) show that over half of all the new employment opportunities in the PRC are provided in the informal sector, which now exceeds 100 million workers. In spite of the uncertainty inherent in a job which is not subject to official labor legislation and social protection, the majority of rural migrants moving to cities still remains attracted to it, especially because the income they can obtain working in the informal sector exceeds, on average, by several times the average rural income. However, many migrants enter the informal sector at the beginning and only temporary, wishing to eventually find a stable employment in the formal job market (Meng, 2001). The last of the pull factors is more psychological, and deals with the perception of a higher standard of living in the urban areas by rural workers. This perception is indeed more than a perception, but a true and concrete reality, especially in the light of all the examinations previously carried out on the social condition of rural and urban areas. As well, a remarkable difference in the perceived social status between rural and urban residents still persists nowadays, even stronger than it used to be a few decades ago (Lu and Song, 2006).

By contrast, among the push factors, it was possible to detect four of them which for the Chinese case are worthy examining. The first push factor deals with land size per household. Empirical studies (see, for in-

stance, Zhao, 1999) proved how land size has a remarkable negative impact on the decision to migrate of rural workers; in particular, an increase in land size of approximately 650 square meters decreases the likelihood to migrate by 4.5 percent (if operating in a single individual framework) or 2.9 percent (if operating in a household framework). Rural labor surplus constitutes another push factor which has been gaining more and more relevance, especially after the introduction of the HRS, which remarkably increased rural productivity. Indeed, starting from the early 1980s, the resulting higher crop production and increased availability of food in the countryside provoked a sharp increase in the rural fertility rate (Wu et al., 1999). This, together with the rationalization of the rural production techniques (whose improved methods started to require fewer workers per land surface) has contributed to generate an increasing amount of rural labour surplus, with a consequent increase in the rate of migratory flows towards the urban areas. The third push factor concerns urban productivity spillovers; these constitute an interesting factor influencing migration decisions, since they affect rural workers' income. Urban productivity spillovers can be considered as spatial spillovers of urban productivity, in the sense that, originating from the urban area, they influence the rural workers' income radiating throughout the countryside, and the magnitude of this influence depends on the distance between the rural and the urban area³². In China, many studies empirically verified the effect of urban productivity spillovers on migration. Peng (1992), for instance, finds that there is a remarkably huge effect on rural productivity from being closed to the cities, because of transfers of technology from the urban areas. In con-

³²The farther the location of the countryside is from the urban area, the lower are the positive effects of urban spillovers. In this sense, the productivity spillover effect could also be seen as a pull factor, since, indeed, it originates from the urban area.

crete terms, in the PRC this phenomenon has been facilitated and carried out by the so called *Township and Village Enterprises* (TVEs). These, according to the Chinese law, are non-planned market oriented firms operating in the rural sector, which produce goods under the monitoring of the local government. Their origin can be traced back to the Mao era, during the Great Leap Forward (when they were called *Commune and Brigade Enterprises*). At that time, TVEs had a minor role and were relegated in the production of coal, iron, steel, basic chemical products, and farm tools (Weitzman and Xu, 1995). However, it was only after the economic reforms period that TVEs started to acquire a more important and dynamic role and began to contribute remarkably to the increase of Chinese GDP. This was made possible by a series of positive circumstances. First of all, the introduction of the HRS enabled the accumulation of income savings in rural areas and this undoubtedly constituted an important source for the start up of TVEs³³. Secondly, the government, throughout the implementation of more relaxed authorization policies, allowed (and in many cases promoted) the transfer of technology from urban to rural areas; in addition, it incentivized the relocation of many skilled urban workers in the countryside, in order to endow the TVEs with a sufficient base of physical and human capital adequate for them to start operating properly (Chow and Li, 2002). During the 1990s, TVEs experienced their greatest booming phase, increasing their employment rate from around 30 million workers

³³From an economic perspective, the accumulation of savings in the rural areas was made possible for two main reasons: firstly, as mentioned before, the abolishment of restrictions over the imposed quota of production stimulated a higher productivity; as well, the subsequent sale of the agricultural overproduction allowed peasants to obtain higher profits. Secondly, the new government decided to abandon the former policy of artificially underpricing agricultural products. As a result, this new policy stimulated the emergence of a (liberal oriented) rural market, where demand and supply of agricultural products arose naturally, in this way making possible the emergence of profit opportunities and the creation of savings among peasants.

at the very beginning of the Deng era to approximately 140 million in the mid-1990s (Naughton, 2007). Nonetheless, it is important to emphasize the fact that the vast majority of TVEs has been mostly concentrated in the richer eastern coastal area of the PRC, where the levels of economic and urban development were the highest in the country. Throughout the '90s, rural industrial productivity acquired a more and more important role in the overall economic productivity of China, arriving to account for approximately one third of the national economy. In examining the reasons behind the success of TVEs it is possible to find, among other things, two main events. The first deals with a policy of fiscal decentralization implemented by the central government in 1994³⁴, which delivered increasing administrative power to local authorities and linked the fiscal local revenues to the careers of local cadres. As a consequence, the latter were strongly incentivized to promote the profitability of TVEs. The second reason was the huge financial support for TVEs implemented by the central government through a massive concession of loans (Oi, 1992). To all this, it must be added the increasing demand of consumption goods by rural citizens, which inevitably enlarged the production of TVEs, contributing to raise their level of profit. However, starting from the late 1990s, most of the TVEs experienced a consistent downturn and were forced to restructure considerably. This happened because of a series of factors. Firstly, after the retirement of Deng Xiaoping, the new Jiang Zemin's administration continued the market reforms at an even more sustained pace. Because of this, TVEs began to experience an increasing level of competition, having to face now as competitors (besides stronger urban firms) many foreign firms; as a consequence, during the first years of

³⁴As previously stressed, the fiscal decentralization reform further exercised a remarkable positive impact on physical capital accumulation. This topic is analyzed in details in chapter 4.

the new century, around 30 percent of TVEs went bankrupt (Saich, 2015). Secondly, many TVEs were expropriated by local officials. Thirdly, following a remarkable overall credit crunch, it became increasingly difficult for TVEs to obtain loans. Because of these factors, starting from the 2000s, the influence of state TVEs on the Chinese economy has been largely reduced. A resulting development in consequence of these negative factors has been the emergence of rural industrial clusters among TVEs, especially in the neighboring rural areas surrounding the major city centers. Despite all this, an important privatization process of TVEs, starting in the same period, took place; this contributed to restore the role and productivity of TVEs, mainly due to a more efficient use of resources and management practices by the private sector (Hsieh and Song, 2015) so that ultimately, nowadays, the influence and importance of TVEs in transferring technology from urban to rural areas is still ongoing and rather strong. The last (but nonetheless extremely important) push factor of migration is represented by rural rents. The latter actually constitute a thorny topic, given the profound social repercussions (in part already examined) they impose on rural workers' lives. In the countryside, peasants are subject to a wide range of different payments, including, besides taxes, informal levies, fees, financial charges, etc. (Wang et al., 2010). As a matter of fact, the categories of taxes that rural workers are obliged to pay could be classified into two types: state taxes and local taxes. With reference to the former, we have two sub categories: the so called "hidden burdens" and the "state taxes" in the proper sense. The first refer to mandatory sales to the state, below the market price, of a specific imposed quota of crops (this clearly constituting a heritage of the Maoist tradition). The second sub-category deals with proper taxes due to be paid to the central

government, such as taxes on land and house, slaughter taxes, taxes on farmland utilization and so on. Overall, however, these first sub-categories of payments to the central government are generally not heavy for peasants, constituting just approximately the 1.8 percent of the rural workers' gross income (Bernstein and Lu, 2008). The second category, represented by local taxes, is conversely the one which impacts the most; the latter can be divided into two sub-categories: the first one is represented by fees and charges set by governmental administrations based at the local level; the second one comprises taxes which peasants have to pay to the collective funds at village level. With reference to the first subcategory, rural workers have to pay these fees in order to compensate for certain general services (such as the maintenance of rural infrastructures). These fees are overall heavy and Bernstein and Lu (2008) even reported cases where local authorities required these payments even when the service was not provided. The second sub-category consists of all the other taxes and fees which have to be collected by local authorities in order to finance local public projects, such as investments in education (e.g., for the construction of schools), health (e.g., for the construction of hospitals), and so on. In fact, the latter sub-category constitutes a recurrent matter of dispute, since the relative amount of the imposition is usually remarkably high and exclusively decided by village cadres³⁵. As a result, this opens the way to potential cases of abuse and corruption among local authorities, who often enforce arbitrary and unfair collection methods. As it was formerly mentioned, the increasing fiscal pressure in towns and villages is largely a consequence of the massive bureaucratic enlargement of the state administration. In particular, in institutional terms, the proper process

³⁵As reported by Wang et al. (2010), there were cases in the countryside where, because of this excessive taxation, parents could not even afford paying the education to their children.

of deconcentration of governmental powers started to take place just after the reform period. The bureaucratic expansion occurred both vertically and horizontally. Vertically, since deconcentration was carried out, first of all, through a process of decentralization, with officers of the central government delegating powers to their lower-level subordinates stimulating them to take more and more administrative initiatives. Due to the fact that the overall amount of money transferred from the central government to local administrations was not adequate enough, the latter were also provided with the authorization to muster their own resources outside of the regular state budget. This consequently entailed the establishment of extraordinary-budgetary and self-collected funds, mainly collected among rural workers, who soon started to bear heavier and heavier burdens. Horizontally, local administrations were allowed by the central government to collect off-budget funds, mainly by imposing a huge set of different fees. Overall, everywhere in the rural areas, peasants witnessed an unbalanced growth of local bureaucratic institutions, which were depleting at a fast pace most of the available resources, so that later started to squeeze rural workers for additional funds (Bernstein and Lu, 2008). Regardless of the many efforts aimed at reducing the size of the governmental apparatus, as of 2015, the heavy bureaucratic system at township level had not been noticeably reduced yet, with the consequence that this issue still remains in force in the majority of rural areas. All this might suggest how the central state still remains reluctant, in a way, to decrease its bureaucratic apparatus, and also appears to be willing to maintain its grip over the socio-economic affairs of citizens. Conversely, the negative aspect of this policy is that it is becoming more and more difficult to control an increasing number of local officers and consequently to protect the interests of

rural workers in an effective way. Ultimately, from this analysis, it is possible to infer how rural taxation in the PRC constitutes a main push factor of migration among rural workers in the countryside, especially in those regions with a higher level of local corruption and more relaxed control exercised by the central authority.

2.9 Final remarks on chapter 2

This chapter has carried out a legal and institutional analysis of the rural-to-urban migration phenomenon in the PRC, trying to shed some light on the most salient features of it and bring out some inefficiencies related to the main legal frameworks affecting and regulating rural migration. Particularly, it provided a detailed analysis of the *hukou* and HRS legal frameworks, as well as an in-depth legal investigation of property rights in China, with reference to both the rural and urban contexts. To complete the framework of analysis, the historical phases through which rural-to-urban migration started and developed were investigated, in order to understand the nature of the phenomenon. Finally, the principal economic driving forces at the base of rural-to-urban migration were subsequently analyzed. The analysis of this first chapter suggests that: firstly, the *hukou* system constitutes an infringement of the Chinese constitution. Secondly, despite the most recent amendments, the current code of property rights, although providing a rather clear legal interpretation for the urban framework, still remains more vague for the definition of the same property rights with reference to the rural context, especially with reference to land expropriation. Thirdly, the HRS, although having contributed to raise the general economic condition in the countryside, still presents many economic inefficiencies which hinder the improvement of

the rural households' standard of living. Overall, many flaws currently persist in all these legal frameworks, to the particular detriment of rural citizens. Moreover, nowadays, rural workers are often burdened by a heavy local taxation, and additionally face the issue of corruption among village cadres. All these factors can help understand how rural-to-urban migration is currently registering higher and consistent rates, since many rural workers are pushed to leave the country sides to find better opportunities in the cities. From this, it follows that improvements in the living condition of rural dwellers could only be made possible by a series of equity-oriented legal and institutional reforms involving the legal frameworks regulating the rural context. For instance, first of all, a main effort should be undertaken by the authorities to enact some necessary reforms which would provide a clearer framework for the taxation of rural dwellers. Secondly, to overcome the production inefficiencies of the current land tenure system, a series of incentives aimed at rewarding the more productive farmers would undoubtedly stimulate a more efficient usage of the land (in this way alleviating the issue related to an inefficient usage of resources among farmers). Thirdly, a law imposing a mandatory written form for the contracts inherent in the sale of crops would lower enforcement costs (also decreasing, in this way, the number of disputes). Moreover, government intervention aimed at stimulating the creation of a proper rural credit market would increase the overall efficiency and productivity of the rural sector. Additionally, and most importantly, a series of equity-oriented and more protective government laws in favour of rural citizens faced with land expropriation, together with a clear re-definition of property rights in the countryside, would contribute to provide more certainty to rural dwellers. Finally, but no less important, a reform of the

hukou system would be crucial in order to facilitate the migration procedures of rural dwellers and, above all, to reduce the disparity of treatment between the former and regular urban citizens.

Chapter 3

The effect of rural-to-urban migration on urbanization and growth: a theoretical approach

The second chapter has introduced the topic of rural-to-urban migration in China, examining the legal frameworks affecting and regulating migration, as well as the main economic drivers influencing the decision of rural workers to migrate to the urban areas. From the analysis of chapter 2 it emerged how given the current socio-economic condition in the countryside, many rural workers have been pushed to migrate to the urban areas in search of better opportunities. The third chapter proceeds to the analysis, studying the impact of rural-to-urban migration on human capital accumulation and the long-run economic growth of the city, thus trying to shed some light on the relationship between rural-to-urban migration and city growth; particularly, it develops a theoretical dynamic model of rural-to-urban migration, in which a spatial framework for the rural area is taken into account. In this setting, spacial variables are proven to exercise a crucial role in determining the optimal city size, since they affect rural workers' decision to migrate to the city. The first finding of the model

is that more rural migrants lead to a higher congestion level within the city, but at the same time, both city dwellers and rural migrants invest in human capital which ultimately, together with urbanization, constitutes a key factor for the growth of the urban economy, since it boosts technological accumulation and city output; eventually, different growth scenarios emerge from the analysis, depending on the initial level of technology, degree of urbanization and rates of investments in human capital. The second finding of the model is that regulatory policies aimed at reducing the migration rate could imply negative consequences for long-term growth.

3.1 Rural-to-urban migration, urbanization and growth

Relying on some classical assumptions of the literature, this chapter shows that human capital accumulation constitutes the key driver for urban growth together with urbanization (since the higher the rate of urbanization³⁶, the higher the rate of human capital accumulation). As for the urbanization process, the latter has always proved to constitute a crucial element in the path of development, not only in the history of the current developed world, but especially nowadays with reference to China and other emerging countries. Overall, today, the degree of urbanization remains higher in more developed countries (MDC)³⁷ than in LDC. In 2018, the percentage of people living in urban areas in MDC is predicted to be around the 79% of the total population, while for LDC this percentage is going to be around the 49%. These shares are going to increase

³⁶The urbanization rate is defined by the total number of people living in the city; obviously, to a higher degree of urbanization also corresponds a higher level of congestion costs.

³⁷More developed countries comprise Europe, Northern America, Australia/New Zealand and Japan. Lesser developed countries (LDC) are the remaining countries.

with time, reaching 86% in MDC and 64% in LDC in 2050, thus indicating an inexorable increasing trend in both the two regions (even if higher in LDC)(UNDESA, 2012). Also, the vast majority of the gross national products worldwide are produced in MDC, and specifically in the urban areas (while in LDC this share is basically evenly split between urban and rural areas).

Generally speaking, in the initial stages of growth, economic development is characterized by urbanization, that usually begins with a spatial transformation of the economy, in which it is possible to observe a consistent flow of rural migrants towards the cities. As analyzed in the previous chapter, in China urbanization and rural-to-urban migration had already started to develop considerably in the first years following the establishment of the PRC. During this process, public and local authorities usually control land markets and property rights, and all this clearly affects the city formation progression as well as the city size (Arzaghi and Henderson, 2005). Also, the role of national government policies regarding trade, labor market and investments in facilities and infrastructure is important in determining the outline of urban development (Arzaghi and Henderson, 2005). Some empirical studies (e.g., Abdel-Rahman et al., 2006) further suggested the relevance of the degree of the urbanization process over time; particularly, the more gradual and controlled is the degree of the urbanization process, the higher will be the likelihood of having higher standards of living during the transition phase³⁸ (indeed, countries which urbanized too fast and without enough control experienced lower standards of living (Galor and Tsiddon, 1997))³⁹.

³⁸As for China, during the years different regions experienced different degrees of urbanization with resulting heterogeneous trends among major urban areas (see Heyuan, 2016).

³⁹An additional point of discussion deals with the role exercised by multinational corporations; in-

Endogenous growth theory models constitute a powerful tool to analyze the long-term economic growth; particularly, in the related literature, among the input factors boosting the economy, we find the crucial role exercised by investments in human capital (especially with reference to education⁴⁰ (Lucas, 1988)); these investments are in turn stimulated by the degree of urbanization, which ultimately becomes the true engine of economic growth (see, e.g., Galor and Tsiddon, 1997). All this further enhances the industrial and service base of the urban economy and prompts spatial proximity of agents, as well as the generation of positive externalities in terms of knowledge (for instance among firms) and an increase in the efficiency level of the labour market (Olney, 2013).

Another positive mechanism which is enforced by urbanization is the so called radiation effect (see for instance Qi, 2003), which occurs when urban improvements in technology, education and health care tend to produce positive spillovers in the surrounding rural areas, spreading knowledge and technology. Of course, if in general terms urbanization can thus be seen as a tendency towards social progress and general well-being, it is important to notice how, on the other hand, this process also brings costs and negative consequences, especially in terms of increasing pollution, traffic congestions, a worsening in the hygiene conditions due to an excessive population density, and so on; these are the so-called congestion costs. In China, the latter has started to gain increasing attention among the

deed, multinational corporations often have no interest in encouraging a gradual and controlled level of urbanization in LDC, since to them, the presence of a large multitude of unemployed urban workers in the labour market ensures that there will be a large supply of a cheap and easily exploitable labour to be hired at a low cost in their factories (Olney, 2013).

⁴⁰It has recurrently been shown that returns from education, particularly in LDC, are higher in cities than in rural areas (see, for instance, Qiang and Qiang, 2010) where pupils are less inclined to invest in schooling.

population and the media, especially during these last decades.

Besides the urbanization process, another important factor worthy of consideration is the degree of urban concentration (or spatial equilibrium); urbanization and the degree of urban concentration are in fact two related but separated issues. Indeed, the latter particularly affects LDC and deals with the spatial distribution of the population (as well as resources) within the urban area. Whatever is the optimal level of urban concentration throughout time, the literature (see for instance Ales and Glaeser, 1993) has agreed on the fact that the majority of the countries examined eventually showed a propensity towards over-concentration, and that the latter has been proven to be costly and to generate negative consequences. Indeed, an excessive or uneven density of the population in some areas might have negative consequences on the economy and on the general well-being of citizens, as it might hinder, for instance, the exploitation of economies of scale as well as hampering an optimal allocation of resources within the city. Henderson (2003) has proven that for each level of development there exists an optimal degree of national urban concentration (which also depends on average income) and, also, that the main policy variable affecting concentration relies in investment in transport infrastructure; in particular, an intensification of the density of road networks drastically decreases concentration, with this effect increasing with income (i.e., the higher the income, the bigger will be the reduction in spatial concentration provoked by an expansion of the road system). Again, in the case of China, different cities implemented different policies to deal with issues related to over-concentration so that different regions experienced different outcomes (Heyuan, 2016).

As mentioned, the aim of this chapter is to study the effect of migra-

tion on urban growth through a dynamic model of rural-to-urban migration with human capital accumulation integrated with a spatial setting, in which two principal spatial drivers examined in chapter 2, i.e., the urban productivity spillovers and rural rents, are taken into account. As seen in the previous chapter, these two factors are important for the Chinese case, since they exercise a notable weight in the decision to migrate of rural dwellers, representing as well a valid alternative to the standard (non-spatial) models of classical rural to-urban migration⁴¹ so far proposed in the literature.

This chapter is organized as follows: section 3.2 outlines the model of rural-to-urban migration and solves for the two equilibria of optimal levels of urbanization. Section 3.3 analyzes the dynamic path of the economy, with a main focus on the role exercised by human capital. Finally, section 3.4 concludes.

3.2 Model

Consider N single firm workers, living for one period and providing their labor supply inelastically⁴², and two different locations: the city and the rural area, endowed with different production technologies and productivity factors. In the rural area, further assume the absence of human capital, due to the presence of low skilled tasks requiring an inferior amount of knowledge⁴³.

⁴¹See, e.g., Bertinelli and Black, 2004; Lu and Song, 2006; Stark and Fan, 2007.

⁴²Of course, workers will take the decision to invest in human capital or not at the beginning of the period, working in the middle of it and consuming in the end. No physical capital is included in the model for the sake of simplicity.

⁴³Despite the fact that human capital has been extensively included as a production factor in the literature (see, for example, Stark and Fan, 2007) it is just sufficient, for the model to work, to have a higher marginal productivity of human capital in the urban area compared to the rural area.

Further assume that urban workers can have access to different levels of public infrastructure and production technologies and make investments in education, but the latter require a certain fixed amount of effort. In the urban area, there is the additional issue of congestion externalities, due to an excessive increase in the level of the population, also boosted by the arrival of migrants from the rural area who do not take into account this issue. This inevitably generates negative spillovers (for instance, a worsening of the urban health system, public services and so on) which decrease the general well-being of urban citizens⁴⁴.

Given these premises, the income earned in the urban area at time t by the single worker is:

$$I_{ut} = G_u A_t h_{it}^\alpha - P h_{it} - b z_t N \quad (3.1)$$

where the first term on the right hand side (RHS) represents the gross earning received by urban worker i (being a urban citizen or a rural migrant relocated to the city), with G_u expressing the exogenous productivity factor of the urban area (for instance, the level of urban infrastructure, the efficiency and quality of public utilities in the city, etc.) and A_t the overall initial level of technology of the whole economy at time t ; h_{it} is the amount of human capital owned by worker i at time t (with decreasing returns to scale in education, i.e., $\alpha < 1$). In the second term, P is the effort expended by the worker to obtain the amount of human capital he/she owns. Finally, the third term takes into account the congestion effects of overurbanization, being b a positive constant, and z_t ($0 < z_t < 1$) the percentage of the total population N living in the city⁴⁵.

⁴⁴This happens particularly in many developing countries, where examples of overurbanization within cities are common and constitute a big issue for the urban planners.

⁴⁵Further assume a response one for one of the share of the urban population with respect to changes

As previously mentioned, in the rural area no human capital accumulation is assumed, therefore the gross earning gained by rural workers in the countryside is simply $G_r A_t$ ⁴⁶. Subsequently, assume a spatial structure for the rural area; therefore, besides the gross income, let firstly introduce a productivity spillover effect deriving from the city which propagates throughout the countryside and whose effect decreases with the distance from the urban area (i.e., rural areas closer to the city will benefit more from this spillover compared to the more distant ones)⁴⁷. Besides the distance, the final effect of the spillover on rural income will also depend on the absolute level of ω , measuring the decay of the spillover itself; when ω increases, the spillover benefit in the countryside decreases, thus leading to a worsening in the income condition of rural dwellers; on the contrary, when the decay of ω is flatter, rural workers enjoy a higher beneficial effect from the productivity spillover, thus experiencing higher rural salaries. The second spatial variable is related to rural rents; indeed, let assume that rural workers have to pay a rent for their house given by $r(d)$, representing the land rent for each unit of occupied living surface⁴⁸⁴⁹. Another variable which would be worthy of investigation in the model is represented by the living housing surface chosen by rural workers in the countryside. Here, let consider that variable as exogenously given and normalize it to one for

in congestion costs.

⁴⁶Moreover, the distribution of the population in the rural area is assumed to be constant and uniform.

⁴⁷It is possible to consider this productivity spillover effect as the economic impact exercised by TVEs in the rural areas (impact which is of course stronger in the rural areas closer to the city) in terms of, for instance, relocation of industrial facilities, job creations, improvements in the level of rural infrastructures, and so on.

⁴⁸Even if they own the house, because of living inside it, they always face an opportunity cost given by a potential rent they lose from not renting the house to other people.

⁴⁹As explained in chapter 2, rural rents actually cover a wider variety of taxes. Here, for the sake of simplicity, only the taxes on the house are considered.

the sake of simplicity⁵⁰.

The equation for the rural income is thus given by:

$$I_{rt} = G_r A_t - \omega(d) - r(d) \quad (3.2)$$

Rural workers living in the countryside will then maximize their income with respect to the distance, and this will lead, from deriving the FOC from expression (3.2), to the following condition:

$$r'(d) = -\omega'(d)$$

which says that the rent is decreasing with respect to $\omega(d)$ in order to compensate a loss in the rural income from a lower productivity spillover in approaching the farthest regions of the countryside (in other words, $r(d)$ gets lower the more we approach the two extremes). Further assuming that the spillover is linear with respect to the distance, this entails that $\omega(d) = \omega d$, and subsequently also the gradient of the rent will be linear. From this, the following proposition 1 follows:

Proposition 1

Rural rents will increase more and more in approaching the urban area. Moreover, the more sensitive the decay of the spillover effect is with respect to the distance from the city, the higher will be the rents in getting closer to the city.

Subsequently, it becomes necessary to consider the geometric properties of the distribution of the rural area around the urban area and the consequences that this implies. It is assumed that the distribution of the rural

⁵⁰The analysis with the housing living surface variable chosen endogenously by rural workers is also carried out, in Appendix A.

population around the urban center is linear⁵¹. As depicted in Figure 3.1, the city can therefore be represented by the point A, while the two segments of equal length, $[\bar{d}, A]$ and $[A, \bar{d}]$ constitute the linear distribution of the rural area around the city⁵².



Figure 3.1: Linear distribution of the rural area.

The distribution of rural workers will thus be given by the following equation:

$$\bar{d} = ((1 - z_t)N)/2$$

Given then the linearity of the productivity spillover effect and the gradient of the rents, it is possible to derive the following expression:

$$r(d) = r(0) - \omega d$$

where $r(0)$ is the rent inside the city center, and \bar{r} the rent at \bar{d} ; from this it follows that:

$$r(\bar{d}) = \bar{r} = r(0) - \omega(\bar{d})$$

from which:

⁵¹This is of course a simplifying assumption; the same distribution of the rural area around the city could also be concentric. An analysis involving the concentric case is carried out in Appendix B.

⁵²The two \bar{d} are, respectively, the left and the right extreme of the rural area, i.e., the two farthest rural points from the city center.

$$r(0) = \bar{r} + \omega((1 - z_t)N/2)$$

and therefore:

$$r(d) = \bar{r} + \omega((1 - z_t)N/2) - \omega d$$

After plugging and rearranging it is possible to obtain the following equation for the rural income:

$$I_{rt} = G_r A_t - \bar{r} - \frac{\omega}{2}(1 - z_t)N \quad (3.3)$$

From (3.3) some interesting facts emerge. Firstly, the rural income is increasing in the gross earning but decreasing in \bar{r} ; the increase in the opportunity cost of land brings to an increment of $r(d)$, whatever is the distance from the city. As for ω , the latter, as it was easy to expect, decreases the rural income in increasing the distance from the city (moreover, as already stressed, an increase in the sensitivity of $\omega(d)$ to the distance increases the gradient of the rent). Finally, the rural income results in an increasing number of people living in the city but a decreasing number of people living in the rural area (since the more people remain in the countryside, the higher is the negative effect exercised by the rents in the rural area, because of higher competition for the land).

Coming back to the urban reality, in the city also the urban workers maximize their income; deriving the FOC from (3.1) with respect to h_{it} , the optimal level of human capital results in:

$$h_{it}^* = (\alpha G_u P^{-1} A_t)^{1/(1-\alpha)} \quad (3.4)$$

This value will affect the level of urban population, even if workers (and

especially rural migrants) are unaware of the effect of congestion costs due to the agglomeration.

As seen, there are many causes triggering rural-to-urban migration. Among these, we find the urban-rural income differential, a driver of migration previously discussed in chapter 2. An initial gap between a superior urban income with respect to the rural income will provoke the migration of rural workers to the city up to the point where an equilibrium is achieved. In the end, at this equilibrium level, the rural income will be equal to the urban income, that is:

$$G_r A_t - \bar{r} - \frac{\omega}{2}(1 - z_t)N = G_u A_t h_{it}^{*\alpha} - P h_{it}^* - b z_t N$$

Once this equilibrium condition is achieved, there will be no migration anymore.

In deriving from the above expression of equilibrium the fraction of population \hat{z}_t who eventually located to the city at time t , it is possible to obtain the following market solution:

$$\hat{z}_t = \frac{2(G_u A_t h_{it}^{*\alpha} - P h_{it}^* - G_r A_t + \bar{r}) + N\omega}{N(2b + \omega)} \quad (3.5)$$

An investigation of the conditions of existence for \hat{z}_t is necessary. Analyzing the urban and rural incomes reveals how their absolute value is influenced by the share of people living in the urban (/rural) areas. Indeed, it was previously shown how the urban income is negatively affected by the congestion costs that increase in relation to the number of urban dwellers; conversely, the rural income is positively influenced by the decrease in the number of people living in the rural area; this lowers the competition for the land (which affects in turn the rural rents) and the decay of the productivity spillover. Therefore, considering expression (3.1)

for the urban income, it can be observed that the latter reaches its maximum when $\hat{z}_t = 0$, i.e., when there is no urban population, while the rural income, from expression (3.3), reaches its highest when $1 - \hat{z}_t = 0$ (alternatively $\hat{z}_t = 1$), i.e., when there is no rural population. The necessary condition for the existence of the equilibrium at \hat{z}_t can therefore be given by the following expression:

$$G_r A_t - \bar{r} - \frac{\omega}{2} N < G_u A_t h_{it}^{*\alpha} - Ph_{it}^* < G_r A_t - \bar{r} + bN$$

The graph in Figure 3.2 better helps in understanding this condition. For very low levels of urbanization (i.e., for levels of z_t at the left of \hat{z}_t in the graph, whose extreme point at $z_t = 0$ is represented by the lowest value for the rural income, $G_r A_t - \bar{r} - \frac{\omega}{2} N$, and by the highest values for the urban income, $G_u A_t h_{it}^{*\alpha} - Ph_{it}^*$), city dwellers enjoy remarkably high incomes, due to a minimal presence of congestion costs; on the other hand, the incomes in the rural areas are very low, given a high number of rural workers competing for the land.

On the contrary, for very high levels of urbanization (i.e., for levels of z_t at the right of \hat{z}_t in the graph, whose extreme point at $z_t = 1$ is now represented by the highest value for the rural income, $G_r A_t - \bar{r}$, and by the lowest value for the urban income, $G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - bN$), congestion costs are very high, thus lowering the urban income, whereas the rural income turns out to be high, because of reduced land competition. Two different scenarios can therefore take place. In the first one, when the urban income exceeds the rural income (i.e., when $0 < z_t < \hat{z}_t$), rural workers will migrate to the city, in this way increasing the urbanization level and lowering the urban income. In contrast, in the scenario where

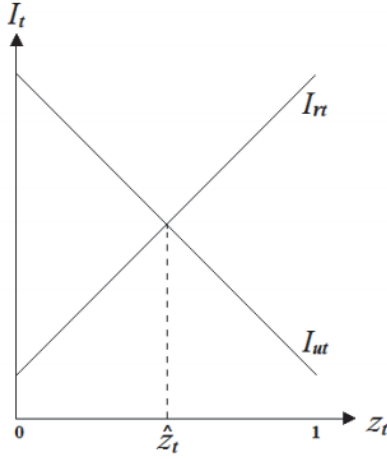


Figure 3.2: Equilibrium conditions.

the rural income exceeds the urban income (i.e., when $\hat{z}_t < z_t < 1$) there will be a migration of urban dwellers towards the countryside and this will decrease the urbanization level. In both scenarios, the differential between the two incomes will adjust the urbanization level accordingly, until the equilibrium point at \hat{z}_t is achieved. Here, no migration will occur anymore.

Proceeding to the analysis, from expression (3.5) further useful results through comparative statics follow. In calculating the partial derivatives with respect to \hat{z}_t it is possible to find that, first of all:

$$\frac{\partial \hat{z}_t}{\partial \bar{r}} > 0$$

This means that for the market solution there is a positive marginal effect of land rents at the extreme rural periphery; this might be reasonable, because when land rents located in the most distant corners of the countryside increase, all the other rural land rents will increase subsequently; moreover, when they become too excessive, peasants are more likely to

abandon their houses to migrate to the city.

Then:

$$\frac{\partial \hat{z}_t}{\partial G_u} > 0$$

As it was easy to expect, a higher urban exogenous productivity factor will attract rural migrants to the urban area, given the positive psychological impact exerted on them by, for instance, better health and education systems, functioning facilities, extended and efficient infrastructures, and so on.

Of course, the opposite is true when the rural exogenous productivity factor improves; in this case rural citizens will be more likely to remain in the countryside, since:

$$\frac{\partial \hat{z}_t}{\partial G_r} < 0$$

Finally, a crucial point concerns the effect of ω ; calculating the partial derivative, produces:

$$\frac{\partial \hat{z}_t}{\partial \omega} = \frac{2b}{(2b + \omega)^2} - \frac{2N(G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r})}{[N(2b + \omega)]^2}$$

Given the necessary condition for the existence of the equilibrium at \hat{z}_t previously examined, the first positive term of the partial derivative is higher in absolute value than the second one, i.e.: $bN > G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r}$. This means, consequently, that it is always true that $\frac{\partial \hat{z}_t}{\partial \omega} > 0$. In other words, a marginal increase in the decay of the productivity spillover (moving away from the urban area), will result in a higher urban agglomeration, since it lowers the rural income of workers living in the countryside, therefore pushing them to migrate to the city. In the

end, however, the final effect can overall be considered small, due to the squared values of the denominators in both the terms of the expression of the partial derivative, which annihilate the values of the corresponding numerators. A deeper analysis of the effect of ω on the urban levels of agglomeration is carried out in Appendix C.

To proceed to the analysis, let now introduce the figure of the urban planner, who is the public servant equivalent of the local urban authority in charge of setting the optimal rate of rural-to-urban migration for the city. The urban planner is assumed here to be a rational agent with perfect information; hence, contrary to urban workers and rural migrants, he takes into account the impact of congestion costs due to an excessive degree of rural-to-urban migration; accordingly, he will set, at time t , the most feasible number of urban citizens maximizing the overall per capita net output of the economy \bar{I}_t , which in this case is given by the following expression:

$$\max_{z_t} \bar{I}_t = (1-z_t)[G_r A_t - \bar{r} - (\omega N)/2 - (\omega z_t N)/2] + z_t[G_u A_t h_{it}^{*\alpha} - P h_{it}^* - b(z_t N)]$$

Deriving the FOC from the above new equilibrium expression it is possible to derive the proportion of citizens z_t^u which the urban planner will choose as an optimal solution:

$$z_t^u = \frac{G_u A_t h_{it}^{*\alpha} - P h_{it}^* - G_r A_t + \bar{r} + N\omega}{N(2b + \omega)} \quad (3.6)$$

This result is important, as surprisingly, even if the urban planner takes into account the congestion effect of urban agglomeration, it is not necessarily always true that $z_t^u < \hat{z}_t$, as one could expect. Indeed, depending on the sign of the terms in the round bracket of expressions (3.5), different

results emerge; particularly, the condition $z_t^u < \hat{z}_t$ is verified iff $G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r} > 0$; on the contrary, when $G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r} < 0$, it follows that $z_t^u > \hat{z}_t$ ⁵³. With the aim of providing a deeper insight on these findings, the two cases will now both be examined.

First case ($G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r} > 0$)

This first scenario arises when the gross urban income net of the cost to acquire human capital exceeds the gross rural income net of the negative effect exercised by the rents in the rural area; so this condition can be rewritten from the former expression as: $G_u A_t h_{it}^{*\alpha} - Ph_{it}^* > G_r A_t - \bar{r}$; one could also think about this in terms of a ratio between the shares of the net rural income over the net urban income, that is, when $\frac{G_r A_t - \bar{r}}{G_u A_t h_{it}^{*\alpha} - Ph_{it}^*} < 1$. Since $z_t^u < \hat{z}_t$, the final economic well-being, in the eyes of workers, will be higher in the urban area than in the rural area, leading necessarily to a higher level of urban agglomeration⁵⁴, as more rural workers would have eventually moved to the city.

Second case ($G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r} < 0$)

The second scenario arises whenever $G_u A_t h_{it}^{*\alpha} - Ph_{it}^* < G_r A_t - \bar{r}$, or, in terms of the ratio between shares, when $\frac{G_r A_t - \bar{r}}{G_u A_t h_{it}^{*\alpha} - Ph_{it}^*} > 1$. This case occurs when the economic condition of the countryside is particularly prosperous and therefore rural workers enjoy considerably high rural salaries (due to a high value of G_r). Because of this, they will end up neglecting the

⁵³The additional condition involving the positivity of the numerator must hold for both the expressions (3.5) and (3.6). Particularly, for expression (3.5) it must be that $N\omega > 2(G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r})$ if $2(G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r}) < 0$, whereas for expression (3.6), $N\omega > G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r}$ if $G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r} < 0$.

⁵⁴It is important to recall that in the model there is a congestion externality both in the rural and urban area.

negative effect played by rents in the countryside, so that, due to this myopic attitude, the final effect will be a higher agglomeration level in the rural area. Conversely, the urban planner, who does not have a myopic view, considers not only the effect of congestion costs within the city, but also the effect of rents; hence, to counterbalance this issue, he accordingly sets a solution by which $z_t^u > \hat{z}_t$. One could also think about this in terms of the overall economic situation affecting the rural and the urban areas. In fact, this second scenario could also arise in the presence of a reduced rural income, as far as, however, the net urban income in the city turns out to be remarkably lower (because, for instance, of a situation of economic recession in the city) and as long as the negative effect of rents remains modest and neglected by rural dwellers.

From this, the following proposition 2 follows:

Proposition 2

An excessive relocation of workers in the urban (/rural) area will be determined by the final magnitude of the net urban and rural incomes. According to the market solution, there will be a level of excessive urban agglomeration in the city only if the gross urban income net of the cost of acquisition of human capital will be higher than the gross rural income net of the negative effect exercised by rents in the countryside. Particularly, given the value of the rural income, the negative effect exercised by rents is in the end of fundamental importance in determining the final situation of a higher or lower level of agglomeration in the countryside.

Therefore, to sum up, contrarily to what one could expect, despite the presence of congestion costs linked to an excessive level of urban agglomeration, it is not always the case that the degree of agglomeration set by

the urban planner will always be lower than the one corresponding to the market solution. This is particularly the case when we are in the presence of remarkably high rural salaries⁵⁵ compared to the urban ones, or when the economic situation within the city is not thriving (think about a recession), given, e.g., a high cost of human capital accumulation by workers (for instance, because of the presence of bureaucratic barriers) or when the returns from education are remarkably low (for example because of a poor education system). In this context, the role exercised by the spillover effect of rural rents in the countryside must then be considered, given its impact on the gross rural income, which eventually will affect the final choice of location of rural workers. Indeed, when the level of the rents is very low and the gross rural income is particularly high, rural workers will not consider the negative effect of rents and consequently there will be more agglomeration in the rural area. From his point of view, the urban planner (who as previously stressed is on the contrary not myopic and does take into account both the effect of urban congestion costs and rents) does not see the issue of a potential mass relocation of rural workers from the countryside to the urban area, and therefore, also in order to counterbalance the myopic attitude of rural workers, increases the number of allowable migrants to the city (so that eventually $z_t^u > \hat{z}_t$); all the more so, in the case of a bad economic situation in the city, because of an increased difficulty in human capital acquisition and/or very low returns to scale in education, having a higher number of urban dwellers will help to increase the chances to foster the city growth.

⁵⁵This condition is especially verified when the exogenous productivity factor in the countryside increases, for instance because of an improvement in the quality of the infrastructure; the latter have in fact been proved to play a crucial role in increasing the productivity level of the rural areas (see, e.g., Duranton and Turner, 2008).

On the contrary, when the net urban incomes greatly exceed the gross rural incomes net of the values of rents, it follows that $z_t^u < \hat{z}_t$. There are two feasible explanations for this. First, it can be the case that the city has moderate congestion costs and registers a consistent economic growth, boosted by a good system of urban infrastructures, high returns from education and low costs of acquisition of human capital, thus attracting workers from the countryside. Nevertheless, it can also be that in reality the urban (net) incomes are much lower than they appear, because of the presence of high congestion costs; the problem arises because the latter are not perceived by workers, thus giving them the false impression that in the city urban dwellers truly enjoy higher incomes. In both these two cases, the urban planner wants to narrow the share of the urban population, in order to decrease the congestion costs within the city.

3.3 Dynamic path of the economy and the role of human capital

The second step of the analysis consists of examining the dynamic path of the economy, that is the long-run repercussions, provoked by urbanization and rural-to-urban migration, on the urban economy. Considering the equation of motion linking the overall initial level of technology A_t to the level of technology of the previous period A_{t-1} , the degree of urbanization z_t , the average level of human capital h_{it} , and the parameter θ (providing decreasing returns for z_t and h_{it} , so that $0 < \theta < 1$), the following expression can be written⁵⁶:

⁵⁶The average level of human capital in the whole economy solely depends on the average level of urban human capital, since in the rural area the presence of human capital was not assumed. Denoting as \bar{h}_{it} the average level of human capital in the whole economy, it follows that: $\bar{h}_{it} = (1 - z_t)0 + z_t h_{it}$.

$$A_{t+1} = \max f(A_t, [z_t h_{it}]^\theta) \quad (3.7)$$

As already stressed above, this analysis relies upon some classic assumptions assumed in the literature, postulating that investments in human capital⁵⁷ boost the long-run economic growth of cities, since they entail the accumulation of technology (see, e.g., Benabou, 1996).

In the Chinese urban context, rural migrants contribute to human capital accumulation in several ways, depending on their educational level and job position. If from the one hand the most skilled migrants can raise the general level of human capital in the urban area through investments in further education, on the other hand, less skilled migrants can contribute to human capital accumulation by, for instance, additional training and learning-by-doing. What is crucial for the economy at time t is therefore investment in human capital at time $t - 1$. The other variable affecting the growth process is represented by the degree of urbanization⁵⁸, as more urban citizens will invest in more human capital, boosting in this way the economic growth of the city. Then, the resulting higher productivity will attract more rural migrants who will in turn invest in human capital, thus

Thus, $\bar{h}_{it} = z_t h_{it}$. Moreover, no depreciation is assumed.

⁵⁷As it was exposed in chapter 1, human capital does not solely refers to investments in education, but in broad terms can be defined as the capabilities which are developed through formal and informal education at school and at home, through training, experience, mobility in the labor market, etc. (Mincer, 1981).

⁵⁸In particular, the degree of urbanization affects the growth process in two ways, directly and indirectly. Directly as it appears in equation (3.7), and indirectly because, affecting the level of technology, it automatically influences the optimal level of human capital chosen by urban workers (as the latter depends on A_t), which will eventually end up affecting the final equation of motion. It is possible to see this plugging $(z_t h_{it})^\theta$ into expression (3.4), to obtain: $h_{it} = [\frac{\alpha G_u(z_{t-1} h_{it-1})^\theta}{P}]^{1/(1-\alpha)}$, which in turn will impact on the final equation of motion in (3.7). Of course, an essential condition for generating long-term growth is that the returns from human capital and the degree of urbanization at time t are higher than the current level of technology at time t (i.e., $(z_t h_{it})^\theta > A_t$).

creating a positive circle. Moreover, these investments will rise according to the increase in the technological level. In the end, depending on the values of the parameters, the urban economy will experience different growth paths. First of all, if the initial technological level is too low, the city will be stranded in a poverty trap without economic growth and will be likely to remain with its current technological level forever. In this case, the shapes of A_{t+1}^p and A_{t+1}^f (which are the functions governing the technological path of the economy, in the cases of partial and full urbanization respectively) are irrelevant, as the final equation of motion will always be concave, lying below the 45° line (see Figure 3.3). Secondly, if the initial level of technology rises (over a threshold level), A_{t+1}^p will intersect the 45° line (where $A_{t+1}^p = A_t$); if the A_{t+1}^p function is concave, there will eventually be two equilibria: a lower (unstable) and an upper (stable) equilibrium. In the latter case (which accounts for all the technological levels above the lower intersection of the A_{t+1}^p function and the 45° line) the economy will experience growth and an equilibrium of partial urbanization. Nevertheless, whether the city growth reaches an equilibrium level (the so called steady state level⁵⁹) of partial or full urbanization will depend on the concavity or convexity of A_{t+1}^p ; if the latter is concave, we will end up in the case of partial urbanization. However, if the A_{t+1}^p function is convex, the economy will experience full urbanization. In this case, the final level of growth of the economy will depend on the shape of

⁵⁹A steady state level can be defined as an equilibrium level of growth to which an economy adjusts in the long run, given a sufficient initial amount of input factors. In this case, if the starting endowment of technology is high enough, the economy will begin experiencing increasing growth rates of technology and human capital, until it will reach the steady state level of equilibrium. At this point, both the levels of technology and human capital will stop growing and will stabilize at a constant level. Deviations from the steady state level will automatically be corrected so that the economy will always converge back to the equilibrium level.

the A_{t+1}^f function; in particular, if the latter is concave, the economy will eventually converge to a steady state. On the contrary, if A_{t+1}^f is convex, the economy will benefit from boundless growth.

To sum up, according to the different dynamic paths that the level of technology $\{A_t\}_{t=0}^\infty$ will take, there will eventually be three different scenarios: no urbanization, partial urbanization, and full urbanization.

$$A_{t+1} = \begin{cases} A^0 & \text{if } z_t = 0 \\ A_{t+1}^p & \text{if } 0 < z_t < 1, A_{t+1}^p > 0 \text{ and } (z_t h_{it})^\theta > A_t \\ A_{t+1}^f & \text{if } z_t = 1, A_{t+1}^f > 0 \text{ and } (z_t h_{it})^\theta > A_t \end{cases}$$

where the equations of motion A_{t+1}^p (governing the dynamic evolution of A_t in case of partial urbanization) and A_{t+1}^f (governing the dynamic evolution of A_t in case of full urbanization) were obtained by plugging expressions (4) and (5) into $(z_t h_{it})^\theta$. It is shown in Appendix D.1 that at the point where $z_t = 1$ and $A_{t+1}^p = A_{t+1}^f$, the slope of A_{t+1}^p can be lower or higher than A_{t+1}^f , depending on the value of certain parameters. Eventually, the path of the economy will also depend on the magnitude and shape of the functions of motion A_{t+1}^p and A_{t+1}^f .

Each one of these three cases will now be analyzed.

First scenario: No urbanization

This is the worst among all of the three scenarios considered; indeed, because of the poverty trap, urbanization will never take place (i.e., $z_t = 0$); that is the case when the initial level of technology⁶⁰ is:

⁶⁰Notice that an equation in implicit form was obtained, because of the presence of the rent and technological spillover effect terms in the expression of the rural income.

$$A_0 < \left[\frac{G_r A_0 - \bar{r} - \omega(N/2)}{G_u^{\frac{1}{1-\alpha}} P^{\frac{\alpha}{\alpha-1}} (\alpha^{\frac{\alpha}{1-\alpha}} - \alpha^{\frac{1}{1-\alpha}})} \right]^{(1-\alpha)}$$

Proof. In plugging (3.4) into (3.1) it is possible to get the maximized level of net earnings for each urban worker, which hence results to be: $I_{ut}^* = (A_t G_u)^{\frac{1}{1-\alpha}} P^{\frac{\alpha}{\alpha-1}} (\alpha^{\frac{\alpha}{1-\alpha}} - \alpha^{\frac{1}{1-\alpha}})$ (given $z_t = 0$). Then, comparing this expression with (3.3), provides the threshold for the initial technological level.

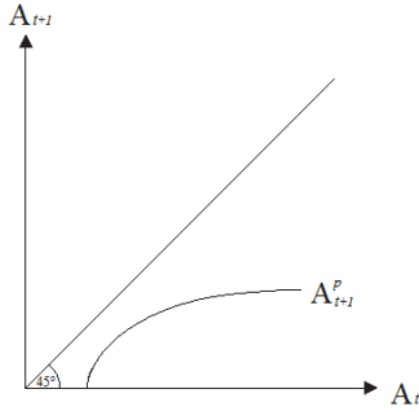


Figure 3.3: No Urbanization.

In this case, the per capita gross earnings for both urban and rural workers will in the end be the same: $G_r A_t = G_r A_0, \forall t$. This scenario is represented in Figure 3.3 (with the function of motion always being concave). As it can be noticed, in this case the initial level of technology A_0 is too low and incentives to invest in human capital are not sufficient enough; therefore, the dynamic path of the technological level will always remain below the 45° line and the urban development process will never take place.

Second scenario: Partial urbanization

This scenario takes place when $0 < z_t < 1$. In this situation, the equation of the dynamic path will be obtained by plugging expressions (3.4) and (3.5) into (3.7), to obtain:

$$A_{t+1}^p = [B^{2/(1-\alpha)}(\frac{-2P}{N(2b+\omega)} + \frac{2G_u A_t B^{(\alpha-1)/(1-\alpha)}}{N(2b+\omega)}) + B^{1/(1-\alpha)} \frac{2\bar{r} + N\omega - 2G_r A_t}{N(2b+\omega)}]^\theta$$

where $B = \alpha G_u P^{-1} A_t$.

As graphically shown in Figure 3.4, two possible steady state levels for the technological path emerge. The first steady state level, A_1 , is unstable. For all the values of A_t ranging from 0 up this point, the initial level of technology is not sufficiently high to start the urban growth process. As well, the workers' income and their incentive to invest in human capital will be too low. Because of this, the economy will remain stranded in a poverty trap, and the level of growth of the city will eventually become zero. However, if the initial level of technology is equal to or superior to A_1 , the urban economy will start growing (boosted by the increasing rates of investments in human capital and of urbanization) until it reaches the steady state level A_2 . At this point, the growth rate of investments in human capital and urbanization will come to a halt and the growth level of the urban economy will enter a condition of stable equilibrium⁶¹.

Third scenario: Full urbanization

Finally, in this last case the city experiences full urbanization. The kink of the dynamic function at point A_2 of Figures 3.5, 3.6 and 3.7 represents

⁶¹The initial level of technology could also start above A_2 ; in this case, however, there will be a downturn of investments in human capital (as well as in the urbanization rate), which will eventually bring back the equilibrium to the steady state level of A_2 .

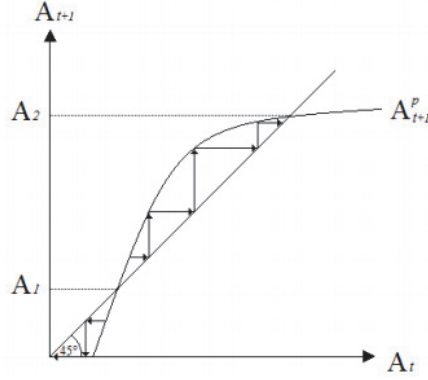


Figure 3.4: Partial urbanization.

the point where, given a determined high enough technological level, the entire population will start to move to the city and invest in human capital. The final equation of motion will be equal to the one of the partial urbanization case, but being now $z_t = 1$, it will produce:

$$A_{t+1}^f = B^{\theta/(1-\alpha)}$$

In this third case, A_{t+1}^p will be convex, but two different scenarios can arise depending on the shape of the A_{t+1}^f function. Starting with the first scenario where A_{t+1}^f is concave, as previously mentioned, this further entails two sub-scenarios. In the first sub-scenario, as it is shown in Appendix D.1, when the gross rural income exceeds the value of the rents plus the coefficient ω , it is possible to encourage a faster urban growth in the first transition phase of partial equilibrium, that is $\partial A_{t+1}^p / \partial A_t > \partial A_{t+1}^f / \partial A_t$ (Figure 3.5).

This trend could possibly be explained by the presence of remarkably higher urban wages compared to rural salaries net of the values of r and ω ;

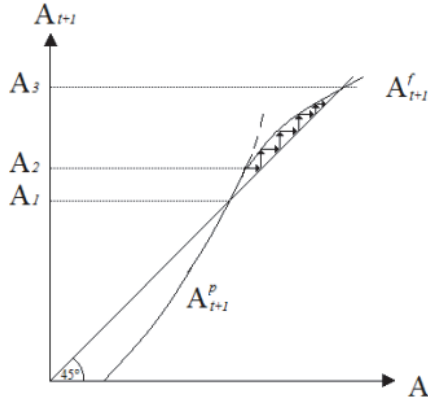


Figure 3.5: Full urbanization with steady state with $\partial A_{t+1}^p / \partial A_t > \partial A_{t+1}^f / \partial A_t$.

this situation will ultimately push the majority of rural workers to migrate to the city at a faster pace in the first phase, because of a better standard of living in the urban area. Ultimately, this first sub-scenario might therefore entail a particularly prosperous condition for the growing urban economy, whose citizens are indeed benefiting from remarkably higher urban wages. Eventually, as depicted in Figure 3.5, once the partial urbanization level is achieved, at point A_2 , the speed of growth decelerates, since the remaining number of migrants moving to the city represents a smaller share compared to the number of migrants who have already relocated to the urban area; this clearly leads to reduced contributions to growth until the steady state of full urbanization is achieved. Conversely, in the second sub-scenario, the values of rents plus ω exceed the net rural income and eventually the city growth, after the partial urbanization level is reached, will register an acceleration process, as it is shown in Figure 3.6. This entails that $\partial A_{t+1}^p / \partial A_t < \partial A_{t+1}^f / \partial A_t$.

Since in this second sub-scenario the values of r and ω curtail the level of gross rural incomes, the underlying cause this dynamic trend might once

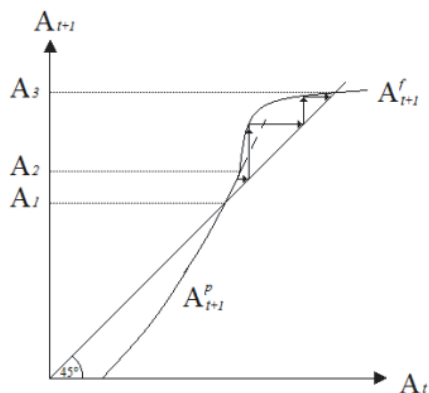


Figure 3.6: Full urbanization with steady state with $\partial A_{t+1}^p / \partial A_t < \partial A_{t+1}^f / \partial A_t$.

again be found in the income gap between the urban and rural salaries; particularly, in this case, it might be that the initial levels of the urban income, although always superior in comparison to the rural income, are so low that, because of a remarkably reduced urban-rural income gap, only few rural workers will eventually decide to relocate to the city in the first transition growth phase of partial equilibrium. The latter face indeed a trade-off between high rural rents, low productivity spillover benefits and unattractive urban salaries. The urban growth path will however register a trend reversal in the final phase of the partial urbanization process; in this stage, technology will grow to a point such that the remaining and consistent share of rural workers still living in the countryside will ultimately relocate to the city; this happens since the latter are attracted by the increased city growth, which, although slower in the initial phase, has now almost reached its steady state, with the urban-rural income gap having widened substantially. Eventually, this will accelerate the next phase of urban growth (above the point A_2) thanks to the investments in human capital by the new relocated migrants. Ultimately, in

both the sub-scenarios, the economy reaches full urbanization at the new (higher) steady state level A_3 , where the per capita earnings are equal to $(A_3 G_u)^{\frac{1}{1-\alpha}} P^{\frac{\alpha}{\alpha-1}} (\alpha^{\frac{\alpha}{1-\alpha}} - \alpha^{\frac{1}{1-\alpha}})$.

Finally, the second scenario of the third case remains to be examined, that is when A_{t+1}^f is convex. As it is shown in Appendix D.2, a necessary condition for this case to happen is that $\alpha + \theta \geq 1$; this means that returns to investments in human capital are remarkably high and/or the effect of human capital on technology is particularly high. In this scenario, as it is shown in Figure 3.7, the economy of the city and the level of technology will grow boundlessly; in particular, the urban economy will firstly reach the stage of partial urbanization (at point A_2), to then achieve full urbanization and continue its path, with per capita earnings (and growth rates) increasing forever⁶².

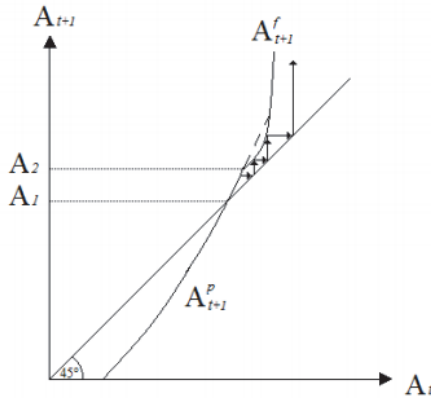


Figure 3.7: Full urbanization with unbounded growth.

⁶²Note that in the case where $\theta + \alpha = 1$, after having reached the level of full urbanization, the economy will now experience a constant growth rate of technology.

3.4 Final remarks on chapter 3

This chapter developed a dynamic model of rural-to-urban migration in order to analyze the impact of rural-to-urban migration on long-run city growth. In doing this, a spatial structure to the rural area was provided, in order to take into account the important role exercised by the spatial variables of the rural rents and spillover productivity effects (studied in the previous chapter) in the whole process. These two spatial variables have so far been neglected by the literature, but nonetheless they have been proven to exercise a crucial role in affecting the final optimal degrees of urbanization, especially in China (see the effect exercised by rural taxation and TVEs in chapter 2). Depending on the absolute net values of the rural and urban incomes, different equilibria for the optimal city size can be achieved. When rural workers enjoy considerably high rural incomes, they inevitably end up neglecting the effect exercised by rural rents and, accordingly, the market solution for the urbanization level will be lower, in absolute value, than the urban planner solution. On the other hand, in the presence of higher urban salaries, rural workers will be attracted to move to the city, so that, in contrast to the previous case, the market solution will now be higher, in absolute value, than the urban planner solution. Therefore, after having introduced the spatial variables in the model, it is not the case that the market solution will always be higher than the urban planner solution as one might think, and this clearly represents a novelty for the literature. In general terms, and as already stressed, many empirical studies (see, e.g., Lu, 2006) have confirmed that urban-rural income differentials exercise a key role in affecting the rural workers' decision to migrate.

Eventually, rural-to-urban migration boosts both urbanization and human capital accumulation, and the degree of urbanization and level of human capital accumulated in the city by workers constitute the main engines of urban growth, through the increase in the overall level of technology. Also, according to the initial level of technology, different scenarios can emerge. For too low levels of technology, the situation in which the urban economy remains stranded in a poverty trap could arise, since investments in human capital are not sufficiently high. However, if the initial level of technology is high enough, the urban process begins, leading to an increase in the levels of investment in human capital, technology and output over time. The growth path will eventually depend on the levels of return to human capital, urbanization and technology; for remarkably high levels, the city might also experience unbounded growth. However, these growth benefits deriving from overurbanization also entail the emergence of congestion costs, which ultimately lower the quality of life of urban dwellers. Therefore, it is up to the urban planner to choose the best trade-off between growth and negative congestion externalities. As a matter of fact, it could be the case that ill-designed policies intended to lower the level of urbanization by restraining the overall degree of migration might entail a negative impact on economic development; indeed, they could provoke a decrease in the technological steady state level of the economy, possibly leaving it stranded in a poverty trap (especially during the initial stages of the urbanization process). In China, some urban areas have limited the urbanization rate by restricting migration flows, especially after the *hukou* decentralization reforms, with often adverse effects on long-term economic growth (see, e.g., Fang and Dewen, 2008). On the contrary, many cities which enabled policies designed to accept significant shares of migrants

have registered positive economic benefits (see, e.g., Frijters et al., 2015), and this can undoubtedly provide empirical proof to the findings of the theoretical model developed in this chapter. Given these facts, it follows that urban regulations which restrict migration flows in order to manage overurbanization issues can entail unfavourable long-term consequences. From all this, it emerges how in a situation of urban overcongestion, it might be the case that a spatial relocation policy of citizens and productive activities, instead of a reduction in the number of urban dwellers, could relieve the issues related to overurbanization with no adverse dynamic repercussions. This clearly relates to the issue of the degree of urban concentration previously analyzed in section 3.1. As a matter of fact, policies of spatial relocation have been successfully implemented in certain cities of China which registered issues related to overcongestion. For instance, the city of Shanghai, in order to overcome the congestion costs provoked by the flows of rural migrants, has been implementing a policy of relocation of urban residents and industrial facilities from central and more populated city areas towards more peripheral and less densely-populated ones. This enabled the city to benefit from the rural migrants' contribution to the urban growth while at the same time having a controlled and reduced increase in congestion costs (Weiping, 2005). Moreover, additional policies of integration of migrants have contributed to relieve potential social frictions between the latter and native urban residents.

Chapter 4

Quantifying the impact of human capital accumulation on Chinese growth: an empirical investigation

63

Using a panel data of 30 Chinese provinces for the period 1995-2013, this chapter aims to conclude the analysis carried out in the previous chapters quantifying the impact of human (as well as physical) capital accumulation on economic growth in China over the last two decades, in the light of all the previous findings and considerations. In particular, the main objective is to investigate the contributions, in term of growth spillovers, of the two input factors given their different level of mobility; if on the one hand the mobility of physical capital has been remarkably boosted after the tax reform of 1994, on the other hand, because of the restrictions imposed by the *hukou* system on workers and students, the mobility of human capital appears nowadays to be notably more reduced. In this empirical framework, a spatial econometric approach is adopted;

⁶³The content of chapter 4 has been published on *World Development Perspectives* (<http://dx.doi.org/10.1016/j.wdp.2016.08.001>).

different spatial panel specifications are used to detect the evolution of spatial dependence within and among provinces, with physical capital disaggregated at sector level. This analysis suggests that: first, the contribution of factor inputs to economic growth appears higher compared to the same contribution previously analyzed by the literature in the first phase of economic reforms, as does the magnitude of spatial spillovers. Secondly, the impact of physical capital on GDP per worker remains notably higher than that of human capital, despite the significant and consistent increase in public expenditure on education since the beginning of the new century. Thirdly, no noticeable difference is detected at sector level in the magnitude of intra- and inter-provincial spillovers for physical capital.

4.1 The drivers of Chinese growth

In the previous chapters, it was shown that the current Chinese legislation on rural-to-urban migration is rather strict, but nonetheless rural-to-urban migration constitutes a key factor for the city growth; this is mainly due to the fact that rural migrants contribute to raising the overall level of human capital within the cities, which ultimately constitutes one of the main drivers of long-term urban growth. This chapter aims at quantifying what has been the impact on urban growth exercised by both human and physical capital, the latter constituting another important factor of growth. Generally speaking, since the beginning of the reform period in 1978, China has experienced an astonishing growth rate, which has dramatically increased the level of real per capita GDP as well as the living standards of its citizens. However, not all the provinces of the country have benefited equally from this economic miracle, with the result that nowadays a remarkable degree of income inequality still persists among

regions (Fleisher et al., 2009; Cheong and Wu, 2014). So far, a wide strand of economic research has tried to determine the role and importance exercised by human capital, physical capital and total factor productivity on Chinese economic growth. With reference to physical capital, it is undoubtedly true that this factor represents one of the key drivers responsible for China's sustained growth (Ding and Knight, 2009; You and Solomon, 2015). With the beginning of the reform period in the late '70s, China experienced an exceptional increase in the ratio of investment to output, surpassing in absolute terms the majority of the other developing as well as developed countries (Knight and Ding, 2010); this remarkable increase in the investment rate in fixed assets subsequently raised productivity and output, especially that of the expanding secondary sector. After 1978, a major event which deeply affected the trends in physical capital accumulation, as well as the overall path of the Chinese economy, has been the tax reform of 1994 briefly introduced in chapter 2. In the literature, many studies have conclusively confirmed the impact of tax policy on capital accumulation and investments by enterprises (see, e.g., Hall and Joergenson, 1967; Hassett and Hubbard, 1997; Cummins et al., 1996). In China, this new legal tax framework⁶⁴, besides promoting fiscal decentralization, also marked the switch from a production to a consumption-type value added tax (VAT), eliminating investments from the tax base⁶⁵. Lin (2008) postulated that the effects of this reform might increase capital and output-labor ratios. Nie et al. (2010), using a dataset

⁶⁴The tax reform was initially implemented in certain provinces of China, to be then gradually extended to the whole country.

⁶⁵Specifically, under a production-type VAT regime, investments and capital depreciation cannot be deducted from the value added, so that fixed assets and associated expenditures are taxed many times. Conversely, under a consumption-type VAT regime, when computing the tax base, the cost of capital investment can be deducted from the value added.

of over 300,000 medium-sized enterprises for the time period 1999-2005, empirically confirmed this assumption. In particular, they demonstrated that the Chinese tax reform incentivized significantly the investments of firms in fixed assets, as well as the mobility of physical capital. Overall, the total amount of investments in fixed assets⁶⁶ soared from 91 billion Yuan in 1980 to 2 trillion in 1995 and 51 trillion in 2014, when the new VAT system was already in force in the whole country. This accounted for over 80% of GDP from the beginning of the 1990s to the end of the 2000s, with real per capita GDP passing from 382 Yuan in 1978 to 46,652 Yuan in 2014 (China Data Online, 2015). Besides physical capital, the factor productivity constitutes another crucial element in explaining the dynamics of output growth, especially with reference to endogenous growth models. The recent literature on endogenous growth has further expanded the analysis on TFP, assuming that the long-run growth rate of productivity is proportional to the level of research and development (R&D) carried out in an economy⁶⁷. Nonetheless, if some empirical validation can be drawn from these models with reference to cases belonging to the American and European realities, limited contributions remain in the case of China. This can be mainly explained by the fact that the industrialization process in the PRC is relatively recent with respect to what happened in Western

⁶⁶Among other factors sustaining investments in fixed assets, an important contribution, besides high saving rates, came from the entrance of China into the WTO in 2001. Indeed, the prospects for profit by expanding exports created additional demand for investments (Walmsley et al., 2006).

⁶⁷In this context, the literature uses to subdivide between semi- and fully- endogenous growth models. Specifically, according to semi-endogenous growth models, the growth rate of productivity is driven by exogenous factors such as the population growth rate, so that policies focused on R&D result ineffective to increasing productivity growth. Conversely, fully-endogenous growth models rely on the assumption that productivity growth would depend on R&D intensity at firm level, therefore policies aimed at fostering R&D can entail positive repercussions on the growth rate (for a good summary, see Minniti and Venturini, 2017).

countries (effectively starting from the late 1980s); as a result, the dynamics of R&D policies in the PRC remains at the moment rather unclear. In the end however, if the majority of economists recognize the important role exercised by physical capital accumulation on Chinese growth, there is no similar common view concerning total factor productivity. Indeed, while for some economists the TFP has contributed to more than 30% of China's growth rate during these last few decades (see, e.g., Chow and Li, 2002; Bosworth and Collins, 2008), for others, its contribution to growth has been much more limited, with TFP growth rates below 1.5% (see, e.g., Young, 2003; Wang, 2000). The most recent contributions (see, e.g., Tian and Yu, 2012) seem to corroborate this latter hypothesis, indicating a TFP growth rate post-1978 of around 2% and a corresponding contribution rate to Chinese economic growth of approximately 20%⁶⁸. In addition, the large impact on TFP exercised by foreign direct investments before the mid-1990s, fell significantly after 1994 (Fleisher et al., 2009).

Besides physical capital, the other important factor of growth which was the object of analysis in the previous chapter is represented by human capital. With reference to education (constituting a principal determinant of human capital), as already mentioned, China has invested heavily in its educational system in the last few decades, even though many shortcomings in the quality of education still persist, as well as regional disparities among provinces (Wang and Yao, 1999). Public expenditure on education has been growing consistently since the beginning of the reform era and risen substantially over the last decade (National Bureau of Statistics of China, 2015). Of course, it is logical to assume that a higher per capita GDP is correlated to more financial resources available and willingness to

⁶⁸Some of the TFP growth rate should also be attributed, besides technical progress, to a process of reallocation of productive resources among sectors (see, e.g., Brandt and Rawski, 2002).

invest in education; indeed, the provinces with the highest level of economic growth (i.e., the Eastern provinces) are also those which have made the highest investments in education, followed, respectively, by the Inland, Northern and Western regions (see Figure 4.1⁶⁹). Moreover, gaps in the quality of education between urban and rural areas still represent today a severe issue (Wang and Yao, 1999).

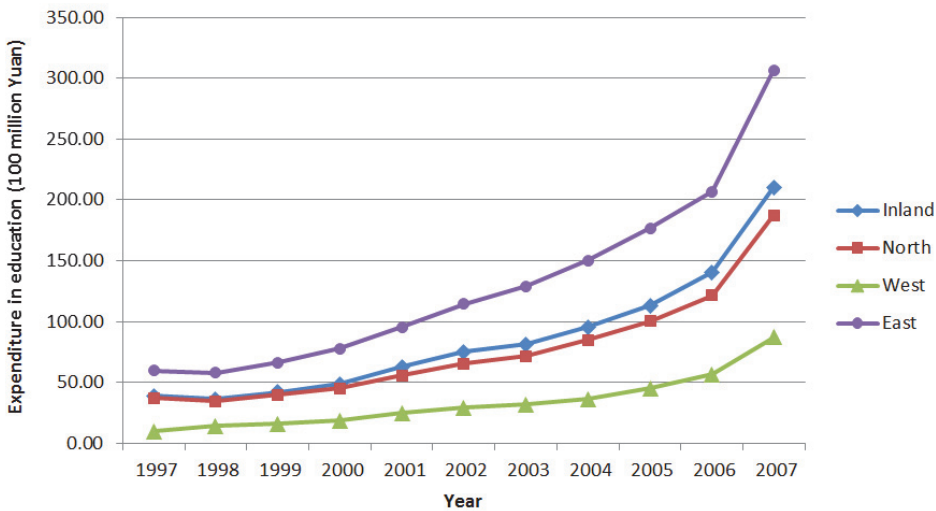


Figure 4.1: Expenditure in education, 1997-2007 (source: China Data Online, 2015).

Historically, from the establishment of the People’s Republic of China in 1949, the government was already deeply committed to eradicating illiteracy, and to extending basic education to the majority of the population; a mandatory 9-year school period was consequently put into force. By the end of the 1960s, China had reached virtually universal enrollment

⁶⁹The four regions include the following provinces: East (Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan), Inland (Shanxi, Anhui, Jiangxi, Henan, Hubei, Hunan, Guangxi, Sichuan, Chongqing, Guizhou, Yunnan, Shaanxi), North (Inner Mongolia, Heilongjiang, Jilin, Liaoning, Ningxia) and West (Gansu, Qinghai, Xinjiang). A political map of China disaggregated at provincial level is provided in Appendix E.

in primary education (Wang and Yao, 1999). Conversely, enrollment in (non-compulsory) high school education proceeded at a remarkably lower rate, remaining so up to the 1980s. It was only from the 1990s that they began experiencing a rapid and significant increase; the proportion of enrolled high school students as a portion of the total number of school-aged high school population rose from 38% in 1990, to 58% in 2000 and 89% in 2012 (World Bank, 2015). With reference to enrollment rates in higher education, they saw a very slow increase in the past decades and still stand at the lowest level; they remained consistently low throughout the 1990s and in 2013 the proportion of students enrolled in higher education over the total number of school-aged population in higher education was only around 33%. However, starting from the late 1990s, a notable increase was seen with a total enrollment rate in 2005 being 4.6 times higher than in 1998 (World Bank, 2015). As a matter of fact, since the late 1990s, China has started to invest massively in higher education as part of a broader development strategy, to improve the quality of universities and institutions of higher education (Li et al., 2011). Today, enrollment rates in high school and higher education are experiencing a rapid increase, and both secondary and tertiary education are expected to play a significant role in sustaining the economic growth process in the coming decade. Nonetheless, among the current factors limiting an efficient diffusion of human capital in terms of student mobility, we find the *hukou* system; indeed, the latter imposes a series of restrictions for students (especially graduate ones) coming from the rural areas and wishing to enroll or transfer to an urban university (Liu and Jiang, 2001).

So far, with reference to the analysis of the drivers of growth in China, spatial analysis of growth spillovers has been quite limited in the litera-

ture. Ying (2003) provides a seminal contribution in studying the effect of factors of growth at a provincial level by adopting a spatial perspective. Zhang and Felmingham (2002) detect the presence of regional spillovers in Chinese output growth from the Eastern to the Western and Central regions, and from the Central to the Western regions. Groenewold et al. (2008) adopt a VAR methodology for six regions of China; they detect the presence of intra-provincial spillovers for the South Eastern and North Eastern regions and inter-provincial spillovers originating from the North East regions. Bai et al. (2012) examine market potential in promoting regional income growth; by adopting a spatial error model, they find that this contribution is remarkable. Huang and Chand (2015) investigate and detect the presence of spatial interactions on local wages at a provincial level and find that human capital and economic growth constitute two important drivers in promoting inter-provincial spillovers on wages.

As previously stressed, this chapter aims at quantifying the impact exercised by human (and physical) capital accumulation on urban growth; moreover, the adoption of a spatial perspective, since it allows detection of the presence of potential inter- and intra-provincial growth spillovers, can provide valid insights into the correlation between factor mobility and the strength of spatial spillovers; indeed, if on the one hand the mobility of physical capital is in the end considerable, conversely the mobility of human capital remains much lower, and this is also due, as already stressed, to the current *hukou* system, which restricts rural-to-urban migration and hence the mobility of workers and students (within and among provinces). In performing this analysis, this chapter further provides additional contributions to the literature. This is carried out in three main ways. Firstly, it extends the analysis of previous studies, such as Ying (2003) and Zhang

and Felmingham (2002), considering a time horizon from 1995 to 2013, in order to analyze the contribution of the factors of accumulation to growth following the tax reform until these more recent years. A time lag of one year for the tax reform seems reasonable; as previously stressed, this event exercised a significant impact in accelerating economic growth and capital accumulation (especially for investments in fixed assets), thus marking a sort of discontinuity with respect to the initial phase of economic reforms initiated in 1978. Secondly, it aims to assess the impact on growth of physical capital accumulation by disaggregating into secondary and tertiary sectors of the economy (such a subdivision was not present in the most recent studies such as, e.g., Bai et al. (2012); Ouyang and Fu (2012)), to verify whether there is a gap in the spillover effects originating from the two sectors. To compute estimates for physical capital, one of the most recent methodologies which was developed by Wu (2009) is adopted. This approach, which computes different capital estimates for each of the three sectors in China, also allows for different depreciation rates for each sector, thus overcoming the issue in the existing literature of assuming *ad hoc* rates of depreciation (see, e.g., Wang and Yao, 1999; Chow and Li, 2002; Peng and Hong, 2013). Finally, it decomposes the output controlling for potential capital dependence on productivity. In the current literature, a widely used aggregate production function for the study of Chinese growth has been the classical Cobb-Douglas functional form (e.g., Tian et al., 2010; Su and Liu, 2016; Scherngell et al., 2014; Fleisher et al., 2011). However, performing the growth accounting using that particular decomposition might create some confusion, in that part of the accumulation of physical capital is provoked by total factor productivity. Therefore, in order to avoid such an issue and derive a more accurate estimate for

the contribution to growth of physical capital, the accounting is carried out following a slightly different approach (see, e.g., Jones, 2015; Young, 2003), decomposing in terms of physical capital-output ratio.

The rest of the chapter is organized as follows. Section 4.2 provides a description of the data and the empirical methodology. Section 4.3 analyzes the econometric results. Finally, section 4.4 concludes.

4.2 Data and empirical strategy

The data sources used for this analysis come from the China Statistical Yearbook, the National Bureau of Statistics of China and China Data Online. A panel data of 30 Chinese provinces is used (excluding the two special administrative regions of Hong Kong and Macau, and the autonomous region of Tibet because of lack of data). The time horizon covers 19 years, from 1995 to 2013. Considering capital accumulation in the secondary and tertiary sectors, these two sectors, in 2014, absorbed together 90.8% of the Chinese GDP (National Bureau of Statistics of China, 2015). In particular, the value of the secondary sector as a share of GDP remained high and relatively constant in the past two decades, growing from 46.7% in 1995 to 46.9% in 2005, to slightly decrease at 42.6% in 2014. On the other hand, the tertiary sector is the one which has increased the most, passing from 33.7% in 1995 to 41.4% in 2005, to 48.2% in 2014, thus surpassing the secondary sector as the major component of GDP. Conversely, the role of the primary sector has been decreasing drastically; in 1995 it represented almost 20% of GDP, but its share dropped to 11.7% in 2005 and to 9.2% in 2014 (National Bureau of Statistics of China, 2015). Because of the low impact on GDP of the primary sector, the latter is excluded from the analysis, considering only the secondary and tertiary sectors.

Human capital represents the other important driver of growth. A good proxy utilized for the estimates of human capital is represented by the years of schooling. Some seminal contributions of spatial analysis on Chinese growth (see, e.g., Ying (2003)) did not provide proper estimates for human capital, since they conversely used enrollment rates in education. For correct estimates of human capital, it is good practice to take into account the average years of education (stock variable), rather than the school enrollment rates (flow variable) (see, e.g., Mankiw et al., 1992). Moreover, when utilizing enrollment rates, it is difficult to capture the impact on growth in the short term, since the process usually requires several lags (Bassanini and Scarpetta, 2002). Finally, when using average years of education, reverse causality issues are less severe (Temple, 2000). For these reasons, in the analysis, the average years of education of the labour force are utilized as a proxy for the human capital. The China Statistical Yearbooks provide the proportion of workers by education level for the years 1998, 1999 and 2000. The number of workers with secondary and tertiary education for the remaining years is estimated by taking into account the yearly number of graduates for each educational attainment level. In order to avoid double counting, the number of workers with secondary high school diploma after 2000 is purged of the number of workers belonging to a specific year who continued with higher education, following a procedure similar to Wang and Yao, 1999. The same logic applies for workers who concluded their educational path after middle school.

Descriptive statistics for physical and human capital are provided in Table 4.1.

Table 4.1: Descriptive statistics.

	Capital stock in the secondary sector ^a					Capital stock in the tertiary sector ^a					Average years of education				
	Mean	St.Dev	Max	Min		Mean	St.Dev	Max	Min		Mean	St.Dev	Max	Min	
1995	East	3422	1896	6574	660	5220	2884	10631	1200		8.8	0.8	10.6	7.9	
	Inland	1863	921	3860	663	2045	1148	4836	685		7.9	0.4	8.6	7.3	
	North	1992	1271	3791	472	1655	1305	3754	436		8.6	0.4	8.9	8.1	
2001	West	1331	921	2306	475	900	633	1556	293		7.8	0.7	8.5	7.2	
	East	6977	4493	13539	789	11042	5686	19539	1860		9.1	1.1	10.6	8.1	
	Inland	3032	1595	6210	1160	4694	2023	8583	1763		8.2	0.5	8.9	7.2	
2007	North	2865	1857	5606	678	3044	1973	6012	793		8.7	0.4	9.1	8.2	
	West	2079	1346	3494	814	1744	1129	2861	602		8.2	0.7	9.0	7.8	
	East	13724	10059	31187	1067	21364	10122	36217	3045		9.1	0.9	10.6	8.2	
2013	Inland	5682	2701	10653	2683	10585	3811	17558	4303		8.3	0.6	9.3	7.3	
	North	6224	4256	13002	1235	7564	4402	14198	1799		9.1	0.4	9.4	8.5	
	West	3400	2092	5593	1425	3895	2427	6231	1385		8.4	0.7	9.2	8.0	
2013	East	34946	25248	78234	1935	50413	21848	85236	6401		9.1	0.7	11.0	8.4	
	Inland	15829	7975	29437	6112	29993	10828	52948	9824		8.8	0.6	9.9	7.6	
	North	20749	14253	42856	3012	25054	13871	41845	4564		9.3	0.2	9.6	8.9	
	West	6978	3973	10934	2987	9311	5734	15059	3589		8.8	0.5	9.3	8.4	

^a100 million Yuan in 2000 constant prices.

The most straightforward approach to estimate the production function is:

$$Y_{it} = A_{it} K_{iS,t}^{\alpha} K_{iT,t}^{\beta} H_{it}^{1-\alpha-\beta} \quad (4.1)$$

where Y_{it} is the output (real GDP), $K_{iS,t}$ the physical capital in the secondary sector of the i^{th} province, $K_{iT,t}$ the physical capital in the tertiary sector, H_{it} the stock of human capital of the labour force, and A_{it} the total factor productivity⁷⁰. However, as mentioned above, this expression for the production function, although being the most immediate one, presents the main drawback that part of the accumulation in the level of physical capital can be attributed to growth in total factor productivity. Therefore, it becomes more appropriate to separate the contributions provided by capital and total factor productivity. To this end, divide expression (4.1) for $Y_{it}^{\alpha+\beta}$ and solve for Y_{it} . Then, divide both sides of the equation for L_{it} to obtain:

$$\frac{Y_{it}}{L_{it}} = A_{it} \left(\frac{K_{iS,t}}{Y_{it}} \right)^{\alpha} \left(\frac{K_{iT,t}}{Y_{it}} \right)^{\beta} \frac{H_{it}}{L_{it}} \quad (4.2)$$

In this specification, output per worker $\frac{Y_{it}}{L_{it}}$ derives from capital-output ratio, $\frac{K_{iS,t}}{Y_{it}}$ and $\frac{K_{iT,t}}{Y_{it}}$, human capital per worker, $\frac{H_{it}}{L_{it}}$, and total factor productivity, A_{it} , and the capital-output ratio is proportional to the investment rate. Finally, L_{it} represents the total labor force of the economy.

To estimate the values of the capital stocks, the method developed by Wu (2009) is utilized:

⁷⁰Following Tian and Yu (2012), in the framework used in this analysis, the TFP is simply treated as the portion of output which is not explained by the input factors in the production function.

$$K_{iq,t} = \sum_0^t (1 - \delta_{iq})^k \Delta K_{iq,t-k} + K_{iq,0} (1 - \delta_{iq})^t \quad (4.3)$$

where $K_{iq,t}$ is the real value of the capital stock of the $q = S, T$ (secondary and tertiary, respectively) sector of the economy for province i in the year t , $\Delta K_{iq,t-k}$ the real value of the increment in the level of capital stock, δ_{iq} the level of depreciation (specific for each province and sector) and $K_{iq,0}$ the initial capital stock. The latter is obtained from $K_{iq,0} = \Delta K_{iq,1} / (\delta_{iq} + g_{iq})$, the term at the numerator representing the incremental capital stock at period 1, the denominator containing the depreciation rate of capital stock from period 0, and g_{iq} the rate of growth of the newly generated capital stock. To take into account the effect of inflation, the capital estimates are then deflated for a sector-specific price index for Chinese provinces $P_{iq,t}^{con} = I_{iq,t}^{cur} / I_{iq,t}^{con}$, where $P_{iq,t}^{con}$ is the price index for each region and sector in 2000 constant prices, $I_{iq,t}^{cur}$ the income in current prices and $I_{iq,t}^{con}$ the income in 2000 constant prices. $I_{iq,t}^{con}$ is defined as $I_{iq,t}^{con} = I_{iq,0}^{cur} \prod_0^t (1 + r_{iq,k})$, where $r_{iq,k}$ represents the real rate of growth of income in the q sector for the i province in the k^{it} year, and $I_{iq,0}^{cur}$ the initial income at current prices for the starting period.

For the human capital, the saving rate is assumed to be determined exogenously by governmental policies and individual preferences. Subsequently, the dynamics for human capital take the following form:

$$H_{it} = S_h Y_{it} - \theta H_{it-1} \quad (4.4)$$

where S_h represents the average fraction of income invested in human capital and θ is the depreciation rate.

Rewrite now output per worker, capital output ratios and human cap-

ital per worker as y_{it} , $k_{iS,t}$, $k_{iT,t}$ and h_{it} respectively. From this, the empirical model can be written as:

$$y_{it} = \alpha_0 + \alpha_1 k_{iS,t} + \alpha_2 k_{iT,t} + \alpha_3 h_{it} + \mu_i + \eta_t + \epsilon_{it} \quad (4.5)$$

$$i = 1, \dots, N; \quad t = 1, \dots, T$$

where μ_i and η_t represent province-specific and time-period fixed effects respectively, with $N = 30$ and $T = 19$. A two-way fixed effects model is adopted, firstly to control for time-invariant characteristics specific for each province; indeed, in the case of omission of time-invariant specific effects, the regression estimates could suffer of bias due to potential correlation between the province specific characteristics and the regressors. Similarly, to control for potential time shocks affecting the provinces, time fixed effects are used. All the variables are expressed in logarithmic form, therefore the coefficients are interpreted as elasticities. Because of the potential presence of spatial interaction among provinces, non spatial ordinary least square (OLS) and fixed effects (FE) estimations could suffer from omitted variable bias. In order to overcome this potential issue, both non-spatial and spatial econometric specifications are tested; spatial analysis can be conducted in several ways, primarily on the basis of the interactions between the dependent and the independent variables. For the analysis, the principal spatial econometric techniques can be derived from this general form:

$$y_{it} = \rho \sum_{j=1}^N W_{ij} y_{jt} + \beta x_{it} + \gamma \sum_{j=1}^N W_{ij} x_{jt} + \mu_i + \eta_t + \phi_{it} \quad (4.6)$$

$$\phi_{it} = \lambda \sum_{j=1}^N W_{ij} \phi_{jt} + \xi_{it}$$

$$\xi_{it} \sim \text{i.i.d.}(0, \sigma^2 \mathbf{I})$$

where ρ is the scalar spatial autoregressive parameter of the dependent variable and x_{it} is the matrix of observations of all the regressors in the right hand side of equation (4.5). β is the column vector of the regression coefficients and γ the scalar spatial autocorrelation parameter of the independent variables. W_{ij} represents the spatial weight matrix (whose entries are constituted by the spatial weights w_{ij}), which catches the geographical interactions among provinces; in particular, the term $\sum_j W_{ij} y_{jt}$ captures the spatial interaction between the value of the dependent variable at time t of province i , with the value of the dependent variable at time t of the neighbouring province j (the so called *neighbouring effect*). In a similar fashion, $\sum_j W_{ij} x_{jt}$ captures the spatial dependence of the values of each independent variable of province i with the corresponding values of each independent variable of the neighbouring province j . μ_i and η_t denote, respectively, individual-specific and time-specific fixed effects. Finally, $\sum_j W_{ij} \phi_{jt}$ captures the spatial province interaction within the error terms, with ξ_{it} assumed to be independent and identically distributed, with zero mean and constant variance. For the choice of the spatial weight matrix, W , a three-step strategy is employed. Firstly, a threshold distance \bar{D} is identified, beyond which there is no more direct spatial interaction among spatial units. Secondly, distance decay is modeled as the inverse of the distance among spatial units. Finally, W is row-normalizing to obtain a better interpretation of the parameters (see, for instance, Alderighi and Baudino, 2015), which is:

$$\hat{w}_{ij} = \frac{w_{ij}}{\sum_{j \in \Gamma(i)} w_{ij}}$$

where $D(i, j)$ is the distance between i and j and $\Gamma(i) \equiv \{j | 0 < D(i, j) < \bar{D}\}$ the set of neighbouring provinces which are at a distance lower than \bar{D} ; and

$$w_{ij} = \begin{cases} 0 & \text{if the provinces } i \text{ and } j \text{ are not neighbours} \\ 1/D(i, j) & \text{otherwise} \end{cases}$$

Depending on the restrictions set on the parameters of equation (4.6), it is possible to utilize different spatial econometric approaches. The first specification, the spatial autoregressive model (SAR), is obtained by setting $\gamma = 0$ and $\lambda = 0$:

$$y_{it} = \rho \sum_{j=1}^N W_{ij} y_{jt} + \beta x_{it} + \mu_i + \eta_t + \xi_{it} \quad (4.7)$$

This model assumes that the value of the dependent variable detected at a specific location is influenced by a weighted average of the other neighbouring dependent variables. In the case object of analysis, This would imply that the level of GDP per worker in province i is influenced by the level of GDP per worker in province j . Because of potential bias due to error autocorrelation (given the presence of the dependent variable in the right hand side of equation (4.7)), the ordinary least square (OLS) estimation might lead to biased estimates. A solution to this problem is to utilize maximum likelihood (ML) estimation procedures (Smirnov and Anselin, 2001; Lee, 2004; Anselin, 1988).

The second specification, the spatial error model (SEM), is derived by setting $\rho = 0$ and $\gamma = 0$. In this case, the spatial effect derives solely from the spatial autocorrelation of the error terms:

$$y_{it} = \beta x_{it} + \mu_i + \eta_t + \phi_{it} \quad (4.8)$$

$$\phi_{it} = \lambda \sum_{j=1}^N W_{ij} \phi_{it} + \xi_{it}$$

This model relates to a case where a non observable shock in province i is conditioned by non observable shocks in the neighbouring provinces. Finally, the third case refers to the spatial Durbin model (SDM), and it occurs when introducing as the only restriction $\lambda = 0$:

$$y_{it} = \rho \sum_{j=1}^N W_{ij} y_{it} + \beta x_{it} + \gamma \sum_{j=1}^N W_{ij} x_{ij} + \mu_i + \eta_t + \xi_{it} \quad (4.9)$$

Following LeSage and Pace (2009), it is possible to subsequently test whether to simplify the Durbin model into a spatial autoregressive model (under the null hypothesis $H_0 : \gamma = 0$) or into a spatial error model (under the null hypothesis $H_0 : \gamma + \rho\beta = 0$, with $\lambda \neq 0$). Both tests follow a chi-squared distribution.

If both null hypotheses are rejected, then the Durbin model provides the best fit to the data. Otherwise, if the first null hypothesis is not rejected, it can be affirmed that the spatial autoregressive model provides the best description for the data, whereas if the second null hypothesis is not rejected, the spatial error model provides the best fit to the data.

4.3 Estimation results

4.3.1 Non-spatial estimates

The estimates for the non-spatial panel data model are reported in Table 4.2. Columns from (1) to (3) report the estimation results for province-

specific fixed effects only, time-period fixed effects only, and two-way fixed effects (i.e., both province-specific and time-period fixed effects), respectively.

Table 4.2: Non-spatial estimates.

Dep. var.:	Province-specific fixed effects	Time-period fixed effects	Two-way fixed effects
<i>GDP per worker</i>			
<i>Phys. capital</i> (secondary sector)	0.620*** (0.1826)	0.114*** (0.0330)	0.076** (0.0383)
<i>Phys. capital</i> (tertiary sector)	0.737*** (0.1547)	0.522*** (0.0544)	0.150*** (0.0456)
<i>Human capital</i>	-0.197* (0.0740)	0.122*** (0.0312)	0.104*** (0.0307)
σ^2	0.037	0.056	0.008
Adjusted R^2	0.953	0.928	0.987
Log-likelihood	149.029	22.781	602.219
Sample	570	570	570
LM spatial lag	415.162***	178.399***	0.765
LM spatial error	96.839***	66.572***	0.000
Robust LM spatial lag	325.555***	112.010***	4.302**
Robust LM spatial error	7.232***	0.183	3.537*

Notes: all variables are expressed in natural logarithms. The levels of significance are * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$. Robust standard errors in parentheses.

To test whether province-specific and time-period fixed effects are jointly significant, a likelihood-ratio (LR) test is performed. The null hypothe-

sis of the joint insignificance of time fixed effects is rejected (906.38 , 19 degrees of freedom, $p < 0.01$), as well as the null hypothesis of the joint insignificance of province fixed effects (1158.88, 30 degrees of freedom, $p < 0.01$). These results thus imply the inclusion in the model of both province and time fixed effects. Furthermore, a Hausman test is conducted to determine the correct panel model specification between random and fixed effects. The results of the test (57.41, 21 degrees of freedom, $p < 0.01$) suggest that the fixed effects form constitutes a more suitable specification. In the light of these tests, it can be assumed that, among the three model specifications, the two-way fixed effects estimation in column 3 holds the greatest explanatory power. Furthermore, all the variables show positive and significant explanatory power⁷¹.

As already stressed, non-spatial estimates could, however, suffer from omitted variable bias for not including in their regression the spatial components. Consequently, a start can be made by identifying the threshold distance beyond which spatial effects fade. In doing so, a series of diagnostics is performed using the Moran's I test for spatial autocorrelation among the provinces. The Moran's I index for the variable Y at time t is:

$$I = \frac{\sum_i \sum_j w_{ij} (Y_i - \bar{Y})(Y_j - \bar{Y})}{S^2 \sum_i \sum_j w_{ij}} \quad (4.10)$$

where $S^2 = \frac{1}{n} \sum_{i=1}^n (Y_i - \bar{Y})^2$ and $\bar{Y} = \frac{1}{n} \sum_{i=1}^n Y_i$. Y_i and Y_j denote the observed value of real GDP in province i and j respectively.

From the results of Table 4.3, the strongest pattern of spatial autocor-

⁷¹In addition, in order to cope with the potential problem of reverse causality, a Granger causality test is performed on equation (4.5). The null hypotheses that physical and human capital do not Granger cause output are both rejected at a significance level of 5%. Conversely, the null hypothesis that output does not Granger cause physical and human capital cannot be rejected.

Table 4.3: Diagnostics for spatial dependence on China’s provincial real GDP (1995-2013).

	\bar{d} (km)	p-value	z-value	Moran’s I
W-1	800	0.128	0.995	0.070
W-2	900	0.111	1.186	0.077
W-3	1000	0.019	2.364	0.126
W-4	1100	0.027	2.180	0.106
W-5	1200	0.041	2.013	0.079
W-6	1300	0.031	2.181	0.105
W-7	1400	0.035	2.111	0.097
W-8	1500	0.037	2.133	0.083
W-9	1600	0.037	2.090	0.072
W-10	1700	0.040	1.894	0.063

relation is detected for a threshold distance of 1,000 kilometers, therefore $W - 3$ is chosen as spatial weight matrix. Subsequently, to assess whether a spatial approach would constitute a better solution to the non-spatial models of Table 4.2, a series of standard and robust Lagrange-Multiplier (LM) tests is performed for a spatially lagged dependent variable and for spatial error autocorrelation in a fixed effects panel data model, following the procedure of Debarsy and Ertur (2010). When using the classic LM test, the null hypotheses of no spatially lagged dependent variable and no spatially autocorrelated error terms are strongly rejected at 1% level for each of the specifications with the exception of including both province and time-fixed effects. Conversely, when considering the robust LM tests, the null hypothesis of no spatially lagged dependent variable is strongly rejected for all the model specification forms at 1% level (and at 5% level if considering both province and time fixed effects). On the contrary, the null hypothesis of no spatially autocorrelated error terms is strongly rejected

at 1% level only for the province-fixed effects, while it stands at 10% for both province and time fixed effects and cannot be rejected for the time fixed effects alone. These test diagnostics suggest that a SAR model would constitute a better fit than a non-spatial model, since the results provide consistent rejections of the hypothesis of no spatially lagged dependent variable among all the specification forms. On the other hand, given the results obtained, a model specification with spatially autocorrelated error terms remains doubtful.

4.3.2 Spatial estimates

Inferring from the results of the LM tests that the spatial specification form constitutes a better fit compared to the non-spatial forms, it becomes necessary to test which spatial form is more appropriate. The likelihood-ratio test is used to assess whether the Durbin model can be simplified into a spatial autoregressive or spatial error model; this procedure is carried out by testing the two null hypotheses specified earlier for the Durbin model which simplify the SDM into a SAR and SEM model respectively. The results of the likelihood-ratio tests do not lead to reject the first null hypothesis: $H_0 : \gamma = 0$, but to reject the second null hypothesis: $H_0 : \gamma + \rho\beta = 0$ (93.26, 3 degrees of freedom, $p < 0.01$). This implies that the SAR model provides a better fit for the data compared to the SDM and SEM models, hence the spatial autoregressive model is used when performing a sensitivity analysis. Table 4.4 reports the spatial ML estimates for the SAR, SEM and Durbin models, all with fixed effects. For completeness, the SAR model with random-effects (SAR-RE) is also reported.

Table 4.4: Spatial estimates.

Dep. variable:	SEM	SDM	SAR-FE	SAR-RE
<i>GDP per worker</i>				
<i>Physical capital</i> (secondary sector)	0.139*** (0.0305)	0.133*** (0.0304)	0.136*** (0.0275)	0.140*** (0.0277)
<i>Physical capital</i> (tertiary sector)	0.123*** (0.0205)	0.144*** (0.0230)	0.143*** (0.0226)	0.157*** (0.0233)
<i>Human capital</i>	0.045** (0.0239)	0.061** (0.0241)	0.063*** (0.0231)	0.068* (0.0232)
<i>W * Physical capital</i> (secondary sector)		0.030 (0.0586)		
<i>W * Physical capital</i> (tertiary sector)		-0.033 (0.0322)		
<i>W * Human capital</i>		0.109* (0.0624)		
rho		0.745*** (0.0327)	0.765*** (0.0164)	0.751*** 0.0170
lambda	0.964** (0.0051)			
σ^2	0.008	0.007	0.007	0.008
Adjusted R^2	0.926	0.976	0.977	0.977
Log like	523.432	570.062	567.771	474.243
Sample	570	570	570	570

Notes: all variables are expressed in natural logarithms. The levels of significance are * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors in parentheses.

In the light of all the diagnostics performed, it becomes necessary to concentrate on the SAR-FE model. The results obtained in the spatial analysis are a good reflection of the expected theoretical assumptions, since all the regressors show a positive and significant impact on GDP per worker. From the estimates it can be observed how an increase of 10 percentage points in the capital-output ratio in the secondary sector leads, *ceteris paribus*, to a positive and significant increase of 1.36% in GDP per worker, whereas the same increase of 10 percentage points involving the tertiary sector leads to a positive and significant increase of GDP per worker of 1.43%; thus, the effect is slightly more pronounced. Concerning human capital, a 10% increase in the share of human capital per worker leads to an increase of 0.63% in GDP per worker. With reference to the interpretation of the spatial coefficients, since the value of ρ (the coefficient of the spatially lagged dependent variable) is positive and significant, the spatial results of Table 4.4 may not provide accurate estimates for the coefficients (LeSage and Pace, 2009); indeed, using the point estimates of Table 4.4 for the interpretation of spatial spillovers may lead to erroneous conclusions since the spatial estimates might differ substantially depending on the model specification used. Following LeSage and Pace (2009), in order to reduce the divergence in the estimates from different model specifications and to provide a better interpretation for the spatial spillovers, it becomes necessary to apply partial derivative measures; the latter allow both the direct and indirect spatial impacts of factor inputs on GDP per worker to be derived. That is, a change in a value related to a particular regressor in a certain province will affect both the response variable of the same province (*direct effect*) and the response variables of neighbouring provinces (*indirect effect*). The indirect effects are particularly

important, since they capture the inter-provincial spillover effects exercised by human and physical capital accumulation on GDP per worker in neighbouring provinces (whereas the direct effects capture intra-provincial growth spillovers). The sum of the direct and indirect effects is defined as the *total effect*. The estimates of the SAR-FE model for the total, direct and indirect effects are reported in Table 4.5. The discrepancy between the spatial estimates from the direct effects and those deriving from Table 4.4 is due to the presence of feedback effects originating from the spatially lagged dependent variable ($\rho \sum W_{ij}y_{it}$). These feedback effects emerge as a consequence of impacts passing through neighbouring regions and back to a region itself (Debarsy et al., 2012). In other words, a positive difference in the impact of a certain regressor between the direct effects and the standard SAR-FE estimation indicates a positive neighbouring feedback, in the sense that marginal increases in that regressor in the neighbouring provinces of a particular province lead to a positive impact on its own level of GDP per worker in that province. That is to say, comparing Table 4.4 with Table 4.5, if a province increases its own level of capital-output ratio in the secondary sector by 10 percentage points, then it obtains a more responsive effect on its own level of GDP per worker (1.51%) compared to the standard SAR-FE estimation (1.36%), given the positive spatial feedback effects deriving from neighbouring provinces. On the other hand, the indirect effects capture the effect of spatial spillovers propagating in neighbouring provinces; for instance, still considering Table 4.5, an increase of 10 percentage points in the level of capital-output ratio in the secondary sector in a certain province will lead to an increase in GDP per worker of neighbouring provinces of 4.26%.

The results of Table 4.5 indicate positive and strongly significant val-

Table 4.5: Total, direct and indirect spatial effects of the SAR-FE model.

Dep. variable: <i>GDP per worker</i>	Total effect	Direct effect	Indirect effect
<i>Physical capital (secondary sector)</i>	0.576*** (0.0970)	0.151*** (0.0255)	0.426*** (0.0738)
<i>Physical capital (tertiary sector)</i>	0.613*** (0.0809)	0.161*** (0.0263)	0.452*** (0.0572)
<i>Human capital</i>	0.270** (0.1060)	0.070*** (0.0262)	0.200** (0.0802)

Notes: all variables are expressed in natural logarithms. The levels of significance are $*p < 0.10$, $**p < 0.05$, and $***p < 0.01$. Standard errors in parentheses.

ues at a 1% level for the direct effects for all the regressors. In making a comparison between the estimates of the SAR-FE model in Table 4.4 and those of the direct effects in Table 4.5, it can be noted how the latter show higher values for all the variables compared to the former. Considering the indirect effects, all the variables present positive and strongly significant values at 1% level, with the exception of human capital per worker, whose level of significance stands at 5%. Overall, from Table 4.5, significant and positive intra- and inter-provincial spillovers emerge for both physical and human capital, although being more pronounced for physical capital. Another interesting fact emerging from Table 4.5 is that compared to the secondary sector, physical capital accumulation in the tertiary sector displays higher direct and indirect effects, but the gap with the secondary sector, in both cases, is minimal. Consequently, an increase in the accumulation rate of physical capital either in the secondary or tertiary sector in a province will lead to an almost equal increase in its own level of GDP per worker and in the level of GDP per worker of neighbouring provinces. From a policy perspective, without taking into consideration the spatial

components and solely focusing on the non-spatial results, a policy maker could adopt inaccurate measures. For instance, given a 10% increase in the level of capital-output ratio in the tertiary sector which leads to a lower increase in GDP per worker in the two-way FE non-spatial model compared to the total spatial effect (1.50% against 6.13% respectively), the policy maker could wrongly underestimate the impact on growth of physical capital accumulation in the tertiary sector.

4.4 Final remarks on chapter 4

This chapter has investigated the contribution exercised by human and physical capital (the latter disaggregated at sector level) on Chinese economic growth over the last two decades. During this period, the positive impact of both human and physical capital on GDP has increased vigorously, whereas the contribution of TFP has decreased; this illustrates the fact that the growth of China in these recent decades has been mainly driven by factor inputs (Tian and Yu, 2012). The accumulation of physical capital, as well as its mobility level, have been strongly stimulated by the tax reform of 1994, which allows for the deduction of the cost of capital investment from the value added. With reference to human capital, despite the fact that the massive investments in education since the beginning of the new century by the central government have contributed to raising its total level, conversely, the restrictions imposed by the *hukou* system have produced the opposite effect. Eventually, from the analysis, capital accumulation in both the secondary and tertiary sector presents a strong and positive impact on GDP per worker, as well as positive and significant spatial spillovers. In comparing the two sectors, despite the higher amount of investments (in absolute terms) in the tertiary sector during

these last decades, the coefficients on the total effects for the secondary and tertiary sectors present a reduced gap. With respect to previous spatial econometric studies which focussed the analysis on the two decades which immediately followed the beginning of the reform era in 1978 (e.g., Ying, 2003), overall physical capital accumulation appears now to have a much deeper impact on GDP per worker, with more than two thirds of this deriving from indirect effects, thus confirming the presence of strong inter-provincial spillovers. This finding might also be corroborated by recent studies (e.g., Fleisher et al., 2010; Zeng, 2011) which have highlighted the emergence and development of inter-provincial industrial clusters among enterprises that have grown substantially particularly since the beginning of the new century. An additional source for intra- and inter-provincial spillovers among firms could also be detected from the development of new economic zones, whose relevance and contribution to China's economic growth started to increase after the mid-'90s (Zeng, 2011). With reference to human capital, its impact on per capita GDP, although quite relevant, still remains rather lower compared to physical capital. However, given the positive results, the econometric estimates can provide an empirical confirmation of some recent trends discussed above and theoretical assumptions expressed in the literature; firstly, the average level of education in China is increasing rapidly thanks to the consistent rises in governmental expenditure on education since the beginning of the new century. Secondly, an important source of spillovers can be attributed to the growing emergence and development of interactions among government, institutions of education and enterprises among regions (see, e.g., Kroll and Liefner, 2008; Sunami, 2002). In addition, the role of universities in promoting the diffusion of knowledge and technology within provinces is

acquiring more relevance (Tang, 2010). Nonetheless, some rigidities still hinder the process of human capital diffusion, such as the inadequate financial subsidies and autonomy provided to university researchers (Liu and Jiang, 2001), and, above all, the still current limitations on mobility imposed for workers and researchers coming from rural areas by the *hukou* system. As stressed, this legal tool undoubtedly represents today the principal obstacle for a sustained and efficient increase in the total rate of human capital accumulation⁷².

To sum up, compared to the first phase of economic reforms, these findings suggest a stronger and significant evolution in the process of marketization and development of intra- and inter-provincial growth spillovers, such as technological and knowledge diffusion, and capital mobility. For policy makers, taking into account and exploring the path of these increasing spatial interactions should undoubtedly lead to a better understanding of the ongoing process of Chinese economic growth and to the formulation of better policy strategies; above all, the results of this analysis provide a valid empirical evidence that the spatial diffusion of human capital spillovers has not yet reached a satisfactory level and therefore a

⁷²The *hukou* system could ultimately be considered as a reflection of the efficiency level of Chinese institutions. An additional expansion of the empirical investigation carried out in this chapter could have taken into account the role exercised by institutions on long-term growth. As a matter of fact, the role exercised by institutions on long-term growth has been constituting an important matter of debate among scholars. A strand of literature has supported this hypothesis, claiming that institutions affect growth not only through physical capital and TFP, but also through human capital (Moretti, 2004; Caselli, 2005). Acemoglu et al. 2014, for instance, using cross-country regressions to evaluate the impact on long-term development for a sample of 62 countries, show that focusing on human capital while controlling for institutions (proxied by the World Bank Law index), leads to more robust and consistent results. Nonetheless, despite all the most recent contributions, these mechanisms still appear rather unclear, also in the light of many potential methodological errors (ranging from bad control methods to serious endogeneity concerns). Furthermore, the application of these empirical studies on the Chinese case remains virtually non-existent, also in the light of some profound differences between the Chinese and the Western realities.

reform of the *hukou* system would undoubtedly help to raise the level of mobility of students and of the labour force within and among provinces, thus increasing the magnitude of human capital spillovers and hence its total impact on growth.

Chapter 5

Conclusion

This thesis has provided a legal and economic analysis of rural-to-urban migration in the PRC, trying to shed some light on three major issues related to this phenomenon; firstly, which are the main flaws of the institutional frameworks regulating the current socio-economic conditions in both the urban and rural areas; secondly, what are the repercussions provoked by rural-to-urban migration on growth, urbanization and congestion costs inherent in the urban areas; thirdly, what has been the attitude of the authorities in regulating and affecting migration. Given the notable influence exercised by rural-to-urban migration on the socio-economic context of Chinese cities, implementing the right regulatory policies becomes crucial in order to achieve two principal goals; firstly, to reach long-term sustainable urban economic growth; secondly, to incentivize an equality of treatment between rural migrants and urban citizens. Indeed, if on the one hand rural migrants have proven to positively contribute to the urban economy, on the other hand they have been suffering discrimination compared to urban citizens. Overall, the issue of Chinese rural-to-urban migration remains particularly complex; this thesis has tried to provide a deeper understanding and comprehension of this important phenomenon.

The next section summarizes the findings and insights emerging from chapters 2, 3 and 4. Section 5.2 subsequently provides concluding remarks and final policy recommendations. Finally, section 5.3 gives some suggestions for future research.

5.1 Summary of findings

5.1.1 Insights from Chapter 2

Chapter 2 introduced the topic of rural-to-urban migration in China, discussing and evaluating the main legal and institutional frameworks regulating and affecting this complex phenomenon; one of the major aims of this chapter was to find out what are the main flaws and inefficiencies related to these frameworks. The first important legal framework affecting migration is represented by the HRS. It has been shown that the HRS have contributed to raising the standard of living of rural workers compared to the previous pre-reform period; nonetheless, today the HRS still presents many inefficiencies which curtail the level of well-being in the countryside, therefore pushing many rural workers to migrate to the urban areas. Among these inefficiencies it is possible to find, first of all, the way according to which land has to be allocated among peasants. Indeed the HRS legal framework establishes that land has to be allocated based on household size and not on the level of a household's productivity; this can clearly lead to situations where inefficient rural workers possess more land per capita than efficient ones. Secondly, the HRS does not allow peasants to transact their land, in this way distorting an efficient redistribution of the plots. Thirdly, when land has to be allocated to rural workers, the entire negotiation is carried out by village authorities and rural workers

cannot participate in the process; this can subsequently lead to cases of corruption and abuse. Fourthly, the HRS does not specify any precise form for contracts concerning the sale of crops; as a consequence, the majority of peasants continue to stipulate contracts verbally and this leads to an increase in enforcement costs and contentious situations. Finally, since rural workers cannot use their land as collateral (because they do not enjoy possession over it), financial institutions are reluctant to enter the rural market and this creates bad financial repercussions among peasants. As stressed, all these issues clearly contribute to lower the well-being of inhabitants in the countryside, pushing many rural workers to migrate to the cities. The other legal framework affecting the condition of rural citizens is represented by property rights. Due to the double nature of the Chinese social reality, embedded in both socialist and liberal features, an exhaustive definition of property rights has never been provided by the authorities. It was only with the entry into force of the new constitution of 1982 and, especially, with the 2007 law on property rights, that the government contributed to bring some clarity to the matter. Moreover, important developments in the definition of usufructuary and security rights involving both citizens and enterprises have also been accomplished. Nowadays both urban and rural citizens enjoy ownership over some “*exclusive parts*” of their house, but are restricted from the ownership of the land, which always remains in the public domain. Despite these legal improvements, the principal flaw in property rights remains the lack of juridical protection against land expropriation in rural areas. If on the one hand the appropriation of land for public interest is less likely to happen in urban areas, on the other hand it constitutes a common procedure in many rural areas of China. As a matter of fact, in the cities the process of land expropriation

is transparent and directly supervised by central authorities; the latter always provide a fair monetary compensation to the individuals affected by land expropriation. Conversely, in the countryside, the same process is carried out by local authorities in conjunction with village cadres, and the supervision of the central authority is virtually absent. Because of this, rural dwellers affected by land expropriation often suffer cases of abuse and unequal monetary compensation; this clearly represents an additional factor behind the decision to migrate of rural workers. The last important legal tool analyzed in this chapter is the *hukou* system, which constitutes the main juridical instrument to control rural-to-urban migration. Established in the period following the Communist revolution, the *hukou* is still in force nowadays, imposing a series of requirements and quotas for those rural citizens wishing to relocate to the urban areas. To cope better with local needs, the management of the *hukou* procedures has been decentralized at the local level with two laws, in 1997 and 2001; as a result, today the single urban areas implement their own migration policies. Overall, the current legislation remains particularly detrimental for rural migrants, who face many bureaucratic obstacles to obtain the conversion of their *hukou* status from agricultural into non-agricultural. Even when they successfully manage to obtain it, they still face an unequal treatment compared to urban citizens, as well as a series of discriminations and legal restrictions. Among these, it is possible to find restrictions with the purchase of a house, the resistance of urban authorities in providing the same level of well-fare benefits enjoyed by urban residents, social marginalization, and so on. Ultimately, the *hukou*, besides creating a huge disparity of treatment between rural and urban citizens, further breaches the constitution, since it violates the right of movement and of equality before

the law provided by the latter to all citizens of the PRC. For the sake of completeness, in chapter 2, a description of the various historical phases of rural-to-urban migration was provided, as well as the main economic drivers influencing the decision to migrate of rural workers. Among these, special relevance is attributed to the urban-rural income differential, land size per household, level of urban productivity spillovers and rural rents. In particular, the last two variables have proven to exercise a notable role in affecting the decision to migrate of rural workers; therefore, they have been introduced in the theoretical model of rural-to-urban migration developed in chapter 3. From the analysis of chapter 2, some insights emerge on how potentially to improve the legal and institutional frameworks analyzed. First of all, legal reforms of the HRS are necessary in order to better confront the issue related to the floating population and urban congestion; indeed, improvements in the well-being of rural workers would contribute to relieve the issue of excessive departures of migrants from the countryside. In the light of this, the authorities could consider some of the following proposals. First, the reallocation of rural land according to efficiency principles, rather than household size, would constitute the first main step to increase the efficiency of the rural economy. Indeed, in this way more productive peasants would acquire more land, whereas the land surface of less productive farmers would be reduced. This would undoubtedly improve the rural economy, since the overall level of crop production would increase, together with a more efficient redistribution of resources. Second, the provision of some sort of proprietorship over the rural land would constitute an additional strategy to further increase the level of efficiency of the rural economy, as well as the well-being of peasants. The possibility of owning and transacting the land would indeed

facilitate the economic activities of rural workers; for instance, peasants may use their land as a collateral in order to obtain a loan. Moreover, this would further facilitate the development of a credit market; as a matter of fact, the latter represents one of the fundamental factors required for a proper development of the rural economy. Thirdly, imposing a written specification for contracts in the sale of crops would contribute to provide more certainty to transactions, lowering enforcement costs and cases of dispute. Legal changes should also involve the *hukou* system; indeed, after the decentralization reforms, many urban areas have been implementing even stricter counter-measures against migration with respect to the pre-reform period; sometimes, these restrictions have become excessive and biased by the rigidities encountered by local authorities in their respective urban jurisdictions. The central state has delegated much of its power to local authorities involving the management procedures related to the acceptance of migrants; yet, it could impose some requirements in order to eliminate some of the restrictions which can be excessively detrimental to the latter when they decide to migrate to a city. First of all, the central state could impose a maximum threshold to cities when these have to set the price for the award of the *nongzhuanfei*. Similarly, it could increase the quotas for the granting of the *nongzhuanfei*, setting a threshold amount specific for each district. In addition, it could expand the list of qualifications required to obtain a non-agricultural *hukou*, so that the background of migrants moving to cities would expand. Finally, for what concerns property rights, a major suggestion involves the need for a definition of a proper regulatory code involving land expropriation in rural areas. Specifically, the central state should intervene in order to eliminate cases of abuse by local authorities and to provide more certainty of prop-

erty rights among peasants. These objectives can be achieved only after a more precise legal definition of the cases involving land development in the countryside, in order to reduce and confine the actions of local cadres to specific situations. In addition, such a policy would automatically relieve the issue of excessive departures of migrants, since workers in rural areas would face a much reduced state of uncertainty.

5.1.2 Insights from Chapter 3

Chapter 3 developed a theoretical model of rural-to-urban migration, introducing some of the key drivers of migration examined in chapter 2, i.e., urban-rural income differential, urban productivity spillovers and rural rents. In particular, a spatial structure to the rural area was provided, so that the two spatial variables inherent urban productivity spillovers and rural rents were introduced in the model; in addition, it was assumed that the relocation of workers from rural areas to cities is provoked by the gap between their respective net incomes. The principal aim of chapter 3 is to explain the long-term effects of migration on urbanization and city growth. Relying on some classical assumptions of the literature, it was further assumed that rural-to-urban migration contributes to human capital accumulation (which for the sake of simplicity is assumed to be solely accumulated in the urban area) and the latter contributes to the accumulation of technology which ultimately fosters city growth and output. Contrarily to what someone could assume, it is not always the case that the local authority sets an urbanization level which is lower than the one corresponding to the market solution. Indeed, depending on the levels of the net urban and rural incomes, two different outcomes can emerge; specifically, the market solution level of urbanization will exceed the solu-

tion set by the local authority only if the gross urban income net of the cost of the acquisition of human capital turns out to be higher than the gross rural income net of the negative effect exercised by rents in the countryside. On the contrary, if the net rural income is higher than the net urban income, the local authority will set a level of urbanization higher than the market solution. This occurs because the urban planner, expression of the local authority, is a rational agent and takes into account the role exercised by rural rents, as well as the congestion costs within the city (the latter are wrongly supposed to be neglected by migrants and urban citizens). In examining the dynamics of the city growth, its two main determinants are human capital accumulation and the level of urbanization within the city, since the more people who are present in the city, the more will be the investments in human capital. Then, also depending on the initial level of technology of the city, different growth paths will eventually emerge. For too low levels of initial technology, the city will remain stranded in a poverty trap. If, however, the initial level of technology happens to be sufficiently high, the growth process will begin, with an increase in the levels of human capital accumulation and urbanization until a steady state level of partial, full, or unbounded growth will ultimately be achieved. In the end, the findings of this theoretical model suggest that rural-to-urban migration constitutes a key element for the long-run city growth, since rural migrants invest in human capital, hence contributing to boost the urban process of economic development. Therefore, restrictive migration policies undertaken by local authorities could imply adverse dynamic consequences in terms of city growth. The major insight emerging from the analysis of chapter 3 suggests that in order to cope with urban congestion issues, local authorities should carefully consider curtailing migration policies; indeed,

such an action could lead to negative repercussions in terms of long-term city growth. Instead, urban planners should consider policies of spatial relocation, which would be able as well to effectively face urban congestion issues, but without affecting the process of city growth. Specifically, the latter are policies designed to achieve a more rational distribution of people and resources within a city, which could allow measures to relieve decongestion in urban zones. Such policies have been enforced in emerging countries such as Brazil (Sawyer and Rigotti, 2001) and have proven to be effective in reducing urban congestion without modifications in the level of migration rates.

5.1.3 Insights from Chapter 4

Chapter 4 completed the analysis started in chapter 3, trying to quantify the impact of both human and physical capital accumulation on economic growth (proxied by GDP per worker) in China, using a panel data of 30 provinces for the period 1995-2013 and disaggregating physical capital at sector level. In 1994, the government enacted an important tax reform, which remarkably stimulated the accumulation and mobility of physical capital, thanks to the switch from a production to a consumption-type value added tax, thus eliminating investments from the tax base. Conversely, around the same time period and especially with the implementation of the *hukou* decentralization reforms, most of the urban areas started to implement more restrictive migratory policies, with a resulting decrease in the overall level of mobility of human capital. In the empirical analysis, with the aim of capturing the potential presence of spatial spillovers within and among provinces, both non-spatial and spatial panels were tested. The results of the test suggested the presence of a spatially lagged dependent

variable. Therefore, in using standard non-spatial panel specifications, potential bias due to omitted spatial components could arise. Further tests subsequently suggested that the best specification is constituted by a spatial autoregressive model with fixed effects, in which the spatial effects are captured by the dependent variable; that is, the value of the dependent variable detected at a specific location is influenced by a weighted average of the other neighbouring dependent variables (in other words, the level of GDP per worker in a certain province is influenced by the level of GDP per worker in the surrounding bordering provinces). Also, a threshold distance of 1,000 kilometers beyond which there is no more spatial effect was identified. Partial derivative measures were then applied, in order to derive the direct and indirect effects for the coefficients of the spatial autoregressive model. From the final estimates, significant and positive intra- and inter-provincial spillovers emerge for both physical and human capital, although being notably more pronounced for physical capital; in particular, the magnitude of the total spatial effect for physical capital in both the secondary and tertiary sectors doubles the magnitude of the human capital. Moreover, compared to previous studies which performed a similar analysis for the period before the tax reform, the magnitude of the same spatial spillovers appears here to be noticeably higher for physical capital; conversely, for human capital, the gap in magnitude with the pre-tax reform period, although being positive, is actually less pronounced. Overall, the importance of physical capital accumulation has increased also in light of the sustained development of important inter-provincial industrial clusters among enterprises which have been developed during the last 20 years. Nonetheless, human capital accumulation has not managed to experience similar trends, despite a massive increase in expenditures in education by

the government since the 2000s and the emergence of important interactions between institutions of education and enterprises. Among the causes provoking rigidities in human capital accumulation and mobility, several studies pointed to the *hukou* system, whose restrictions prevent indeed the full exploitation of the potentialities of human capital, especially in terms of knowledge diffusion. In synthesis, from the analysis of chapter 4, it appears clear how hindering the process of human capital accumulation can lead to severe negative growth repercussions. Besides the previous considerations on the *hukou*, some additional insights emerge with reference to this issue, and relate to the legal restrictions enforced at the local level by the city authorities against migrants. Once again, the central state should intervene in order to eliminate (or drastically reduce) such restrictions. First, the central state should prohibit local authorities from restricting access to education to migrants in urban educational institutions (being regular education, training programs or apprenticeship). Secondly, the same restrictions should be removed with reference to migrants' children. Thirdly, many of the restrictions and constraints imposed on firms by the local legislation of many cities involving the hiring of migrants should also be relaxed. Implementing such policies would be beneficial in two ways; first of all, it would reduce the disparity gap between migrants and urban citizens in terms of employment and education opportunities. Furthermore, it would facilitate the increase in the overall urban level of human capital, consequently boosting the magnitude of growth spillovers.

5.2 Concluding remarks and final policy recommendations

In the light of the findings detected in the previous chapters, it emerges how a policy limiting rural-to-urban migration can lead to a curtailment of the long-term economic growth level of urban areas. Indeed, rural migrants have proven to represent a key factor for the urban growth, due to their investments in human capital which ultimately boost the urban economy. The econometric analysis carried out in chapter 4 provided further empirical evidence of the positive effect exercised by human capital accumulation on urban growth. Moreover, the same analysis corroborated the thesis of other studies demonstrating that the current *hukou* system hinders the movement and relocation of workers and students from rural to urban areas; this contributes in turn to curtail the total magnitude of growth spillover for human capital (both at intra- and inter-provincial level), since it restricts considerably the process of knowledge diffusion. Nonetheless, given the current demographic trends, most Chinese cities are going to experience in the nearby future a process of population ageing which will result in a decrease of urban labour supply (Cao, 2012); rural migration can thus be seen as a way to counter-balance this adverse effect. Furthermore, a transfer of workers from the countryside to the cities can help in lowering the rising levels of congestion which some rural areas have also started to experience over the past few years (Chan, 2010); indeed, if on the one hand governmental birth control policies have been effective in reducing fertility rates in urban areas, conversely the same policies have been loosely enforced in rural areas, leading to a consistent increase in the rural fertility rate (Zhang et al., 2002). To sum up, it is possible to

conclude that ultimately, the final impact exercised by rural migrants on the urban economy is beneficial; therefore the current *hukou* legislation appears to be detrimental for the long-term urban growth, since it hinders human capital accumulation, an efficient allocation of labour supply and the creation of positive spillovers related to human capital.

Nevertheless, an excessively high migration rate may also entail unsustainable urban congestion costs; therefore the authorities could additionally embrace legal and institutional reforms to improve the socio-economic context of rural areas, in this way mitigating the issue of excessive departures of migrants from the countryside⁷³. For instance, as already stressed, concerning the HRS, a legal change may involve the adoption of a more liberal framework which gives to peasants some sort of proprietorship over their land (with a subsequent emergence of a land market); additionally, an improvement in the method of plot reallocation could undoubtedly benefit the economic condition of rural workers; the latter, in this way, would also be able to use their land as a collateral. Furthermore, a redefinition of the procedures involving land expropriation, in addition to a deeper control exercised by the central government on local authorities, would lead to a higher state of certainty of property rights in rural areas. Finally, a revision of the legislation involving rural taxation together with an imposition of an equity-oriented code of conduct for tax collection addressed to local authorities by the central government could reduce the heavy fiscal burden borne by peasants.

With reference to the *hukou* system, it was shown that the general attitude on migration regulation undertaken by the authorities has been that

⁷³In addition, an improvement of the economic condition of rural workers could further help in relieving the issue of the floating population, which constitutes nowadays a big problem for many urban areas, since irregular migrants drastically increase the level of urban congestion costs.

one of restricting the flows of migrants to the cities, especially after the *hukou* decentralization reforms of the late 1990s. Among the reasons for this trend, it is possible to list the rigidities defined in chapter 2, such as the protests of urban residents and, above all, the issue related to urban congestion costs. More migrants lead to higher urban growth, but at the same time they increase congestion costs; to cope effectively with this trade-off, it appears that instead of restrictive measures, the focus of attention of local authorities should rather be redirected to the implementation of policies of spatial relocation. As for the widespread fear present among urban citizens according to which rural migrants would “steal their jobs”, this fear appears to be unfounded; indeed, many empirical studies (see, e.g., Meng, 2001) demonstrated how the presence of rural migrants did not entail adverse repercussions on urban dwellers’ income; this was due to a complementarity, rather than a competition, in the urban labour market between the two categories of citizens. Ultimately, in most Chinese cities rural migrants keep suffering discrimination, and not only by urban citizens but also by the local urban authorities (especially for what concerns the provision of well-fare benefits). Particularly, it has been shown how, with the implementation of the decentralization reforms, a higher degree of delegation of power by the central government did not correspond to an adequate and complementary transfer of financial resources to local authorities; therefore, nowadays, the latter do not have incentives to extend the same fair amount of social provision to rural migrants compared to the one provided to regular urban residents. Indeed, since the benefit provision to migrants is not included in any evaluation, it remains in the interest of urban authorities to limit this provision to the bare minimum. The *hukou* decentralization reforms also brought addi-

tional negative consequences to the detriment of rural migrants, above all the establishment by local authorities of remarkably high threshold prices for the grant of the *nongzhuanfei*; this, for the majority of rural migrants, constitutes a particularly onerous issue. Furthermore, access to education for rural migrants is sometimes hindered by the urban authorities and this undoubtedly causes negative repercussions on the process of human capital accumulation. In the end, given the fact that rural migrants who relocated to the urban areas pay taxes as regular urban citizens do, and contribute to the increase in the overall level of human capital within the city, the current situation of abuse towards them appears unjustified. Hence, a series of equity-oriented reforms aimed at improving the living condition of migrants in urban areas would become necessary to reduce the disparity of treatment between the latter and urban citizens, as well as fostering the urban economy. For instance, reforms aimed at removing the restrictions related to access to education for rural migrants would undoubtedly contribute to boost the process of human capital accumulation in urban areas.

To conclude, given all the considerations and facts exposed so far, the authorities should concentrate on the achievement of a sustainable long-term urban growth; to this aim, they should take actions in order to operate a radical reform of the legal and institutional tools governing the socio-economic context of the countryside, as well as relaxing the restrictions for rural migrants imposed by the urban legislation and the *hukou* system. On the one hand, improvements of the economic condition of peasants in rural areas would help in reducing excessive rates of migration as well as mitigating the issue of the floating population. On the other hand, in the light of the positive effect exercised by rural-to-urban migration on

the urban economy, the authorities should focus on precise policy changes. The latter should target a higher quality of life for rural migrants together with moderate increases in congestion costs. This could be achieved, for instance, through the implementation of less restrictive migratory regulations, policies pursuing equality of rights between migrants and urban citizens, and programs of relocation of people and resources. Such policies would indeed be fundamental in order to reach a sustainable long-term urban growth rate.

5.3 Suggestions for future research

Despite the important results and findings emerging from the analysis carried out in this thesis, both the theoretical and empirical specifications could be improved in several ways. With reference to the theoretical model, most of its limitations involve its simplified assumptions of reality. For instance, it is supposed that rural workers are identical in terms of income and preferences involving rents and spillover effects, whereas in reality different people have different preferences. Secondly, besides the linear and the concentric cases, the geometric distribution of the rural area around the urban area could take more complicated forms; additionally, a spatial representation could also be extended to the urban area, with one or more city centers. Thirdly, more expanded models could also take into account the effect exercised, for instance, by the labour market or introduce the role of firms in the analysis. With regard to the empirical model, one of the most severe limitations involves the fact that a single reduced form equation was utilized. A more complete analysis involving more sophisticated models, such as structural models, could perform a better investigation in studying the effect of growth spillovers. Addi-

tionally, the same analysis of spillover effects could provide more precise results if conducted at a more disaggregated level (for instance, in using prefectures or districts instead of provinces). These suggestions are left for future research, with the aim of expanding the analysis carried out in this thesis in order to provide more detailed insights on the complex topic of Chinese rural-to-urban migration.

Appendix A

Analysis of the rural income with the living surface variable endogenous

In the model, the living surface variable, L , was considered exogenously given and normalized to one. This assumption is however not very realistic, since in reality rural workers usually have the opportunity to choose the living surface they desire (given of course their income constraint). The main reason beneath this analysis is to understand whether the living surface occupied by each rural household changes depending on their distance from the urban area; in other words, if peasants living closer to the city will live in smaller houses with respect to other peasants living farther from the city.

Under this setting, the new optimization problem from expression (3.2) can be rewritten as:

$$\max_{dL} I_{rt} = \max_{dL} [G_r A_t - \omega(d) - r(d)L]$$

Deriving the FOC with respect to d it is possible to obtain:

$$r'(d) = -\frac{\omega'(d)}{L}$$

which, as in the former case, always entails that the rents are decreasing

in their value with respect to the spillover effect.

Then, in order to derive the first order conditions with respect to L , it is firstly necessary to specify for it a feasible functional form; using logarithms, rewrite the expression of the maximizing income as:

$$\max_L I_{rt} = \max_L [G_r A_t - \omega(d) - r(d)L + \gamma \log L]$$

where γ is a positive parameter. In this way, it is possible to derive an explicit form for L , as a function of the exogenous variables of the model. Derive the FOC with respect to L to obtain:

$$r(d) = \frac{\gamma}{L}$$

This relationship clarifies an important point and means that using a logarithmic functional form for the living housing surface, an inversely proportional relationship between the latter and the rents is established; in practical terms, this means that rural workers who live closer to the city enjoy a smaller living-area in their house; the housing surface, on the other hand, increases the farther it is from the city. All this can be explained by the fact that the closer a rural house is to the city, the higher are the rural rents, and since many rural rents are associated to the size of the housing surface, peasants will tend to possess a smaller living surface.

Subsequently, rewrite the expression of the maximizing income as:

$$I_{rt} = G_r A_t - \omega(d) - \gamma + \gamma \log\left[\frac{\gamma}{r(d)}\right]$$

from which it is possible to derive:

$$r(d) = \gamma e^{\frac{G_r A_t - I_{rt} - \gamma - \omega(d)}{\gamma}}$$

Finally, in solving for L , gives:

$$L = e^{\frac{I_{rt} - G_r A_t + \gamma + \omega(d)}{\gamma}}$$

Now, from the latter expression, using comparative statics, let it detect the marginal effect of the exogenous variables on L . Firstly, as it was easy to expect:

$$\frac{\partial L}{\partial I_{rt}} > 0$$

This means that the higher the income of a rural worker is, the higher will be in turn his/her propensity to live in a larger house.

Then:

$$\frac{\partial L}{\partial G_r} < 0$$

Therefore, when the absolute value of the productivity factor of the rural area increases, the housing surface decreases. This might be explained by the fact that in the countryside the house also represents the main place around which the agricultural working activities are usually carried out by rural workers; subsequently, following an improvement in the quality of the infrastructure and services in the rural area, peasants would need a smaller and less well-endowed house.

Finally:

$$\frac{\partial L}{\partial \omega(d)} > 0$$

This result says that an increase in the decline of the productivity spillover positively affects the size of the rural workers' house. Perhaps, it could be the case that, because an increase in ω generates a negative

effect on rural workers' income (consequently making their savings more vulnerable) the latter will react to this monetary uncertainty investing more in real estate properties, whose value is commonly considered to be a guarantee against the volatility of money (Cao et al., 2012).

Appendix B

Analysis of the concentric case

In the concentric case (Figure B.1) the distribution of the population around the city will follow a circular path, where rural inhabitants locate around the city (always represented by the point A) in concentric circles. The diameter of these circles will increase in getting far from the city, up to reaching the most external ring, whose radius is given by \bar{d} and which represents the farthest zone of the rural area.

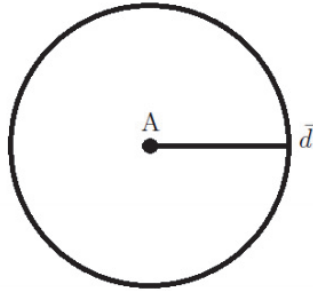


Figure B.1: Concentric distribution of the rural area.

In this specific case, the distribution of rural workers will therefore be expressed by the following equation:

$$\bar{d} = ((1 - z)N/\pi)^{\frac{1}{2}}$$

In following again all the steps for the linear case, the resulting equation for the rural income in the concentric case results to be:

$$I_{rt} = G_r A_t - \bar{r} - \omega((1 - z)N/\pi)^{\frac{1}{2}}$$

Comparing the latter expression with (3.3) it can be noticed how the rural income is slightly higher in the concentric case than in the linear case. This is basically due to geometric reasons; indeed, the negative-distance effect of the productivity spillover on the rural income in the concentric case is more scattered, due to the particular distribution of the rural population around the city; this facilitates the propagation of the activities related to the productivity spillover in a more invasive and wider way throughout the whole rural area. In the model, for the sake of simplicity, the linear case is adopted⁷⁴.

⁷⁴As previously mentioned, results do not change significantly in utilizing the concentric case.

Appendix C

Effect of ω on z_t

It has been shown in the analysis inherent comparative statics that the final effect of the productivity spillover on the optimal level of agglomeration given by the market solution is always positive (although relatively small in absolute value). Similarly to the latter, the partial derivative of ω on z_t^u is:

$$\frac{\partial z_t^u}{\partial \omega} = \frac{2b}{(2b + \omega)^2} - \frac{N(G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r})}{[N(2b + \omega)]^2}$$

hence denoting the same positive marginal effect of the productivity spillover on the level of urban agglomeration in both cases. Then, examine the mathematical effect of the first derivative of ω comparing \hat{z}_t and z_t^u . In the presence of the second case, i.e., when $G_u A_t h_{it}^{*\alpha} - Ph_{it}^* < G_r A_t - \bar{r}$, the negative sign of the second term of the first derivatives of ω (with respect to $\frac{\partial \hat{z}_t}{\partial \omega}$ and $\frac{\partial z_t^u}{\partial \omega}$) will convert into a positive value the negative term of the numerator in both the two cases, therefore the final impact of ω on z_t^u and \hat{z}_t will always be positive, with $\frac{\partial \hat{z}_t}{\partial \omega} > \frac{\partial z_t^u}{\partial \omega}$.

On the other hand, with reference to the first case, when $G_u A_t h_{it}^{*\alpha} - Ph_{it}^* > G_r A_t - \bar{r}$, because of the necessary condition for the existence of the equilibrium at \hat{z}_t , it is always true that $bN > G_u A_t h_{it}^{*\alpha} - Ph_{it}^* - G_r A_t + \bar{r}$.

This implies that also in this case it will be that $\frac{\partial \hat{z}_t}{\partial \omega} > 0$ and $\frac{\partial z_t^u}{\partial \omega} > 0$, but now having: $\frac{\partial \hat{z}_t}{\partial \omega} < \frac{\partial z_t^u}{\partial \omega}$.

In general, it is possible to observe that the effect exercised by ω on the two levels of agglomerations is opposite with respect to the previous two cases formerly examined, in the sense that, in presence of high net rural incomes, the decay of the productivity spillover effect will push for a higher level of \hat{z}_t (even if boosting as well, but in a minor way, the agglomeration level of z_t^u) and vice versa when the urban net salaries are higher. This finding is in fact more tricky than it would appear. In the first case of the analysis of ω , when the gross rural income net of the rents is higher than the net urban income, living conditions in the countryside are relatively better. According to the results previously obtained from the partial derivatives, when the gradient of ω increases, we see in turn a positive increase in the number of workers wanting to locate to the city. This comes as a natural consequence, as if the gradient of ω increases, the final effect will be a worsening in the level of rural incomes; therefore, if this trend continues, there will be an automatic push towards a higher urban relocation of rural workers from the countryside. The urban planner, on the other hand, is conscious of these negative consequences provoked by ω on rural incomes and will accordingly allow the entrance of more rural workers in the city when the gradient of ω increases; his solution will however be smaller compared to the market solution, since he takes into account the congestion costs due to the negative consequences of an excessive level of urban agglomeration⁷⁵.

⁷⁵Recall that in all the scenarios, the final effect of ω will anyways be minimal, given the higher values of the denominators in the two partial derivatives. In this particular case, it was previously mentioned that lower urban salaries might be linked to lower urban productivity; therefore it can be the case that the final result exercised by the effect of the productivity spillover in the countryside will eventually be

With reference to the other case, when the net urban income exceeds the net rural income, the urban planner will consider the trade-off between the level of ω and the urban congestion costs even more carefully (the latter always being neglected by workers), as now the city will become more attractive for rural dwellers, with a consequent potential risk of an even higher increase of congestion compared to the other case. Moreover, since now the productivity of the city is higher than the one of the countryside, the magnitude of the effect exercised by the productivity spillover in the rural area will presumably be higher. In any case, however, in the end when the decay of the spillover increases, the urban planner will set a superior threshold of entrance of rural workers to relieve their lower quality of living; as well, a required condition for this to happen is necessarily the presence of remarkably low congestion costs within the city, so that the urban planner will be able to set a threshold of entrance superior to the one obtained from the market solution.

remarkably reduced, depending, the latter, on the overall level of productivity present in the city.

Appendix D

Analysis of A_{t+1}^p and A_{t+1}^f functions

D.1 Crossing conditions between A_{t+1}^p and A_{t+1}^f

Let examine the conditions according to which, at the point where $z_t = 1$, and $A_{t+1}^p = A_{t+1}^f$, the condition $\partial A_{t+1}^p / \partial A_t > \partial A_{t+1}^f / \partial A_t$ is met. Start writing:

$$\begin{aligned} \frac{\partial A_{t+1}^p}{\partial A_t} &= \theta [B^{2/(1-\alpha)} \times \\ & \left(\frac{-2P}{N(2b+\omega)} + \frac{2G_u A_t B^{(\alpha-1)/(1-\alpha)}}{N(2b+\omega)} \right) + B^{1/(1-\alpha)} \frac{2\bar{r} + N\omega - 2G_r A_t}{N(2b+\omega)}]^{\theta-1} \\ & \times \left[\frac{2B^{2/(1-\alpha)} G_u B^{(\alpha-1)/(1-\alpha)}}{N(2b+\omega)} - \frac{2B^{1/(1-\alpha)} G_r}{N(2b+\omega)} \right] \end{aligned} \quad (D.1)$$

and

$$\frac{\partial A_{t+1}^f}{\partial A_t} = \frac{\theta}{1-\alpha} B^{\frac{\theta}{1-\alpha}-1} \quad (D.2)$$

At the intersection of the two functions, the following equation holds:

$$\frac{\partial A_{t+1}^f}{\partial A_t} = \frac{\theta}{1-\alpha} A_{t+1}^f A_t^{-1} = \frac{\theta}{1-\alpha} A_{t+1}^p A_t^{-1}$$

Comparing then the latter expression with (D.1), having supposed the former to be higher than (D.2), this entails that:

$$\frac{\partial A_{t+1}^p}{\partial A_t} > \frac{\partial A_{t+1}^f}{\partial A_t}$$

That is:

$$\begin{aligned} \theta [B^{2/(1-\alpha)} (\frac{-2P}{N(2b+\omega)} + \frac{2G_u A_t B^{(\alpha-1)/(1-\alpha)}}{N(2b+\omega)}) + B^{1/(1-\alpha)} \frac{2\bar{r} + N\omega - 2G_r A_t}{N(2b+\omega)}]_{\theta-1} \\ \times [\frac{2B^{2/(1-\alpha)} G_u B^{(\alpha-1)/(1-\alpha)}}{N(2b+\omega)} - \frac{2B^{1/(1-\alpha)} G_r}{N(2b+\omega)}] > \frac{\theta}{1-\alpha} A_t^{-1} [B^{2/(1-\alpha)} \\ (\frac{-2P}{N(2b+\omega)} + \frac{2G_u A_t B^{(\alpha-1)/(1-\alpha)}}{N(2b+t)}) + B^{1/(1-\alpha)} \frac{2\bar{r} + N\omega - 2G_r A_t}{N(2b+\omega)}]_{\theta} \end{aligned}$$

Simplifying:

$$\begin{aligned} (A_t G_u)^{1/(1-\alpha)} (\alpha P^{-1})^{\alpha/(1-\alpha)} - \alpha^{\alpha/(1-\alpha)} + (A_t G_u)^{1/(1-\alpha)} P^{\alpha/(1-\alpha)} \\ + \alpha^{-1} [\bar{r} + \frac{N\omega}{2}] < G_r A_t \end{aligned}$$

or

$$\frac{\bar{r} + \frac{N\omega}{2}}{\alpha} < G_r A_t \tag{D.3}$$

D.2 Shape of the A_{t+1}^p and A_{t+1}^f functions

The dynamic evolution of the technological level of the economy will depend on the shape of the function A_{t+1} :

$$A_{t+1} = \begin{cases} A^0 & \text{if } z_t = 0 \\ A_{t+1}^p & \text{if } 0 < z_t < 1, A_{t+1}^p > 0 \text{ and } (z_t h_{it})^\theta > A_t \\ A_{t+1}^f & \text{if } z_t = 1, A_{t+1}^f > 0 \text{ and } (z_t h_{it})^\theta > A_t \end{cases}$$

where:

$$A_{t+1}^p = [B^{2/(1-\alpha)} \left(\frac{-2P}{N(2b+\omega)} + \frac{2G_u A_t B^{(\alpha-1)/(1-\alpha)}}{N(2b+\omega)} \right) + B^{1/(1-\alpha)} \frac{2\bar{r} + N\omega - 2G_r A_t}{N(2b+\omega)}]^\theta$$

and

$$A_{t+1}^f = B^{\theta/(1-\alpha)}$$

Now; $A_{t+1}^p < 0$ when the following conditions are met:

$$A_t < \frac{P}{G_u B^{(\alpha-1)/(1-\alpha)}} \quad \wedge \quad A_t > \frac{2\bar{r} + N\omega}{2G_r}$$

or

$$A_t < \frac{P}{G_u B^{(\alpha-1)/(1-\alpha)}} \quad \wedge \quad A_t < \frac{2\bar{r} + N\omega}{2G_r}$$

with:

$$B^{2/(1-\alpha)} \left(\frac{-2P}{N(2b+\omega)} + \frac{2G_u A_t B^{(\alpha-1)/(1-\alpha)}}{N(2b+\omega)} \right) > B^{1/(1-\alpha)} \frac{2\bar{r} + N\omega - 2G_r A_t}{N(2b+\omega)}]^\theta$$

or

$$A_t > \frac{P}{G_u B^{(\alpha-1)/(1-\alpha)}} \quad \wedge \quad A_t > \frac{2\bar{r} + N\omega}{2G_r}$$

with:

$$B^{2/(1-\alpha)} \left(\frac{-2P}{N(2b+\omega)} + \frac{2G_u A_t B^{(\alpha-1)/(1-\alpha)}}{N(2b+\omega)} \right) < B^{1/(1-\alpha)} \frac{2\bar{r} + N\omega - 2G_r A_t}{N(2b+\omega)}]^\theta$$

Otherwise, the function A_{t+1}^p is strictly positive. Taking the first derivative of A_{t+1}^p with respect to A_t , provides expression (D.1). In the relevant range where A_{t+1}^p and z_t are both positive, the first expression in brackets of the derivative (D.1) is positive. The second expression in brackets of (D.1) is positive as long as:

$$B > \left(\frac{G_r}{G_u} \right)^{\frac{1-\alpha}{\alpha}}$$

which can be rewritten as:

$$A_t > \frac{P}{\alpha} G_r^{\frac{1-\alpha}{\alpha}} \left(\frac{1}{G_u} \right)^{\frac{1}{\alpha}}$$

which is always the case in the relevant range in question. The function reaches its minimum at:

$$A_t = \frac{P}{\alpha} G_r^{\frac{1-\alpha}{\alpha}} \left(\frac{1}{G_u} \right)^{\frac{1}{\alpha}}$$

and is monotonically increasing thereafter.

The evolution of the economy will eventually depend on the curvature of the A_{t+1} function. In particular, the number of times that this function intersects the 45° line, where $A_{t+1}^p = A_t$, will be a crucial factor for the dynamic path of the economy. Then, taking the second derivative of A_{t+1}^p , provides:

$$\frac{\partial^2 A_{t+1}^p}{\partial A_t^2} = \theta(\theta - 1)[B^{2/(1-\alpha)}(\frac{-2P}{N(2b + \omega)} + \frac{2G_u A_t B^{(\alpha-1)/(1-\alpha)}}{N(2b + \omega)}) + B^{1/(1-\alpha)} \\ \times \frac{2\bar{r} + N\omega - 2G_r A_t}{N(2b + \omega)}]_{\theta-2} [\frac{2B^{2/(1-\alpha)} G_u B^{(\alpha-1)/(1-\alpha)}}{N(2b + \omega)} - \frac{2B^{1/(1-\alpha)} G_r}{N(2b + \omega)}]^2$$

To simplify the calculations, label $B^{2/(1-\alpha)}(\frac{-2P}{N(2b+\omega)} + \frac{2G_u A_t B^{(\alpha-1)/(1-\alpha)}}{N(2b+\omega)}) = \Phi$ and $B^{1/(1-\alpha)} \times \frac{2\bar{r}+N\omega-2G_r A_t}{N(2b+\omega)} = \Psi$.

The function A_{t+1}^p will be convex when $\frac{\partial^2 A_{t+1}^p}{\partial A_t^2}$ is positive and this happens when both $\Phi < 0, \Psi < 0$. Or when $\Phi > 0$ and $\Psi < 0$, with $|\Phi| < |\Psi|$. Or $\Phi < 0$ and $\Psi > 0$, with $|\Phi| > |\Psi|$. In these three cases, the slope of the monotonically increasing function of motion will be increasing for $\forall A_t$ and therefore there will always be a single intersection point where $A_{t+1}^p = A_t$.

Conversely, A_{t+1}^p will be concave when $\frac{\partial^2 A_{t+1}^p}{\partial A_t^2}$ is negative and this happens when both $\Phi > 0, \Psi > 0$. Or when $\Phi > 0$ and $\Psi < 0$, with $|\Phi| > |\Psi|$. Or $\Phi < 0$ and $\Psi > 0$, with $|\Phi| < |\Psi|$. In these cases, the slope of the monotonically increasing function of motion will be decreasing and therefore there could be zero, one or two values of A_t to allow tangency points (i.e. when $A_{t+1}^p = A_t$); depending on the values of the parameters it can thus be the case that for $\forall A_t, A_{t+1}^p < A_t$ and in this case there will not be any tangency point. It could then be the case that the condition $A_{t+1}^p = A_t$ is verified and therefore there will be one single crossing point. Or, if $A_{t+1}^p > A_t$ there will be two tangency points.

Finally, as for the analysis of the A_{t+1}^f function, calculations are much easier. Taking the first derivative gives:

$$\frac{\partial A_{t+1}^f}{\partial A_t} = \frac{\theta}{1 - \alpha} B^{\frac{\theta}{1-\alpha}-1}$$

The function is hence monotonically increasing. Finally, taking the

second derivative gives:

$$\frac{\partial^2 A_{t+1}^f}{\partial A_t^2} = \frac{\theta}{1-\alpha} \left(\frac{\theta-1+\alpha}{1-\alpha} \right) B^{1-\frac{\theta}{1-\alpha}-2}$$

Therefore A_{t+1}^f will be monotonically increasing and globally concave if $\alpha + \theta < 1$, and monotonically increasing but globally convex if $\alpha + \theta > 1$.

Appendix E



Figure E.1: Political map of the People's Republic of China disaggregated at provincial level (source: China Statistical Yearbook 2013).

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Summary

This thesis analyzes the topic of rural-to-urban migration in the People's Republic of China, performing a legal, institutional and economic analysis of this phenomenon. Rural-to-urban migration constitutes an important issue for the Chinese authorities, since in many cities it entails relevant economic and social repercussions. The main goal of this analysis is to shed light on the flaws of the current legal frameworks regulating and affecting rural-to-urban migration, as well as evaluating the final impact exercised by rural migration on the long-term dynamics of urban economic growth.

Chapter 2 evaluates the main legal frameworks affecting rural-to-urban migration: the *household responsibility system* (HRS), property rights and the *hukou* system. The HRS and property rights are important, since they exercise a fundamental role in influencing the socio-economic condition of rural citizens in the countryside. The HRS was introduced after the economic reforms of 1978 to relieve the poor living conditions of rural workers. If on the one hand it succeeded in improving the quality of life in the country sides, on the other hand it still presents many flaws which hinder a proper increase of the economic condition of peasants. Among these flaws it is possible to find the prohibition for farmers to transact their land, an inefficient way of land allocation, the lack of an obligation to stipulate contracts involving the sale of crops in a written form and the ban for rural workers to use their land as a collateral (with subsequent negative repercussions for the development of a rural credit market). As for property rights, after the economic reforms, notable efforts were made to provide a clearer legal framework concerning important aspects such as ownership, usufructuary and security rights. However, the issue of disparity and unequal procedures involving land expropriation between urban and rural citizens has not yet been solved properly, with the result that today the latter remain in a higher state of uncertainty. These legal flaws involving the HRS and property rights undoubtedly constitute important causes behind rural-to-urban migration. Other relevant causes also include the urban-rural income gap and a high rural taxation. Finally, with reference to the *hukou* system, this represents the main legal tool regulating rural-to-urban migration. After the *hukou* decentralization reforms in the late 1990s, most of the cities started to restrict rural-to-urban migration and today a high level of disparity of treatment between urban citizens and rural migrants relocated to the cities still persists.

Chapter 3 develops a theoretical dynamic model of rural-to-urban migration, in order to study the impact exercised by the arrival of migrants on the long-term growth level of urban areas. Depending on the initial level of technology, a city can experience different growth scenarios: no urbanization, partial urbanization, full urbanization. If the initial level of technology is sufficiently high, the arrival of rural migrants will increase the investment rate in human capital, and this will subsequently boost urban economic growth through increases in the level of technology. The city growth will then attract more migrants, who, once relocated to the city, will make additional investments in human capital, in this way further augmenting the

urbanization rate and the level of city growth until the achievement of a steady state condition. Nonetheless, to a higher number of rural migrants in the city, besides a higher urban development, also corresponds a higher degree of congestion costs due to an excessive rate of urbanization. To cope with this issue, the urban planner can restrict the number of migrants allowed to relocate to the city, especially when the net urban incomes exceed the net rural incomes. In the end, however, restrictive policies aimed at curtailing the migration rate in the urban area can entail negative repercussions in terms of long-term city growth. From this, it follows that policies of spatial relocation of people and resources, rather than policies aimed to restrict the rural-to-urban migration rate, would result more effective in achieving a more sustainable long-run urban growth.

Finally, chapter 4 completes the analysis of the previous two chapters, aiming at quantifying the impact of human (as well as physical) capital accumulation on economic growth at provincial level. To this aim, a spatial econometric perspective is adopted, which besides allowing one to derive the total impact exercised by input factors on growth, also enables one to obtain intra- and inter-provincial spillover effects for both human and physical capital. Eventually, from the empirical results, positive and significant growth spillovers emerge for both the two input factors, although being remarkably more pronounced for physical capital. Despite the massive investments in education authorized by the government since the beginning of the new century, the increase in the level of human capital spillovers has proceeded at a slow path and no remarkable improvements have been obtained with respect to the first phase of economic reforms. As other studies suggest, this trend might be related to the factors influencing the level of mobility of human capital; if on the one hand the mobility of physical capital has been actively stimulated by the tax reform of 1994, on the other hand, the mobility of human capital results is restricted because of the *hukou* system. This implies that removing the current restrictions on migration imposed by the *hukou* would benefit the overall magnitude of human capital spillovers. Moreover, policies intended to reduce the disparity of treatment between urban citizens and migrants, besides improving the living condition of the latter, would also benefit the urban growth, thanks to a facilitation in human capital investments by rural migrants.

Samenvatting

In dit proefschrift wordt de ruraal-urbane migratie in de Volksrepubliek China onderzocht door middel van een juridische, institutionele en economische analyse van dit verschijnsel. De trek van het platteland naar de stad is voor de Chinese autoriteiten een belangrijk probleem, omdat hij in veel steden belangrijke negatieve economische en sociale gevolgen heeft. De genoemde analyse heeft vooral ten doel licht te werpen op de tekortkomingen van de huidige rechtskaders die de trek van het platteland naar de stad reguleren en beïnvloeden, en het uiteindelijke effect van deze trek op de dynamiek van de economische groei van steden op lange termijn te beoordelen.

In hoofdstuk 2 worden de belangrijkste rechtskaders geëvalueerd die de trek van het platteland naar de stad beïnvloeden: het *household responsibility system* (HRS), de eigendomsrechten en het *hukou*-registratiesysteem. Het HRS en de eigendomsrechten zijn van belang, omdat ze de sociaaleconomische situatie van rurale burgers op het platteland fundamenteel beïnvloeden. Het HRS werd na de economische hervormingen van 1978 ingevoerd om verlichting te brengen in de slechte leefomstandigheden van landarbeiders. Het systeem is er weliswaar in geslaagd om de kwaliteit van leven op het platteland te verbeteren, maar heeft nog veel tekortkomingen die een echte verbetering van de economische situatie van boeren belemmeren. Enkele tekortkomingen zijn het verbod voor boeren om hun land te verhandelen, een inefficiënte manier van landtoewijzing, het ontbreken van een verplichting om contracten inzake de verkoop van gewassen schriftelijk vast te leggen, en het verbod voor landarbeiders om hun land als onderpand te gebruiken (met vervolgens negatieve gevolgen voor de ontwikkeling van een rurale kredietmarkt). Wat betreft de rechten op eigendom, zijn na de economische hervormingen aanzienlijke inspanningen geleverd om voor belangrijke aspecten zoals eigendomsrecht, het recht van vruchtgebruik en zekerheidsrechten een duidelijker rechtskader te verschaffen. De kwestie van verschillen en ongelijke procedures met betrekking tot landonteigening tussen urbane en rurale burgers, is echter nog niet goed opgelost, waardoor de laatstgenoemden op dit moment nog steeds te maken hebben met grotere onzekerheid. Deze juridische tekortkomingen die verband houden met het HRS en de eigendomsrechten, zijn zonder twijfel belangrijke oorzaken van de trek van het platteland naar de stad. Andere relevante oorzaken zijn onder andere de inkomenskloof tussen stad en platteland en de hoge belastingen op het platteland. Tot slot is het *hukou*-systeem het voornaamste juridische instrument dat de ruraal-urbane migratie reguleert. Na de hervormingen van de decentralisatie van het *hukou*-systeem aan het eind van de jaren negentig, zijn de meeste steden begonnen de trek van het platteland naar de stad te beperken, en tot op dit moment bestaat er een groot verschil in behandeling tussen urbane burgers en rurale migranten die naar de steden zijn verhuisd.

In hoofdstuk 3 wordt een theoretisch dynamisch model van de trek van het platteland naar de stad ontwikkeld om het effect van de komst van migranten op de mate van groei van stedelijke gebieden op de lange termijn te bestuderen. Afhankelijk van het initiele technologische

niveau, kan een stad verschillende groeiscenario's doormaken: geen urbanisatie, gedeeltelijke urbanisatie of volledige urbanisatie. Als het initiele technologische niveau hoog genoeg is, zal de komst van migranten van het platteland de investeringsquote in menselijk kapitaal vergroten. Hierdoor zal het technologische niveau stijgen en zal de economische groei van de stad worden gestimuleerd. Deze stedelijke groei zal vervolgens weer nieuwe migranten aantrekken, die, wanneer ze eenmaal naar de stad zijn verhuisd, aanvullende investeringen in menselijk kapitaal zullen doen en zo de urbanisatiegraad en de groei van de stad verder zullen doen toenemen, tot een evenwichtstoestand is bereikt. Een hoger aantal rurale migranten in de stad leidt echter niet alleen tot een hogere stedelijke ontwikkeling, maar ook tot hogere kosten in verband met congestie door excessieve urbanisatie. Om dit probleem het hoofd te bieden kan de stedenbouwkundige het aantal migranten aan wie toestemming wordt verleend om zich in de stad te vestigen, beperken, in het bijzonder wanneer de netto inkomens in de steden hoger zijn dan die op het platteland. Uiteindelijk kan restrictief beleid gericht op beperking van de migratie naar het stedelijke gebied echter negatieve gevolgen hebben voor de groei van de stad op de lange termijn. Hieruit volgt dat duurzamere stedelijke groei op lange termijn effectiever kan worden gerealiseerd met een beleid van gerichte ruimtelijke verplaatsing van mensen en hulpbronnen, dan met beleid dat is gericht op beperking van de trek naar de stad.

In hoofdstuk 4 wordt, tot slot, de analyse van de twee voorafgaande hoofdstukken afgerond en wordt getracht het effect van accumulatie van menselijk (alsook fysiek) kapitaal op de economische groei op provinciaal niveau te kwantificeren. Hiertoe is een ruimtelijk econometrisch perspectief gehanteerd, dat het niet alleen mogelijk maakt om het totale effect van inputfactoren op de groei af te leiden, maar het ook mogelijk maakt om intra- en interprovinciale spillovereffecten voor zowel menselijk als fysiek kapitaal te bepalen. Uiteindelijk komen uit de empirische resultaten voor beide inputfactoren positieve en aanzienlijke groei-spillovers naar voren, hoewel deze voor fysiek kapitaal duidelijk groter zijn. Ondanks de omvangrijke investeringen in onderwijs waartoe de overheid sinds het begin van de eenentwintigste eeuw toestemming heeft gegeven, nemen de spillovers van menselijk kapitaal slechts langzaam toe en zijn geen opmerkelijke verbeteringen tot stand gekomen ten opzichte van de eerste fase van de economische hervormingen. Zoals in andere studies is aangevoerd, zou deze trend kunnen samenhangen met de factoren die de mate van mobiliteit van menselijk kapitaal beïnvloeden; terwijl de mobiliteit van fysiek kapitaal actief is gestimuleerd door de belastinghervorming van 1994, wordt de mobiliteit van menselijk kapitaal merkbaar beperkt door het *hukou*-systeem. Dit duidt erop dat opheffing van de huidige, door het *hukou*-systeem opgelegde beperkingen ten aanzien van migratie bevorderlijk zou zijn voor de totale omvang van de spillovers van menselijk kapitaal. Bovendien zou beleid dat is gericht op verkleining van het verschil in behandeling tussen urbane burgers en migranten, niet alleen de leefomstandigheden van de laatstgenoemden verbeteren, maar ook bevorderlijk zijn voor de stedelijke groei, omdat het investeringen in menselijk kapitaal door rurale migranten vergemakkelijkt.

Curriculum vitae

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Short bio	
Marco Baudino. Born in Cuneo, Italy, in 1987.	
Education	
B.Sc., Business Administration, Bocconi University	2006-2009
M.Sc., Economics and Management of Public Administration and International Institutions, Bocconi University	2009-2012
Work experience	
Italian General Army Staff, Rome, Italy	Summer 2011
Prizes and awards	
Publications	
Others	

EDLE PhD Portfolio

Name PhD student	:	Marco Baudino
PhD-period	:	2013-2017
Promoters	:	K. Heine, G. A. Minerva, A. Minniti
Co-promoter	:	None

PhD training

<i>Bologna courses</i>	<i>year</i>
Introduction to the Italian legal system	2013
Game theory and the law	2013
Economic analysis of law	2013
Experimental law & economics	2014
Behavioural law & economics I – Game theory	2013
Behavioural law & economics II – Enforcement mechanism	2014
<i>Specific courses</i>	<i>year</i>
Seminar ‘How to write a PhD’	2014
<i>Seminars and workshops</i>	<i>year</i>
Bologna November seminar	2013
BACT seminar series	2013
EGSL lunch seminars	2013
Joint Seminar ‘The Future of Law and Economics’	2014
Rotterdam Fall seminar series	2015
Rotterdam Winter seminar series	2016
<i>Presentations</i>	<i>year</i>
Bologna March seminar	2013
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
Teaching	year
Others	year