

**URBANISATION AND RURAL-URBAN  
MIGRATION: EVIDENCE FROM  
CHONGQING IN THE PERIOD 2001 TO 2011**

**By  
JINGHUA OU, BSc, MA**

*Thesis submitted in fulfilment of the requirement for the degree of Doctor  
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School of Contemporary Chinese Studies

The University of Nottingham

## **ABSTRACT**

Following the launch of the 'Develop the West' strategy in 2000, western China has undergone huge changes. Chongqing has been at the leading edge of this wave of development and its model of economic reform is particularly interesting and has also attracted public attention. This study aims to answer a series of unexplored questions about Chongqing's urbanisation and rural-urban migration. The first empirical chapter (Chapter 4) derives a simultaneous equation model from the standard theoretical framework of wage growth to estimate the determinants of wage growth of urban workers of various industries and the effects of openness. Data for 38 industries in Chongqing over the past 11 years is grouped into four sets of panel data in terms of different magnitudes of openness. The data shows that the increase in the demand for labourers is positively related to the wage growth of urban workers. Openness, captured by industry's utilisation or non-utilisation of FDI, impels industrial sectors to use automation techniques more efficiently. The effect of productivity on wages in the group of industries which do utilise FDI is more than twice that of those in the group of industries which do not. Moreover, this chapter has not found enough empirical evidence to support the theory that the building of new cities benefits urban wage growth.

The second empirical chapter (Chapter 5) examines the impacts of dynamic

localisation and urbanisation externalities on Total Factor Productivity (TFP) in three sectors at the county level between 2001 and 2008, by using panel model estimates based on a modified production function. The results show that the all-industry category localisation externalities' elasticity to productivity is significantly negative and that urbanisation externalities are insignificant. The implication is that the specialisation in Chongqing is no longer able to afford the high growth of economic development; thus, the so called 'Chongqing model' lacks sufficient economic basis.

The third empirical chapter (Chapter 6) is based on an in-person survey of 102 households and 138 respondents carried out by the author in 2009. The chapter assesses the determinants of transferring behaviour of the rural-urban migrant workers by using Probit and OLS estimations. A number of conclusions can be drawn from the results. For instance, income in rural areas is crucial to migrant decision-making as to whether to accept urban *hukou*, and manufacturing and construction workers do not receive more wages than others. The survey results suggest that the quality of Chongqing's large urban population accumulation is still at a low level.

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## LIST OF ACRONYMS AND ABBREVIATIONS

AHK	Au-Henderson-Knight
BLUE	Best Linear Unbiased Estimation
CBD	Central Business District
CEDC	Chongqing Expressway Development Corporation
CHIP	China Household Income Project
CKG	Chongqing
CMG	Chongqing Municipality Government
CPC	Communist Party of China
CPI	Consumer Price Index
CQPC	Chongqing People's Congress
CSASAC	Chongqing State Asset Administration and Supervision Commission
CSB	Chongqing Statistic Bureau
CSSP	Chongqing Special Steel Plant
CULS	China Urban Labour Surveys
CWDS	China Western Development Strategy
FDI	Foreign Direct Investment
FE	Fixed Effects
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
HP	Hewlett Packard
HRS	Household-Responsibility System
IATA	International Air Transport Association
IG	Investment Group
IT	Information Technology
IV	Instrument Variable
LM	Lagrange Multiplier
LT	Lewis-Todaro
MAES	Metropolitan Advanced Economic Sphere
MAESAC	Metropolitan Advanced Economic Sphere And County
MAR	Marshall-Arrow-Romer
ML	Maximum Likelihood
NBS	National Bureau of Statistics
NSE	Non-State Enterprise
OECD	Organisation for Economic Co-operation and Development
OFDI	Outward Foreign Direct Investment
OLS	Ordinary Least Squares
PIM	Perpetual Inventory Method
PRC	People's Republic of China

PRH	Public Rental Housing
RE	Random Effects
RESET	Ramsey Regression Equation Specification Error Test
SOE	State-Owned Enterprise
TFP	Total Factor Productivity
TVE	Township and Village Enterprise
UDIC	Urban Development Investment Corporation
WTO	World Trade Organisation
2SLS	Two-Stage Least Squares

# I. INTRODUCTION

## 1.1 Background and Research Questions

Chongqing was made famous to the world by the Bo Xilai incident in the first half of 2012 and discussions with respect to the so-called ‘Chongqing model’ continue to be heard without conclusion (Chongqing Rolls On, 2012; Lu, 2012). To quote Foreign Policy:

*“To understand the uniqueness of the Chongqing model, it is useful to look at China's growth pattern since 2000 ... .. China maintained a state-directed economic model that put exports and investment before living standards ... .. But in Chongqing, the municipal government appears to have found a third way by deploying public policy and public funds to improve people's quality of life. This unorthodox model did not encourage individual consumption at the cost of investment, but rather used state resources to stimulate collective consumption. The model focuses on funding investment in areas where living standards could be immediately improved.”* (Foreign Policy, August 8, 2012)

Back in 2010, Chongqing was selected as the happiest city for its residents by Chinese state-run Xinhua News Agency (Wang, 2010). It is not surprising, because the Chongqing Municipality Government (CMG) has boldly pushed forward a series of economic and social changes that were all of a large scale and highly effective. One of the most remarkable changes is the large scale residency reform initiated by the CMG in 2010. 4.7 million rural migrant workers have been granted Chongqing *hukou* (urban residence), with 3.2 million people receiving grants in the 2011 alone (Huang, 2012). Furthermore, the CMG has also launched a three to four year plan to provide 800,000 families with public rental housing<sup>1</sup>, which has created an era of affordable homes across the country (Noble, 2011).

Chongqing's dazzling social improvements in recent years have been accompanied by the creation of astonishing economic achievements. Both GDP and per capita GDP (measures in nominal RMB) have more than quadrupled since 2001, despite its GDP growth rate not having had a great performance since 2007. In the last five years its economic growth not only

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<sup>1</sup> It is reported by China Daily (Hu, 2011).

increased when the national tendency was a slower growth due to the global financial crisis, but its growth was even faster than it was before. Its growth rate at 16.5 per cent even became the fastest at the provincial-level in 2011. In addition, the industrial scale rose perpendicularly: the total gross output was eleven-fold higher in 2011 than it was in 2001.

Moreover, Chongqing has a great ambition to become the most important inland region and economic powerhouse. According to People's Daily (2010), it was promoted as one of five national central cities following Beijing, Shanghai, Guangzhou and Tianjin. The State Council granted Chongqing the status of China's third sub-provincial and only inland development and openness New Area in 2010, which was named as *Liangjiang*. It is one of the development regions with the most preferential policies in China including the preferential policies of Western Development and the coordination of the *Pudong* and *Binhai* New Area. Based on this, the existing pillar industry, the automobile industry, is planned to expand. According to the government announcement (2012), Chongqing will become the largest automobile production base in China by 2015, with an annual production capacity of 4 million vehicles. In addition, the IT industry has been selected as a new pillar industry. Investment has

already been attracted to Chongqing; such as from leading computer makers, Hewlett-Packard (HP) and Acer, *etc.* and the major contract electronics suppliers, Foxconn and Inventec, *etc.* The city's aim is to become a major IT hub in China and the largest laptop production base in Asia. According to China Daily (2010), the total gross output of the city's IT industry is expected to reach 100 billion US Dollars by 2015.

In sum, Chongqing has become the core region of Western Development and the gateway to developing China's western regions. However, this does not mean that it will necessarily become an economic powerhouse and its economic growth will be sustainable. Chongqing has been called the largest 'city' in the world, a municipality of 33.03 million people<sup>2</sup> in 2010. However, the number includes the population of various satellite towns and cities and an agricultural population of 21.96 million. Since Chongqing became the municipality city directly under the administration of central government in 1997, the urbanisation rate, which is measured by the resident population, has jumped from 31 per cent up to 53 per cent in 2010.

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<sup>2</sup> The data is from CSB online search. In this chapter, if not otherwise instructed, all the government official data is from CSB online search.

The normal urbanisation process includes not only population movements that have closed the wage gap *per se*, but also the development of the rural sector and the transformation of farming technology from labour-intensive to capital-intensive production and to more highly skilled work. However, a large gap in incomes still exists between rural and urban areas; for agriculture production, the output of grain per capita was constant, but the aggregate sown area was shrinking. According to an in-person survey in 2009<sup>3</sup>, agricultural income has not changed for many years; an increased part of income for rural people results from increased non-agricultural wage income. Besides, according to the local official newspaper Chongqing Daily (2012), its Gini coefficient even reached 0.438 in 2010. Meanwhile, according to the survey, the majority of migrant workers are not willing to accept urban residence.<sup>4</sup> For very fast urbanisation on the one hand, and on the other hand, the rural-urban gap increase to account for such a paradoxical phenomenon, there must be some issues that do not cope well under the fast economic growth. The research questions of this thesis are therefore raised: what has really happened to Chongqing's

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<sup>3</sup> It will be reported in chapter 5.

<sup>4</sup> It will be given further evidences in chapter 5.

urbanisation and rural-urban migration over the past ten years? Is the growth sustainable?

## 1.2 Motivations and Objectives

Maintaining economic growth and strengthening social justice are both priorities in China. Urbanisation is used as a vehicle for one of the crucial policies on regional social and economic development. Thus, according to the logic of some scholars,<sup>5</sup> Chongqing seems to have found a sustainable way to maintain its economic development and to keep a harmonious society, known as the ‘Chongqing model’. However, the problem of fast urbanisation and rural-urban migration, the prominent features of the ‘Chongqing model’, are traceable to reversed mechanisms from outside economic environments and strong government intervention measures. In the view of optimistic scholars, Chongqing’s experiences are the factors that strengthen, rather than undermine, its economy. In general, this perspective tends to overlook the vulnerability of the economic foundations and indigenous industries in the inland areas. At the same time, the large number of new incomers poses serious challenges to the city’s population

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<sup>5</sup> For example, see Lu (2012) and Bo and Chen (2009), *etc.*

capacity. Thus, blind urban expansion may fail to achieve its 'economic hub' aim.

Because of the above reasons, Chongqing's urbanisation and rural-urban migration must be put into proper theoretical framework for fresh investigation. Therefore, this study takes the above research questions into three dimensions: urban workers' wage growth, urban agglomeration capability and incomers' motivation. These help to understand the causes of its fast urbanisation and rural-urban migration and to evaluate whether it is sustainable. The three dimensions are interrelated subjects: the causes of wage growth of urban workers explain the urban 'pull' force which can attract migrants; the principles of urban agglomeration explain the city's population absorbing capacity based on its industrial development; and the determinants of migrants' transferring motivation explain the rural 'push' force (income in rural areas might determine migrant transferring decision making, for instance). For the theoretical framework of the overall study, the first two dimensions above are closely related to population accumulation and industrial agglomeration, and the last is related to labour and behavioural economics.

Based on this structure, this study is arranged as follows: first, to explore a model of simultaneous equations to estimate effects on the main determinants of urban wage growth with variations in openness which is captured by industry's utilisation of FDI, secondly to employ a modified value added function in examining the agglomeration extent of the three sectors and thirdly, to make use of a probabilistic migration model and other proper econometric models to investigate the determinants of the transferring motivations of rural-urban migrant workers. Then, the following hypotheses or predictions are expected from testifying by means of those estimates.

### **1.2.1 Openness and the Wage Growth of Urban Workers in Chongqing**

The growth in urban wages has been widely discussed by an enormous literature (see Duranton, 2008 for a review). However, there are several discussions, so far inconclusive, about the deep determinants of the urban wage growth (openness factors), for instance. The urban wage growth in Chongqing, an inland city of China, involves the two most important factors: productivity with Chinese characteristics and geographical predicaments, namely inland areas. Firstly, the conventional theoretical

frameworks rarely consider the features of Chinese productivity such as export-oriented, low-educated, fast paced and repetitive work with few creative and coordination tasks, but place great emphasis on the concept of increasing returns of scale (Duranton & Puga, 2004; Kim, 2006; Marian, Weslyne, & Juan, 2008; Puga, 2010). Secondly, for inland areas, researchers always lack up-to-date empirical research, or estimate the endowment structure in an incorrect way, *etc.*

Moreover, some scholars believe the positive effects of openness are the fundamental factors to the productivity growth in China (Ju, Lin, & Wang, 2009; Jiang, 2011) - a theory which is a great source of inspiration to this study. Accordingly, the first empirical chapter (Chapter 4) attempts to fill those gaps in literature and to document the following hypotheses based on Chongqing's context: (1) because of the profound industrial foundations and the effects of openness the wages of urban workers will increase with a large increase in the demand for labourers; (2) the effects of openness exceeds that of the indigenous industrial reform on the growth of urban wages; (3) investment in automation equipment will form negative effects on the urban wage growth; (4) openness will reduce the use of automation techniques.

### **1.2.2 The Agglomeration Extent of Chongqing's Industry**

According to a large amount of literature about agglomeration scale economy in other countries Chongqing's industry and economic growth at this stage belongs to localisation externalities. However, in the last decade, Chongqing has experienced large amounts of city-bound migration of rural residents; its increase in urbanisation rate is very quick. For large cities, the conventional wisdom suggests that if industrial concentration rates are low, urbanisation rates are high (Rosenthal & Strange, 2004). Besides, Henderson (2010) suggests that the specialization can only support limited agglomeration and growth in most cases, and he also propose to do more research on the developing economies of heavy government interventions during urbanisation.

Thus, this inspires the second empirical chapter (Chapter 5) to estimate the extent of Chongqing's externalities of localisation towards its economic growth over the past 10 years. In order to further understand the effects of government interventions, the estimate is based on different geographical groups and leadership changes groups.

### 1.2.3 The Choices of Chongqing's Migrant Workers

The two main chapters introduced above give the answers to the causes of urban wage growth and openness' effect, and industrial agglomeration from macro level. To understand the labour market in Chongqing from micro level is then necessary.

The in-person household survey was conducted in July 2009. The respondents were chosen randomly by the ratio 1:3:6 in terms of population proportion of a south eastern region, a north eastern region and a one hour drive circle in Chongqing. The survey included a total of 102 households and 138 respondents. According to the theory of labour market segmentation, for instance, it should be predicted that the work opportunities of the manufacturing and construction sectors are not related to migrant wages. The third main chapter (Chapter 6) aims to examine a series of migrants' characteristics to their transferring decision-makings, such as the migrants' opportunity cost, urban experience, education levels, training situations, *etc.* by employing the data of the in-person survey in Chongqing.

### **1.3 Contributions and Structure of the Thesis**

This thesis makes the following contributions to existing literature. For the first main chapter, firstly, it fills the gap in the literature about the effect of openness on the wage growth of urban workers of various industries in the inland city of China. Secondly, it is an effective application of a simultaneous equation model based on different magnitude of openness groups to the study of the urban wage growth. Thirdly, it usefully distinguishes the effects of openness from open industrial sectors to the causes and consequences of urban wage growth. For the second main chapter, firstly, it applies growth accounting techniques to the investigation of the impact of localisation and urbanisation on total factor productivity (TFP) at the county level in Chongqing - an investigation which also fills the gap in literature. Secondly, a conventional production function is modified by using the overall local employment as the labour input and adding an addition input, industry diversity index. For the third main chapter, the originality of the research is that it carried out a survey in local Chongqing and obtained primary data for analysis.

This thesis is organised as follows. Chapter 2 reviews Chongqing's urban and economic situations. In Chapter 3, the theoretical frameworks of wage growth, agglomeration and transferring behaviours are reviewed. And then, the main limitations of existing studies are investigated.

Chapter 4 uses Fixed Effects (FE), Instrument Variable (IV) and Two-Stage Least Squares (2SLS) estimation techniques to estimate a simultaneous equation system on Chongqing's urban wages growth. With empirical data for 38 industries over the period of 2001 to 2011, it achieves many significant results. For instance, it shows the wage growth of urban workers is positively relates to the increase in the number of demand for labourers. Openness impels industrial sectors to use automation techniques more efficiently. However, the effect of productivity on wages in the group of open industrial sectors is double those in the group of closed industrial sectors. The main implication of the results is that openness will make for healthier urban wage growth. However, the main way of population accumulation, - building new cities - does not have a significant effect on the wage growth of urban workers, a situation which is a paradox in that such population should quickly go up without the effective way of accumulation. Further answers to the paradox are given in the following

chapters.

Chapter 5 examines the impacts of dynamic localisation and urbanisation economies on the Total Factor Productivity (TFP) in the three sectors respectively at the county level during 2001 to 2008, by using panel model estimation. The chapter obtains the results that show that the all industry category localisation economies' elasticity to GDP is -0.28 and the urbanisation economies are insignificant. Compared with the level of per capita GDP of developed economies at the same stage, this is very rare. Merging these results suggests that localisation economies in Chongqing are not being able to afford the high growth of economic development anymore. Also, the share of employment in indigenous industry is rather small, which partly results from State-Owned Enterprise (SOE) reforms. This SOE reform doesn't take into account the agglomeration effects from the gathering of people into mega-cities. Moreover, the fast pace of urban expansion is only because strong government interventions offer huge financial support and warrants, a situation which will impose strong constraints on its sustainable growth.

Chapter 6 combines statistical, empirical, theoretical and institutional

analysis to investigate migrants' behaviour. The investigation is based on empirical studies of in-person surveys in 2009 in Chongqing. It gained results such as: migrants with higher village opportunity costs will find jobs in the city which pay more; the urban experience is not an inverted U shaped relationship to Chongqing; the return of education is very low; compared with formal education, training had a surprisingly large effect on the outcome of migrant wages; manufacturing and construction workers do not receive more wages than others, *etc.* Moreover, this chapter also reaches other conclusions about migrant workers' attitudinal questions, such as how income in rural areas is crucial to migrant transferring decision making.

The final chapter (Chapter 7) summarises the major findings of this thesis, point outs the possible directions for future research and proposes some policy implications.

## II. THE BACKGROUND OF CHONGQING

### 2.1 Introduction

This study seeks to analyse the case of Chongqing for four reasons. Firstly, as an inland city, it has been ignored by previous studies which have not taken into account the importance of underdeveloped areas as crucial players in urbanisation. Instead they have placed more emphasis on the role of coastal cities<sup>6</sup>. Secondly, Chongqing has demonstrated the advantages of backwardness to amplify the effect of initial experiences of economic development at an early stage of reform and openness in China. Thirdly, its development speed has broken the national record many times in recent years. Fourthly, Chongqing boldly launched many leading experiments that have paved the way for inland areas. These include large scale State-Owned Enterprises (SOEs) reform and Urban Development Investment Corporation (UDIC) projects, large scale residency reform and fast urbanisation, large scale openness strategy and industrial restructure, *etc.* According to the Economist (2007), Chongqing's development in recent years is a microcosm of China.

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<sup>6</sup> There are few academic papers to analyse the model of the urbanisation process of Western China.

## 2.2 Development and Reform

### 2.2.1 China's Western Development: Chongqing's Status

The western regions of China have long been in poverty and backwardness ever since the early years of economic reform. The physical environment is very harsh and the land is covered by mountains, hills, plateaus and deserts. Infrastructure is very poor and transportation and telecommunication facilities are extremely underdeveloped. According to Yang *et al.* (2000), as early as the late 1970s, Deng Xiaoping suggested that the central government should give the backward western region help in all aspects. In the middle of the 1980s, two stages of regional development were proposed by Deng. Coastal provinces were to make use of their locational advantages and develop first. Then, they could help the development of the interior provinces. During his southern tour in 1992, Deng further proposed that China should shift the focus of development from the coast to the interior by the end of the 20<sup>th</sup> century. His main emphasis was to avoid the problem of widening disparities between the rich and poor. In general, China's Western Development has been under long deliberation, and the

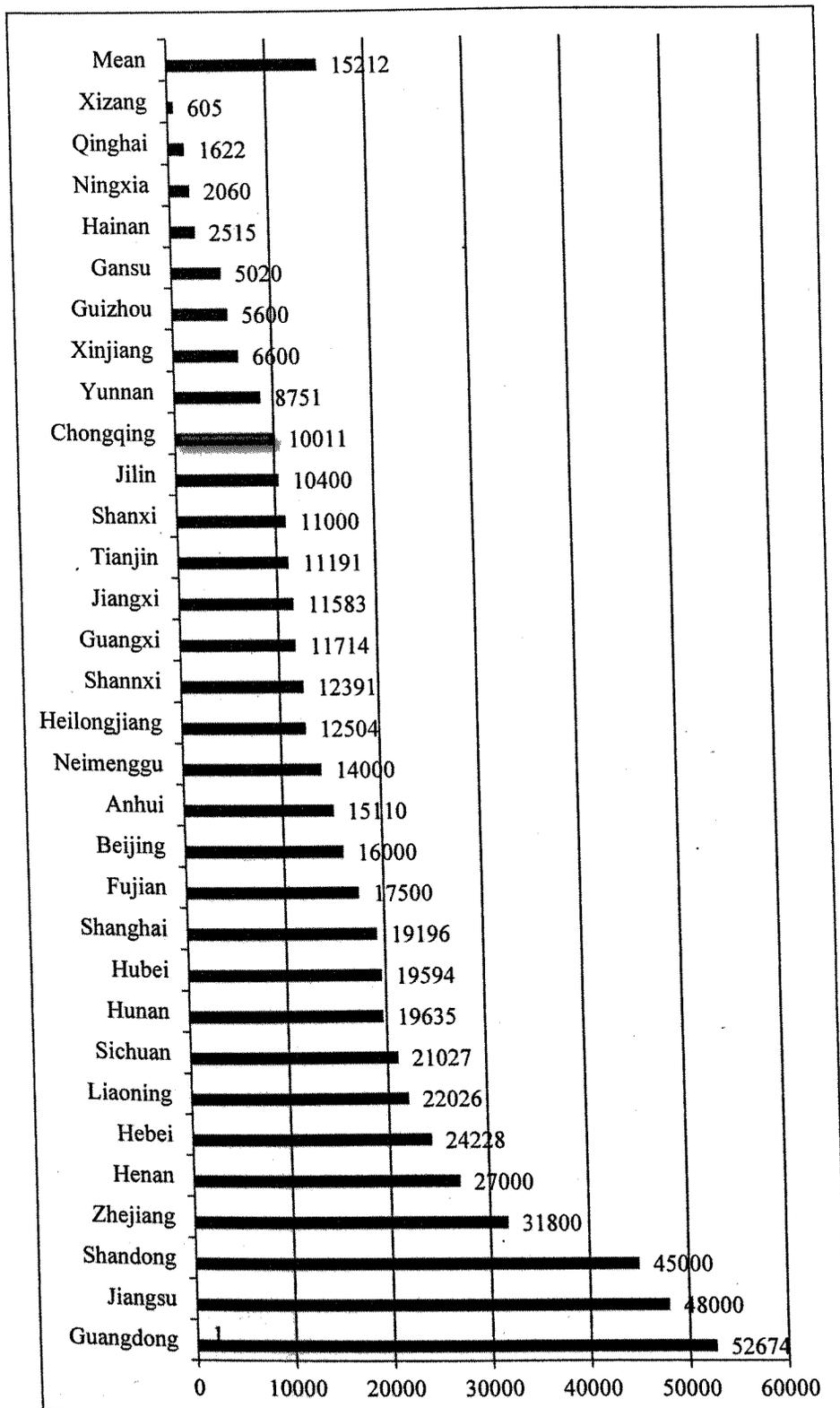
initial priority was the narrowing of regional disparities. However, Yao and Zhang (2001) provide empirical evidence to suggest that the rich Eastern areas became richer and the poor Western areas became poorer during the first twenty years after the launch of reform and openness. By the end of the 1990s Wong (2002a) considered the coastal region to be overly produced and invested in. Wong suggests that the curtailing of the development gap between the coastal and western regions was just a slogan.

Since 2000, and the launch of China's Western Development policy, Chongqing has become the core of western development due to its geographical advantage in the middle of China. Liu and Tam (2000) suggest that it will become a crucial centre for the region that will benefit other inland areas. Wong (2002a) also pointed out that Chongqing would derive speedier growth from opening up and the completion of the Three Gorges Project. According to the official government data, it was shown that Chongqing's GDP quadrupled from 2001 to 2010, - which is the fastest rate in the national context. Its growth rate in 2011 was 16.4 per cent - also the largest in the national context. The gap in GDP between Chongqing and the coastal provinces like Shanghai has clearly decreased. The regional

balanced development strategy has worked very well. Lu's (2012) report in Foreign Policy magazine suggested that the so called 'Chongqing model' has worked. It has not only satisfied state preferences but also immediately improved people's living standards. He thinks that the 'Chongqing model' was different from China's growth pattern because the main concern was living standards rather than investment and exports. Related to this, the Economist (Chongqing Rolls On, 2012) detailed that the value of the state-owned assets saw a six-fold increase in Chongqing during 2003-2009. At the same time, the proportion of GDP in the private sector had grown from 50 per cent to 60 per cent from 2005 to 2010. The government used 15 to 20 per cent of the profits from the local state-owned firms to improve people's livelihood in the past five years. This means that Chongqing's development seems to have gained a good balance, with fast economic growth speed and a better balance between rich and poor. However, this balanced development is apparently not the innovation of the Chongqing municipality government (CMG). It was strongly related to one of the requirements of Party Chief Hu Jintao (Report on the Work of the People's Government of Chongqing, 2008) in 2007 that Chongqing become the significant 'growth pole' in western China, an economic centre of the upper reach region of Yangtze River, and the municipality featuring coordinated

urban and rural development. Under strong province-level competition, the CMG must be very eager to fulfil these requirements. Furthermore, Mayor Huang Qifan is recognized as having played the most critical role in Chongqing's economic transition over the last ten years. He was once in charge of development of the *Pudong* New Area. He also has significant experience on SOEs reform and urban development. There are at least four important reform and openness issues: Chongqing's SOEs reform, Hewlett Packard's (HP) production base that settled in Chongqing, residency reform and financial reform (Huang, 2012). These were all directly related to the Mayor's promotion in recent years. According to Liu (2012), he has changed Chongqing fundamentally. Nevertheless, Chongqing's economic development and agglomeration still face many serious constraints. Although its GDP has passed a trillion RMB in 2011, economic scale was still very low and much lower than the national average (see Figure 2.1). In addition, the question of migration and the lack of indigenous competition in industry still limit Chongqing's urbanisation and economic development.

Figure II.1 Provincial GDP in China in 2011 (10,000 RMB)



Data Source: it is gathered from each province's official statistical communique.

### **2.2.2 SOEs Reform**

Chongqing has a large industry that is traditionally heavy and defence-related. During the Second World War, it became the provisional capital city. Many important industries were relocated from eastern China to Chongqing, which turned the city from being a remote inland port to an important heavy industrial city. For example, Chang'an Automobile Group was then Jinling Arsenal which was relocated from Shanghai to Chongqing. During the 1960s, many military factories were set up under the 'Third Front' development - a large industrial development on the south-western interiors that were recognized as strategically secured areas during possible war time. According to People's Daily (2003), after 1980, these factories were converted to civilian use and moved close to urban areas. During the 1990s, the Three Gorges Project gave the opportunity for Chongqing to construct factories for the manufacture of large scale equipment. For example, ABB and Chongqing Transformer Company formed ABB Chongqing Transformer Company, which was established as a joined venture company in 1998 and was then selected to locate in Chongqing by

the central government. This was to enhance Chongqing's industrial foundation (Li, 2003, p. 206). Overall, Chongqing has a solid industrial foundation.

According to Yao (2004), reforms of State-Owned Enterprises (SOEs) initially repeated the rural Household-Responsibility System (HRS) reform in 1980s, which used a bonus payment system. However, these imperfect reforms have deteriorated the efficiency of SOEs' and made large amounts of losses. The year 1996 represents a watershed when the government went from subsidizing those loss-making firms to offering them a period of time (1997-2002) to reduce losses. In effect, it was during those five years that the loss-making firms created a large redundant workforce. There were over 30 million job losses from formal sectors in urban areas in this wave of SOEs' reform. Appleton *et al.* (2002) claimed that eleven per cent of urban workers had been retrenched since 1992. The typical characteristics of those workers who had been laid off include low education levels, being female, being middle-aged or having a manual or unskilled occupation.

Chongqing is an important city of SOEs. Its SOEs have faced the difficulties of capital shortage. In 1996, there were 1 million SOE workers

who were without any income (Li, 2003, p. 257). Since privatization of housing units began in China in 1998, urban real estate prices in China have risen (Wang, Yang, & Liu, 2011). According to Han and Wang (2003), the SOEs have a large proportion of user-rights of urban land in China and this became their main advantage. They could legally transfer the land to others and gain profit. It was a very efficient way to reduce the SOEs financial burden.

The Chongqing Municipality Government (CMG) has established eight infrastructure-oriented Investment Groups (IGs) since 2001; partly by absorbing the redundant urban workforce and partly by promoting local infrastructure development. For example, the partial employment of highway constructors in newly formed Chongqing Expressway Development Corporation (CEDC) (one of eight IGs) come from laid-off workers of Chongqing Special Steel Plant (CSSP).<sup>7</sup> According to Khan's (2007) teams report on Chongqing's Urban Development Investment Corporations (UDICs), from World Bank, the eight IGs played a vital role

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<sup>7</sup> The CSSP was the then largest bankrupt SOE in China which had 180 thousand employees in 2005.

in the urban reform during the initial years.<sup>8</sup> Firstly, it was a financing platform of the CMG. IGs raised funds for urban infrastructure development from multiple channels. They provided funds to support infrastructure projects through on-lending or direct investment. Secondly, it acted as a public sector investor. They operated as authorized investment agents of the CMG or Chongqing State Asset Administration and Supervision Commission (CSASAC). They operated and managed the assets within their authorized scope, were responsible for maintaining the value of the assets and protecting the interests of the CMG. Thirdly, they were urban land development agents. They conducted up-front development and management of land allocated by the CMG. Fourthly, they possessed all of the valuable infrastructure assets of Chongqing. They operated almost all the urban communications and rail transit: city roads, highways, bridges, tunnels, ports, and railways. They also operated all the land storage, tourism attractions, part of the geographical resources and power; which includes electricity, gas, coal, water-related industries, *etc.* Finally, IGs absorbed vast amounts of laid off workers from the bankrupt

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<sup>8</sup> According to Khan (2007), for example, the eight UDICs' assets reached RMB 191.9 billion in 2006, which accounted for 42.5 per cent of the total municipal state-owned assets.

SOEs and this stabilized society. China's local government debt, which is caused by these local financial platforms, has been criticised throughout (Rabinovitch, 2011).

### 2.3 Migration and Urbanisation

Chongqing has a population of 33.03 million, including 21.96 million farmers. Among them, 8.4 million farmers have become migrant workers, including 3.9 million working and living in the urban areas of Chongqing (Xinhua, 2010). During recent years, Chongqing launched its large scale residency reform within which 4.7 million migrants moved from rural to urban places 3.2 million migrants moved in 2011 alone.<sup>9</sup> In addition, according to Chongqing Commerce News (2007), the aim is to reach an

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<sup>9</sup> The data source is from the Report on the Work of Chongqing Municipality Government (Huang, 2012) in Chongqing People's Congress (CQPC) in January 2012. According to Mayor Huang Qifan's (2010) announcement in a press conference, the rural migrant workers who got the urban *hukou* are included in the 2 million who had 5 years Metropolitan Advanced Economic Sphere (MAES) experience or 3 years county level city experience, 300,000 who did not get the urban-*hukou* because of some historical problems, 400,000 who had graduated from senior high school or the equivalent or above, and the rest of the people who received urban *hukou* came from urban slums. The mayor emphasized that all transformations from rural to urban *hukou* depended on their own volitions.

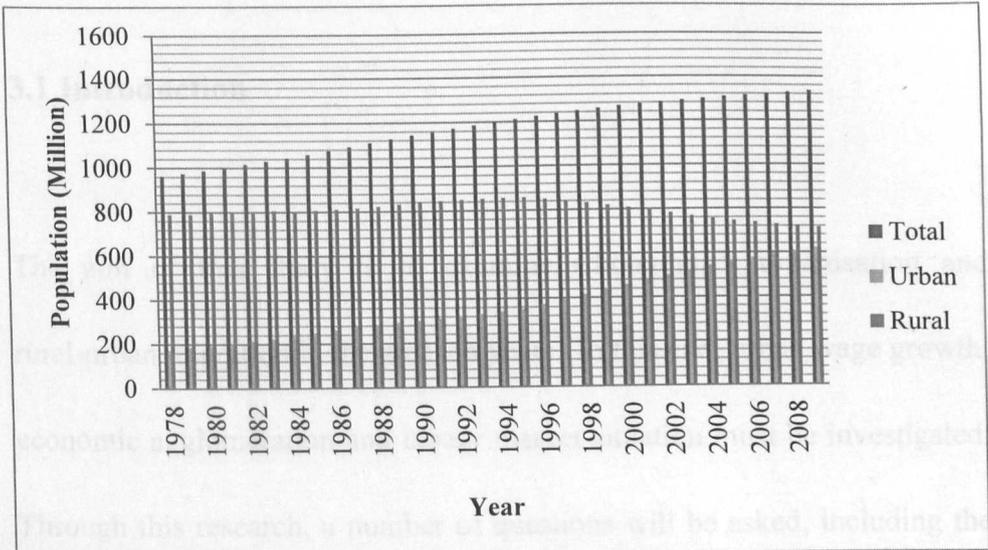
urbanisation rate of 70 per cent or 22 million urban-*hukou* residents by 2020. Larson (2010) concludes that this means Chongqing will absorb roughly 1 million new urban dwellers each year.

In 2010, Chongqing was identified as one of China's five National Central Cities<sup>10</sup>, which were Beijing, Tianjin, Shanghai, Guangzhou and Chongqing. Figures 2.2 and 2.3 show the structure of population distribution in rural and urban areas. In 1996, the rural and urban population ratio in the whole of China and Chongqing was the same at 7:3. After that time, both of the ratios quickly declined. In 2008, Chongqing's ratio was approaching one comparable to the whole of China's 6:5 ratio. This shows that Chongqing's urbanisation is faster than the national average. However, the total population in Chongqing makes it appear that the change is very small. In the middle of the figure, the change even declined a little.

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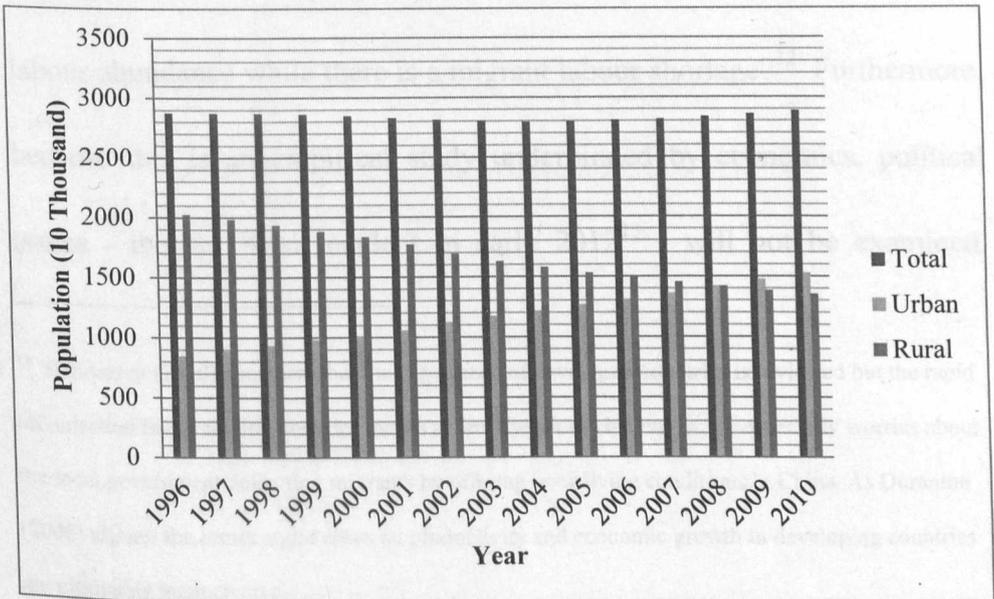
<sup>10</sup> National central cities are the cities at the highest level of China's urban system planning, which have great impact around the surrounding cities on infrastructure, finance, public education, social welfare, sanitation, business licensing and urban planning. In addition, Hong Kong is a special-national central city.

**Figure II.2 Permanent Residents in Rural and Urban China**



Data Source: the data is obtained from NBS online data search.

**Figure II.3 Permanent Residents in Rural and Urban Chongqing**



Data Source: the data is obtained from Chongqing Statistics Bureau (CSB) yearbooks online search.

### III. LITERATURE REVIEW

#### 3.1 Introduction

The aim of this study is to examine Chongqing's urbanisation and rural-urban migration in the past ten years. To this end, urban wage growth, economic agglomeration and labour market situation must be investigated. Through this research, a number of questions will be asked, including the following: how do the determinants affect the wage growth of urban workers? Why is it that urban agglomeration often lags behind economic development in developing countries like China?<sup>11</sup> Why is there a rural labour abundance while there is a migrant labour shortage?<sup>12</sup> Furthermore, because this is an empirical study underpinned by economics, political issues - the Bo Xilai incident in early 2012<sup>13</sup> - will not be examined.

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<sup>11</sup> Henderson (2010) considers that the experience of developed countries is reviewed but the rapid urbanisation in developing countries makes an intense set of challenges. He especially worries about the local government deflecting migrants by offering poor living conditions in China. As Duranton (2008) argues, the issues about cities on productivity and economic growth in developing countries are ultimately inconclusive.

<sup>12</sup> Chan (2010) lists many reports and research about the migrant labour shortage. The earliest one happened in the years 2002 and 2003.

<sup>13</sup> This incident was closely related to China's regime replacement in the autumn of 2012, which will impact the future of China. Thus, all of the world-class news media threw in large amounts of

Nevertheless, politics will be used to provide a perspective to understand Chongqing and China.

This chapter reviews the interests at the core of this thesis including basic concepts, key arguments, empirical results and theories. The rest of this chapter is organized as follows. The next section reviews urban wage growth theoretical frameworks. The third section reviews the concepts and empirical issues with respect to agglomerations, and then Chongqing's situation regarding agglomeration will be briefly reviewed. The fourth section is concerned with labour markets. This includes the transitional history of China's labour market after 1949, the challenges for China's labour market and theory about labour markets. The fifth section will discuss an argument about China's government data. The final section will provide some conclusions.

### **3.2 Urban Wages**

For the *de facto* urbanization process, many scholars argue that the more

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reports.

the urbanization process is completed, the smaller the rural urban wage gap will be (Kanbur, Venables, & Wan, 2006). This process is due to the manufacturing growth based on technology and trade (openness) or other policy shocks that lead to rural-urban migration and urban population accumulation in particular regions. It is not only population movements that have closed the gap *per se*, but the development of the rural sector and the transformation of farming technology from labour to capital and to higher skill intensity.

Higher levels of urbanization are also associated with increased urban wages per capita. The connection between urban wage levels and urbanization has two lines of thinking. Firstly, to stress the idea of either a technology change or productivity differential which leads to a shift of resources out of agriculture into an urban sectors (Krugman, 1991; Fujita, Krugman, & Venables, 1999). Secondly, by focusing on endogenous economic growth context a country can start off as agricultural, and then as the urbanization proceeds, develop a system of cities (Henderson & Wang, 2005). Assessing the urban workers' income change is a crucial factor in studying both arguments.

According to Quigley's (1998) review, most literature on the wage growth and economic scale-related issues began with Marshall's (1890) trinity: labour market pooling, input sharing, and knowledge spill-over. The modern study of urban wage growth and population accumulation began with the work of Vernon (1960) and others, as part of the New York Metropolitan Region Project. The newer research deals with the urban wage growth issues which are disaggregated by firms, workers, or geographical units and estimate wages from productivities. Moomaw (1981), Nakamura (1985), and Henderson (1986), etc. have taken this approach. The key finding of these early papers was that a relationship between wages and productivity existed, with different effects across industries. Additionally, long lists of relatively recent papers have focused on urban wages function to estimate the determinants (Glaeser & Mare, 2001; Au & Henderson, 2006a; Combes, Duranton, & Gobillon, 2008). Of these, Glaeser and Mare suggest that the city (the concept of areas) *per se* helps wage growth compared with non-urban counterparts, which implies that cities speed the accumulation of endowments. They also address unobserved heterogeneity in worker types in several ways. Au and Henderson use China's data to estimate the relationship between real income per worker and city employment. The relationship presents an

inverted U shape. They also find that the strong restrictions on migration result in large income losses. Combes et al. estimate the individual worker wage function by employing a two-step procedure on disaggregate panel data. They control for various location and worker fixed effects and find that spatial skill differences result in wage disparities, which suggests that skills distribution and density of employment are the crucial factors to wage growth. Nevertheless, there are several inconclusive discussions about the deep determinants of urban wage growth which still need to be analysed. Moreover, in the current context, the characteristics of Chinese production and geographical problems in some inland areas must be carefully scrutinised.

### **3.3 Agglomeration**

#### **3.3.1 Concept of Localisation and Urbanisation Economies**

The concept of localisation economies coupled with urbanisation economies has been more prevalently used to examine agglomeration. Glaeser *et al.* (1992) claim that the earliest accurate discussion of the idea that agglomeration originates from localisation is in Marshall's (1890)

*Principles of Economics*. Marshall said that the concentration of an industry in a city helps knowledge spill over between factories and the growth of that industry helps the city grow, and *vice versa*. Another important influential argument related to the spatial industry concentration is found in Jacobs' (1969) *The Economy of Cities*. In contrast to Marshall's analysis of urban specialization, Jacobs stresses the importance of urban diversity. Her argument is that diversity promotes exchange of ideas.<sup>14</sup> Recent empirical studies on this in developed countries that endorse Marshall and Jacobs' sectionalisation method and the result ranges of the elasticity of urbanisation economies to productivity were roughly from 3 to 8 per cent, and ranges of the elasticity of the corresponding localisation economies value were roughly between 3 and 5 per cent (Rosenthal & Strange, 2004).

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<sup>14</sup> This is an analysis of the industry agglomeration and can also be applied in the same way to people. The reason why people are attracted to the city is that it provides an environment in which people can exchange and innovate their ideas quickly. They also have the opportunity to learn from others and improve their own productivities. If they didn't, they would stay in their original location where they feel safer and live at low cost rather than push themselves to an unfamiliar place that is full of competition and high rents. As a result, the attraction of the city entails the city agglomeration.

Localisation and urbanisation economies as a formal concept have been proposed by Walter Isard (1956) who has distinguished agglomeration scale economies into the two forms above.<sup>15</sup> According to Strange's (2009) arguments, there is an unresolved debate as to what is the best way to analyse the empirical data of urban development on localisation and urbanisation economies, especially those of the developing countries. One of the main reasons for this difficulty is that the traditional method was a way of static analysis. However, the static analysis has been replaced gradually by the dynamic analysis. Under the original structure, Glaeser *et al.* (1992) introduced the Romer (1986) and Lucas's (1988) dynamic view of cities on externalities<sup>16</sup>. This view explains simultaneously how cities form and grow. Dynamic localisation economies were called Marshall-Arrow-Romer (MAR) externalities and dynamic urbanisation economies were called Jacobs externalities. Thus, there were two related issues for industrial agglomeration in cities: the first one is static external

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<sup>15</sup> Interestingly, in Isard's (1999) old age, he abandoned the 'old-fashioned' way and used methods from physics and chemistry to analyse agglomeration instead. He then criticized the localisation and urbanisation economies or diseconomies as outmoded. Such method is an apparent novelty but it is still too complicated to be examined when lacking data, which is the crucial restraint making this method far-fetched.

<sup>16</sup> It also can be described as endogenous growth theory.

economies of scale; the second issue is dynamic knowledge accumulation. In thinking about the dynamic view, the analysis of localisation (MAR) and urbanisation (Jacobs) economies are still the appropriate ones to describe agglomeration. In addition, MAR and Jacobs' effects can be measured within and between sectors respectively (Duranton G. , 2007; Combes, Duranton, & Gobillon, 2008). Moreover, the localisation economies also closely relate to urban hierarchy (Da Mata, Deichmann, & Henderson, 2005) or changes in urban boundaries (Walcott, 2007).

The formal definitions of these two agglomeration externalities have been provided by Todaro and Smith's (2009, p. 327) *Economic Development*: urbanisation economies are effects related to the general growth of a concentrated geographic region; localisation economies are effects captured by specific sectors of the economy, such as finance or automobiles, as they grow within an area. Similarly, Duranton (2008) considers that strong localisation economies are expected to boost the growth of specialized cities, and strong urbanisation economies boost that of diversified cities. More precisely, Strange (2009) claims the city's total employment could be used to evaluate the urbanisation economies that can demonstrate the formation of large cities. The level of employment in

particular industries is an index of the localisation economies that can determine the formation of industry clusters. Maarten and Verwijmeren's (2010) argument goes deeper into the heart of this problem. By measuring the intensity of human and physical capital within certain areas in order to establish the density of economic activity, they suggest that the density of general economic activity is associated with urbanisation effects.

For the relationship between specialization (localisation economies) and economic growth, Glaeser *et al.* (1992) propose that specialized cities, which are caused by localisation economies, do not encourage growth. Correspondingly, Henderson *et al.* (1995) support the idea that specialization does not have positive effects on growth. Duranton and Puga (2001) argue that the new industries derived from diverse cities will move to specialized cities after reaching maturity. Henderson (2010) states, in most cases, that specialization can only support limited agglomeration and growth. However, Henderson *et al.* (1995) also emphasize that if sectorial employment is constant, the mature industries will grow. Combes (2000) detects that only small cities can make economic growth by specialization. Rosenthal and Strange (2004) consider that if the city controls the total employment rather than the sectorial breakdown employment,

specialization will not support growth. All of these conclusions are made on the basis of studying developed countries within which the role of national government is much different than it is in developing countries. According to Henderson (2010), the heavy government interventions during urbanisation in developing economies should be taken into account.

### **3.3.2 Empirical Studies on Agglomeration**

Having reviewed the concept of localisation and urbanisation economies, the empirical studies will be reviewed below. Rosenthal and Strange (2004) give the older static work a detailed review. The discussion in this chapter focuses on the dynamic ones. There has been a renewal of interest in agglomeration on localisation and urbanisation economies since scholars introduced dynamic focus, especially in the field of empirical analysis in recent years.<sup>17</sup> Henderson *et al.* (2001) discovered that localisation economies occurred in Korean industries, most notably in mature industries. Combes *et al.* (2004) also found the same results from considering French

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<sup>17</sup> The traditional debate in the empirical literature on agglomeration economies concerns whether they are related to the concentration of an industry or to the size of a city itself. In other words, the debate concerns the relative importance of localisation and urbanisation economies.

panel data. They estimate that large and traditional industries have a relationship between industrial concentration and growth. Further analysis has been carried out by Lall *et al.* (2004) for India, and Deichmann *et al.* (2005) for Indonesia. Both produce similar results. Overman and Venables (2005) provide evidence about localisation effects in their report by looking at a number of case studies in a wide variety of countries and sectors. Au and Henderson (2006a; 2006b) argue that Chinese cities are a mix of localisation and urbanisation economies. Broersma and Oosterhaven (2009) suggest that the regional labour productivity in the Netherlands is affected by urbanisation economies. Baldwin *et al.* (2010) employ data for Canada and find that the metropolitan areas benefit from urbanisation economies. Fu and Hong (2011) also provide evidence to suggest urbanisation externalities in China.

### **3.3.3 Chongqing's Agglomeration**

The three sources of agglomeration economies that are first suggested by Marshall (1890), namely, labour market pooling, spill-over in knowledge and sharing of inputs, have been individually analysed in the context of Chongqing's environment. Firstly, labour market pooling will be discussed.

Strange (2009) provides the example of experience of Apple's program employees who maximize the benefits of finding the most appropriate work. However, Chongqing's technology workers have difficulty in developing their careers. This is in contrast to the observations of Rosenthal and Strange (2008), which present why agglomeration raises wages and therefore high income becomes associated with competitive work and skilled labour. According to Porter's (1990) national competitive development stage theory, Chongqing has not advanced beyond the production base, resulting in a lack of high-technology skilled posts. Meanwhile, SOEs have a large number of high-income posts that are largely unknown to the public until the employees have been chosen by the SOEs. The result is that high-income jobs are limited to the public. Due to this nepotism within the local labour market, the system for employment is very rigid and therefore there is a constant lack of skills available. Secondly, if good workers and good-job vacancies do not match freely, job-finding is only a success under rent-seeking, and there is a failure of knowledge spill-over. Moreover, the bad "*secrets of the trade in the air*" not only distort all resource prices but change good society culture into a bad one, which results in a biased work concentration within work units. Thirdly, the CMG invests heavily in many infrastructures and, although most of them

are under primacy strategies, the sharing of inputs still works. Obviously, this is different from the way major scholars normally consider how input sharing works - where the proximity of firms in related industries brings mutual benefits. It is suggested that these three situations not only happen in Chongqing but also in the whole country and always in the shadow of the Confucian society, which is all based on relationships or connections. However, as this is not the focus here and as there is no ready information, it will not be pursued further.

### **3.4 Labour Market**

#### **3.4.1 Labour Market Development in China**

##### **3.4.1.1 The labour system under planning**

Before the People's Republic of China (PRC) was established, farmers made up the majority of China's population. The movement of labour forces were relatively free across regions (Gottschang, 1987). According to Lin *et al.* (1996), after 1949, due to support in the heavy industry construction in cities, the government imitated Soviet Union's national

planning system to (a) set prices and (b) administrate the allocation of products and inputs, including labour. The urban workers were paid a subsistence wage but government and state-owned work units offered low cost food, housing, education, health care and pensions. Such a system was a political and social complex to restrain the urban workers; the workers were tied to work units. Not only did the workers not have common rights to change their jobs, but also the managers of those work units did not have common rights to manage companies or factories; they must follow the centralized allocations, including for labour. Wages were based on a classification system that distinguished occupation, region, industry, administrative level and type of workplace (Yuen, 2004). Wages differed among individuals but the differences between each other were very small (Cai, Park, & Zhao, 2008). The household registration (*hukou*) system, which can be used as distinguishing agricultural and non-agricultural residents, launched in the 1950s. Agricultural residents were excluded from all urban entitlements as described above.

#### 3.4.1.2 Reform period

The HRS was the earliest and most important economic reform after 1978.

This system gave discretion to rural households who could own their profits. The changes greatly increased the returns of farm activity. In addition, the demand for labour in non-agricultural sectors and relatively high returns attracted farmers to leave traditional agriculture sectors (Cook, 1999). Initially, according to Cai *et al.* (2008), the government suggested rural labourers to “*leave the land without leaving the village*”. After 1983, the government began permitting rural labourers to find jobs outside of their own village on a temporary basis.

Township and Village Enterprises (TVEs), which are collectively-owned work units, had extraordinarily rapid growth in rural areas; and some of them expanded from rural to urban areas. These sectors attracted a large amount of rural migrant workers. It is said there were over 123 million migrant workers in 1993 (Cai, Park, & Zhao, 2008). Cai *et al.* concluded that there were two important consequences of TVEs’ development for China’s labour market at the time. One conclusion was that the abundant rural labourers did not to go far to find a job. The second is that the TVEs growth created pressure to reform SOEs which were recognized as inefficient work units compared with TVEs. In urban areas, the SOEs’ reforms initially had similar principles to the HRS: to increase managerial

autonomy by allowing enterprises to keep a higher share of profits and also set worker bonuses. It also introduced a labour contracts system in the middle of the 1980s. However, the government still controlled the redundancy amount (Meng, 2000).

After Deng Xiaoping's southern tour in 1992, the demand for labour increased with the economic boom in coastal cities. At the same time, a series of reforms were launched; the government re-adjusted migrant expelling regulations which allowed the migrants who had four documents (ID card, urban temporary resident permit, employment certificate and card) to stay working. "*Seizing the large and letting the small go*" (*zhuada fangxiao*) reform was the government allowing small and medium SOEs to be privatized while they kept larger SOEs (Cao, Qian, & Weingast, 1999). However, at this time, the whole of China had a very poor pension system which made the SOEs reform extremely difficult. Initially, the laid-off workers could have only three years of living subsidies which included pensions and health care benefits. The government then implemented an unemployment insurance program in 1999. This program solved the problems of workers whose lay-off subsidies had expired. If their three years of living subsidies expired, they became immediately eligible for

unemployment insurance.

According to Cai *et al.* (2008), the government did not endorse migration as a key way for increasing the incomes of farmers until 2004. Direct intervention in rural-urban migration by the government was ended in cities, except for a few large cities in coastal areas. However, after that, the reform of the labour market has been obstructed. The employment mechanisms of state-owned enterprises became the biggest challenge to labour market reform because they were not subject to market forces (Knight, Deng, & Li, 2011).

### **3.4.2 The Challenge of the Labour Market**

Knight and Li (2005) consider that there is no necessary connection between wages and the competitiveness of the labour market. The wages of urban residents which have been protected by official policies were determined by enterprises' institutions rather than the market. The wages of rural migrant workers were regulated by market forces, all of which makes China's labour market severely segmented. In other words, the rural migrant workers, even those who received the urban *hukou*, would still not

expect to find a good job like the urban indigenous people because the labour market within the urban areas was also segregated (Zhao Z. , 2005). Thus, for rural migrants, the urban-*hukou* has already become unnecessary.

Moreover, since 2003, there has been a striking phenomenon of rural labour abundance when there has been a migrant labour shortage. Between 2009 and 2010, the rural migrant labour markets suddenly changed from surplus to shortage in coastal provinces. Both these reasons have drawn the interest of many scholars. Chan (2010) suggests three points to explain the dearth of migrant labour. He considers that the most important issue is the problem of the migrant workers' age structure. He lays particular stress on younger migrants which are the source from which the emerging sectors draw most of their workforce. The fact is that the pool size of these young migrants has dropped dramatically since 2010. Thus, this relates directly to the pressure of the labour market. Secondly, he finds that there is a structural mismatch of skilled workers; the Guangdong example supports his idea. Thirdly, the central government stimulus package at the end of 2009 was recognized as the crucial reason which caused migrants to return home. In comparison with Chan, the views of Knight *et al.* (2011) are likely to expose more meaning on fundamentality and non-territoriality.

They stress the impact of the segmentation of the labour market on the paradoxical phenomenon explains the institutional constraints. For example, the lack of opportunity in cities to find relatively stable jobs creates obstacles to migrants who try to live in urban areas. They conceive that the increase in migrant wages, which is the most crucial issue needing to be solved in the urbanisation process, might be related to two factors. One is the income increase in rural areas, and the other is the increase in migrant workers' human capital. These two conditions are difficult for China to meet at present, which is another reason that explains China's paradox. Cai and Du (2011) find that all-agricultural sectors wages increased and the wages of unskilled and skilled workers have converged, which means China has passed the Lewis turning point. Based on such ideas, the migrant labour shortage is the norm. Chan and Knight *et al.* both have doubts about this because they do not believe that China's labour market is mature, which is the premise of Cai and Du. The labour market in China is in the process of maturing, but it still needs to overcome many barriers. For example, if the local labour market is mature, the CMG do not need to build such large scale public rental housing to support low-income groups; the low-income groups include the urban traditional low-income groups, the rural migrant worker groups and the new college graduated student

groups.

### **3.4.3 Theory of Labour Transferring from Rural to Urban Areas**

In the important essay of Lewis (1954), 'Economic Development with Unlimited Supplies of Labour', he discovered that the gap between 'capitalist' and 'subsistence' earnings could be explained in many ways: the city's congestion costs, the rural migrants' psychological costs, the city's management costs, the cost of unskilled workers increasing productivity and the social prestige costs, *etc.* Due to this, he notes that even if rural labourers could compete with urban citizens, they will not. However, he still considers that the supply price of rural labour will rise and be associated with the increase of marginal products in the modern sectors by the determination of the markets. Todaro (1969) illustrates an example from Kenya in 1964 to suggest that the government intervention during the urbanisation process resulted in inefficient economic results. It thus conducts a false probability on the rural labour supply. For China, Au and Henderson (2006) find empirical evidence to show that setting artificial barriers in migration from rural to rural, urban to urban and rural to urban areas results in a reduction of the rate of growth of GDP. The interventions

which are in favour of eliminating distorted restrictions will be welcomed. Knight *et al.* (2011) improve and add constraints to Lewis's labour transferring model to give answers. They find new constraints to rural-urban migration; for example, the segmentation of labour market, the outside shocks, spatial differences and urban primacy, *etc.* These constraints form obstacles to rural-urban migration. They consider that if the government gives pertinent interventions to release those constraints it will improve economic growth and resource allocation. However, these models are based on the underlying premise of a competitive environment for analysis, which is not the case. It is necessary to clarify the micro level mechanism which initially affects the migration motivation and then mixes other subsidiary conditions. Otherwise the inefficient argument above would be shown as illusory.

### **3.5 About China's Government Official Statistical Data**

According to Wong (2002b), National Bureau of Statistics (NBS) has good reporting networks and ministries-dependent reporting regulation. On the one hand, the data from NBS was normally used as propaganda purposes, and therefore can be seriously doubted. On the other hand, there was no

evidence proved by scholars that the official government statistical figures that existed were systematically fabricated data. Nevertheless, the data's inaccuracy and inconsistency was a common occurrence. With respect to the organization structure, a national enterprise survey unit, a national urban survey unit and a national rural survey unit were all controlled directly by NBS (Ren, 2002).

### **3.6 Conclusions**

This chapter reviews theories about urban wage growth, agglomeration and labour market. It is demonstrated that China's determinants of urban wage growth, the situation of agglomeration and the arguments of motivations of labour transferring are still inconclusive. This study will try to use Chongqing's case to give a viewpoint on the urbanisation and rural-urban migration of backward regions by decomposing it into three inherent parts: the inland wage growth of urban workers (the 'pull' force of migration), the magnitude of cities' industrial agglomeration (the city's absorbing capacity), and migrants' transferring motivation (the 'push' force of migration). According to the literature discussed above, the thesis raises the following questions, amongst others: What are the determinants of urban wage

growth? How does openness affect the wage growth of urban workers? Why has Chongqing urbanized so quickly? Why are migrant workers who work in secondary sectors still on low incomes? Why are the launching forces of urban-rural balance strategies so strong?

In the following chapters, the thesis will answer the above questions. Firstly, the next chapter examines Chongqing's urban workers' wages through focusing an investigation on various determinants and the effects of openness. In Chapter 5, the thesis investigates Chongqing's localisation and urbanisation economies by focusing on the estimate of modified production function at the county level based on the three sectors respectively. Finally, in Chapter 6 the thesis studies, by way of an in-person survey, the motives of migrant workers for transferring in Chongqing's labour market.

## **IV. OPENNESS AND WAGE GROWTH OF URBAN WORKERS IN CHONGQING**

### **4.1 Introduction**

The subject of the highly deterministic link between growth in urban wages and the accumulation of urban population has been extensively discussed in the literature (see Duranton, 2008 for a review). However, there are several on-going and thus far inconclusive discussions about the deep determinants of urban wage growth (openness factors) and about the policy issues strongly related to proper strategies to achieve economic development and convergence in the inland areas of China. For instance, Bo and Chen (2009) believe that the inland mega city of Chongqing would directly bypass the stage of export-oriented manufacturing to flourish in domestic markets. Chen *et al* (2009) suggest that government policies tend to improve local scale efficiency in inland areas. According to their arguments, despite improvements to the infrastructure of Chongqing, it remains a relatively landlocked city and that logistics costs are always higher than coastal areas; in other words, the natural argument is that Chongqing's urban wage growth would have to depend on its profound industrial foundations to realize the increasing returns of scale, rather than

openness. Nevertheless, it is not realistic to only depend on indigenous industries to develop local economy, because the crucial context of Chongqing is that its economic scale is still well below the national average and much smaller than developed provinces in coastal areas.<sup>18</sup>

On the other hand, for the openness factors *per se*, there is also a large amount of literature (see Anderson, 2005 for a review). Greater openness can affect income variation in many ways by easing the cost of goods and services. Some scholars believe that the positive effects of openness are the fundamental factors for the growth of productivity in China (Ju, Lin, & Wang, 2009; Jiang, 2011). According to their strands of thought, it is a problematic idea that just emphasizes closed development towards inland cities to be a thriving domestic market; such an intuitive method will meet a question about whether it can achieve long-term sustainable growth. Nevertheless, people also doubt whether inland geographical features will meet the requirements of openness which are easy to connect to the overseas and suitable for FDIs in terms of local endowments structure. In

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<sup>18</sup>See Figure 2.1. Chongqing's GDP at province level was 50 per cent less than the national average in 2011. In comparison to this, Beijing's GDP was 5.2 per cent more than the national average and Shanghai's GDP was 26.2 per cent more in 2011.

other words, expecting Chongqing to become a real national hub city in the western region of China, it is indeed another policy choice of development to follow the previous successful experiences of coastal areas to be greater openness. However, the premise is that it must overcome its geographical predicaments of high freight cost and other rigorous conditions like the requirements of human resources. Openness can definitely bring several efficient ways to let 'follower' economies learn from 'leader' economies, none of which are easy to do in inland China. Thus, coastal areas have become more open but the openness of inland areas has been paid less attention over the recent two decades.

So, it is still a matter of dispute as to what model Chongqing and its surrounding areas should take to get rid of poverty and realize inland ambitions, and therefore catch up with developed areas. This chapter combines the above debates and links openness (which is captured by industry's utilisation of FDI) and urban wage growth together to analyse the determinants of Chongqing's urban wage growth. It will also discuss how different magnitudes of openness affect the process of urbanisation and agglomeration of landlocked inland areas. The following discussion is composed mainly of two sections. The first focuses on the theoretical

framework and reviews existing theories and recent empirical evidence regarding openness and urban wage growth. The second section conducts an empirical analysis of data from 38 industrial sectors in Chongqing as a case study to estimate and analyse the hypotheses raised in the theoretical section. In addition, for the scope of this research, there are two main strands of thought to understand the wage growth of urban workers. There are two different aspects during the wage's variation: the process of urbanisation and agglomeration, or the degree of concentration of urban resources. Rather than coming up unilaterally, the two phenomena occur simultaneously in the developing areas of China.<sup>19</sup> The combined effects of both issues are encompassed by this chapter and the analysis of agglomeration effects is dealt with in the next chapter.

## **4.2 The Theoretical Framework**

Urbanisation in China - which is highly related to the wage growth of urban workers - is an unprecedented process. According to McKinsey Global Institute (2009) about 400 million rural people - more than the

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<sup>19</sup> For instance, the urban agglomeration can persist even as high income countries with fully urbanized (Henderson, 2003b).

entire population of the United States - are expected to move to Chinese cities by 2030. On the other hand, in terms of the distribution of urban populations, cities in coastal areas are readily overcrowded while a large proportion of cities in inland areas are undersized (Au & Henderson, 2006a). Thus, there must be a lot of migrant workers to transfer back to their original inland places while more rural people are becoming urban residents. Moreover, there can be no doubt whatsoever that Chongqing, as the exclusive inland national core city, is playing a key role of economic reform and development in the whole process (Wong, 2002a).

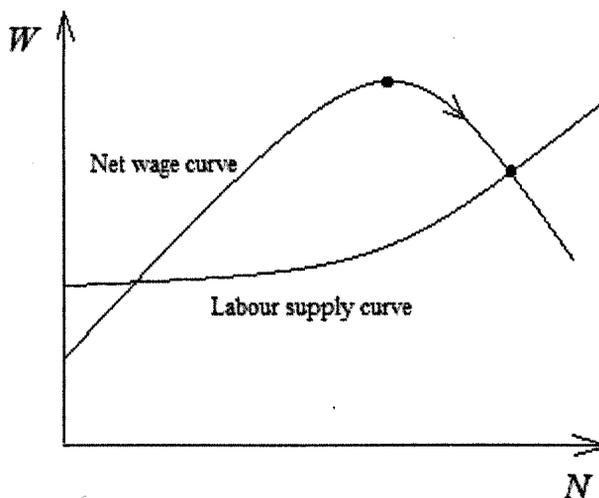
Starting from late 1990s, Chongqing, the biggest city in inland China, started a strategic process of reform and openness, called the China Western Development Strategy (CWDS) which aimed to stimulate inland dynamic growth in order to catch up with coastal areas. Chongqing has achieved its economic growth every year of the last decade. According to the data from Chongqing Statistic Bureau (CSB), the city achieved a GDP growth rate in 2011 of 16.4 per cent, which is the fastest in the national context. Its disposable income in urban sectors rose 185 per cent in real price terms whilst per capita savings in each year increased 164 per cent from 2001 to 2011. Thus, there was an increased rate of personal

expenditure beyond the increased rate of disposable income. Of these expenditures, one of the main items of discretionary consumption is housing, the price of which increased 169 per cent in real price terms over the period. In addition, another significant item is the consumption of private cars, quantity of which increased totally from 55,262 to 782,994 since 2001. This suggests that personal outlays correspond to a substantial increase in discretionary consumption and also reflect the ever-growing desire of consumers for material comfort. Nevertheless, as observed by Deborah (2005), with the inequality of earnings the general behaviour of consumers in the mega cities of China are still moderate because such consumer culture incorporates the memories of the poor past. So, above analyses just account for a reason that the income increase rate of urban residents is far more than a compelled payments increase rate. The net wage of urban individuals is predicted to increase in Chongqing.

In addition, the permanent urban residents have increased in number by 5.5 million and employment in industrial sectors has increased from 0.82 million to 1.46 million over the period of 2001 to 2011. In the case of Chongqing, its increased urban population is associated with an increase in the net wages of urban workers, a situation which is absolutely in contrast

with the classical argument of Harris and Todaro (1970) in their celebrated paper. They stated that the influx of rural workers into urban centres would lower the net wages of the formal sector. Put another way, the curve of urban net wages was predicted to be a downward-sloping curve which corresponds to the results of 'neo-classical' wage curve sloping downwards with an increase in the demand for labourers. This is a puzzle and it has been well discussed by Duranton (2008). In order to lead further discussion of the importance of openness during an urbanisation process, this chapter borrows his theoretical framework to explain and review normal determinants and market inefficiencies on the net wage growth of urban workers.

**Figure IV.1 The Reduced Welfare Effect of Expansive City**



Source: Duranton (2008)

In Figure 4.1, a net wage curve of a city is assumed as a bell-shape in an urban system. In absence of any policy intervention, a labour supply curve cuts the net wage curve and a peak point is not an equilibrium point. A stable equilibrium point is the second intersection point between the labour supply curve and the net wage curve. In addition, the labour supply curve of a city mainly reflects the conditions of rural hinterlands. The influx of migrant workers will create a final equilibrium from the peak point down to the second intersection point, which means the decrease of net wages. In so doing, this shows that inefficient market arrangements make urban economies the second-best economies, as opposed to the first-best economies. Based on this reduction framework, the deep determinants of urban wages will be analysed in the following sections to explain how forces from outside suppress the inefficiencies.

At the beginning, a production function is used to provide the analysis relating to physical capital, human capital and technology. This standard simplification is lacks of the basic concepts of increasing returns to scale and therefore is too simple to explain behaviours. Another argument is to analyse primacy phenomena which are too special. Neither the former

tautology theory nor the latter *ad hoc* theory could satisfy the context of this chapter. Thus, other competing hypothesis should be discussed. The manner of urban increasing returns has also been widely discussed by economists (Duranton & Puga, 2004; Kim, 2006; Marian, Weslyne, & Juan, 2008; Puga, 2010). The earliest one can be traced back to the traditional Marshallian ‘trinity’ theory (Marshall, 1890) which talks of spillovers, input-output linkages, and labour pooling. The problem is that the sources of urban increasing returns are also the sources of urban inefficiencies. Duranton (2008) argued that the sources of inefficiencies stemmed not only from the regularity of production structure and the cost of living, but also were related to the barriers to migration and the failure of co-ordinated regulation from the local government. In addition, some other competing factors such as geography, culture, spatial structure, endowments structure and openness can also explain certain aspects.

Most economists still think institution is the key factor to date, because institution will determine the incentive for production, accumulation and innovation. Good institution or correct policy can suppress wage losses from the inefficiencies and create a higher net wage curve and a larger equilibrium population. However, sometimes bad institution can also make

some places have a larger equilibrium population; the higher barrier to migration can also make a higher labour supply curve, for instance. In fact, it makes a classical phenomenon of ‘pseudo’ urbanisation. A good case raised by Au and Henderson (2006a; 2006b) which was that Chinese cities were generally undersized in 1997 because of the strong barriers to labour mobility. In addition, the higher equilibrium population occurs in a very few large cities which suffer from tremendous inequality, dense distribution of urban population and generates large costs of congestion.<sup>20</sup> Such policies cause tremendous social and economic costs, from which the development of some new large cities have to draw these lessons; Chongqing’s urbanisation policy is not to set barriers but rather build new cities to absorb new incomers<sup>21</sup>, for instance. Theoretically, the creation of a new city is a correct policy, because existing cities would become smaller and thus be able to offer higher net returns to the remaining residents. However, in practice, the policy is still a minefield. In recent news reports or surveys (Bloomberg, 2010; Economist, 2011), it is common to hear of the so-called ‘ghost city’, which follow a huge asset bubble and

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<sup>20</sup> Rural-urban disparity is also one of the fundamental causes of inequality society in China today.

<sup>21</sup> However, this phenomenon needs empirical supports which will be conducted in the following section.

fundamentally result from the creation of new city with the aim of attracting migrant workers. Because of false housing prices, the majority of such housing estates have become the investment goods of urban indigenous people rather than the habitation of those new incomers, who have no dignified places to live. The reasons for this can also be found from the following discussion.

In effect, the institution is still a result of other forces from outside. In another words, some other factors determine changes in institution. Professor Justin Yifu Lin (2003) raised a deep viewpoint to understand the determinants of institution through the prism of changes in endowments structure. Rather than unilaterally pursuing economic growth in a conventional 'sustainable way' (the investment) it emphasizes industrial upgrading and technological progress. The subtle differences in those concepts bring a huge change to the results of research, especially in developing countries like China. It essentially means that different economies have their own optimal products and industries at their specific development stages. In order to explain the importance of this concept in relation to the topic of this chapter, the history of Chongqing is briefly addressed below before turning to further reviews.

Historically, Chongqing was a traditional heavy industrial base during the period of the Second World War because it was the war-capital of the Republic of China and many military factories removed to Chongqing from the cities of the south-east coastal areas. Many well-known factories could be traced from Chongqing. Chairman Mao Zedong's plans moved defence-related and heavy industries inland to make them harder to be bombed as Sino-Soviet relations deteriorated in the middle of 1960s after the People's Republic of China was founded. The area of Chongqing, with its hilly and mountainous terrains, was selected as the destination of that plan. This industrial movement is the so-called 'Third Front' (TF) development, and it further enhanced Chongqing's standing in the national context for heavy industry. Because of the lasting effects of the Third Front development, heavy industry still accounted for 69.9 per cent of the municipality's total industrial value added in 2010. According to documents from central government, the cumulative investments on the TF strategy reached approximately 100 billion RMB, which even exceeded the static budget of the investment of the Three Gorges Project from 1997 to 2007 - 90 billion RMB in 1993 prices (Yang, Wu, & Zhang, 2000). Such huge investments in heavy industry have brought large quantities of

State-Owned Enterprises (SOEs) to Chongqing but those SOEs have gradually become non-viable units, a situation which has created a huge burden since late 1990s before the government tried to reform them. Conversely, because of the lagged effects of huge investment on the TF strategy, Chongqing's GDP was still ranked fifth in the national context in 1990, behind the four mega cities (Shanghai, Beijing, Guangzhou and Tianjin) in coastal areas (Ma, 2012). However, after 1990, the economic growth gap between the western (including Chongqing) and eastern areas increased until 2000 (Yao & Zhang, 2001). In other words, Chongqing actually used to have a relatively similar level of endowments structure to those coastal mega cities at least until after the whole country entered the global economy in the early 1980s, but the gap between them became larger 20 years ago. The trend was only reversed in the last 10 years. So, what is a more fundamental reason? What is the deep factor behind changes to the institution and endowments structure? The reason is simple. The magnitude of openness that is the deep or long-term factor accounts for the differences between the inland and coastal areas.

If all of these areas have equal access to the best available production technology, greater openness may well increase the demand for skilled

labour or employment everywhere. However, the unfavourable geographical condition of Chongqing makes it different from other mega cities located in the coastal areas such as Beijing, Shanghai, Guangzhou and Tianjin. The latter four can benefit from the openness policy very well and develop comparative advantage in the whole areas of China (low labour costs), but Chongqing cannot do so. Also, the industrialization process over the past two or three decades in China has relied heavily on exports that have contributed directly to about one-third of China's GDP in the recent two decades (Jacobs, 2010). The inland mega city Chongqing used to have nothing to do with the modernistic openness or export-oriented economic growth of the past, especially during 1980s and 1990s. It is locked on the upper reaches of the Yangtze River approximately 1,400 kilometres to the west of Shanghai, or 1,100 kilometres to the north of Hong Kong. Despite Chongqing having all the advantages of other coastal cities including its solid industry foundations and large low-cost labour pool, it was extremely difficult to be an openness economy because of its geographical location.

However, the situation is changing in Chongqing because of prosperity in the market for light electronic products around the world, which demands

massive low-cost (low-educated) labourers. Although the automation of routine task activities, which can make precise and well-defined procedures, have reduced the cost of production in the recent three decades (Autor & Dorn, 2012); it is obvious that low skilled workers, who cannot be fully substituted for by the computer at this stage, have lower costs and more flexibility to meet the preferences of different customers over a very short period. Thus, the fundamental reason of openness in Chongqing is that it has the most important feature - the large low-cost labour pool - which is the same as its coastal counterparts with the features of export-oriented processing trade.

In addition, that trait of export-oriented industries at this stage is also the cause of the expansion of the gap between inland and coastal cities, which means that the externalities of export-oriented economic growth are working inefficiently in China. Because such industries must offer low-educated occupations for local jobs - production and craft occupations, operative and assembler occupations, and transportation, construction, and mechanical occupations, *etc.*, - this situation has nothing to do with the 'abstract' creative and coordination tasks. Despite the fact that the externalities of openness can normally bring changes to the factor price

ratios, the differences in the distribution of asset and income and even impact of spatial structure (Anderson, 2005), such externalities from coastal areas can almost not reach the conclusions of inland convergence and growth. The core question remains as to whether openness will bring the growth of true productivity and the improvements of production efficiency. The answer seems clearer nowadays. It has more production efficiency improvements rather than the true productivity growth. Those exports depend mainly on very low opportunity costs of rural migrant workers, which are caused by the unique *Hukou* system of China.<sup>22</sup> Moreover, as mentioned above, the export-oriented industries have a common feature, requiring the physical abilities of rural-urban migrants: easily trainable dexterity to handle fast-paced and repetitive work (Chan, 2010). Under these circumstances, it is much better to carry out opening policy than to wait for receiving the externalities of openness from coastal developed places. Thus, corresponding with the feature of industrialization of China, Chongqing has been an origin place of migrant workers and it is easy to offer such work forces if it has become a direct export-oriented economy.

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<sup>22</sup> The subject of migrant workers will be discussed in in another chapter.

On the other hand, openness to Chongqing is not a strange thing. Its openness history could be traced back to the year of 1891 when it became one of the earliest inland opening commerce ports through the instruments of colonial rule by the imperial power. However, that openness was still at a very low-level and only depended on the freight of small steam-boats through the Yangtze River. Of course, such freight movement could not fully satisfy the modern requirements of this continuously expanding mega city. Moreover, in the case of the products of heavy industries, logistical costs are often difficult to offset, supply is often limited to local areas and the quantities of products is restrained. Thus, Chongqing must reform its industrial structure with a higher proportion of light industrial products, aside from some traditional or advanced industries, like automobile industries. It also needs to setup more highly value-added industries which have less sensitivity to logistical costs, like aircraft manufacturing.

Chongqing's industrial structural change is much difficult than the coastal areas' because of the lack of the physical conditions of openness. It needs long-term endeavour to overcome its geographical predicaments with huge infrastructure investment. Chongqing has prepared for openness since it

became a direct municipality under the central government in 1997, but it still needs greater improvement in internationalisation. The local government understands that openness is one of the best ways to adjust its industrial structure and get viable industries. In recent years, in order to ease logistic costs Chongqing has become an investment-driven economy, enhancing infrastructure and bidding opportunities. According to then pro-vice-mayor Huang Qifan (Economist, 2007), there was 80 per cent growth of the municipality in the first ten years (1997-2007) that have come from investments. On the other hand, as mentioned above, the prosperity of the demand for consumer electronic products in the past decade also gives Chongqing an exceptional opportunity, because the property of electronic products is in light weight and low logistic costs. Those light weight products can be freighted by air transportation which has almost the same logistic costs as its counterparts in coastal areas. According to a recent survey by China Daily (2010), Chongqing has decided to choose IT industry as its new pillar industry to avoid high logistic costs and aims to become the largest electronics production base in the world by 2015.

### 4.2.1 Research Hypotheses

Returning to the theoretical framework, both the urbanisation and openness literature describe a productivity growth process as affected by institution. Much of the discussion in the literature is predicated on the idea that, for a fully opened market, there is a unique model and criterion of growth, with the analyses of national level data. Or as authors such as Jiang (2011) imply, openness may promote economic and productivity growth at the province level of China. However, no research to date has attempted to directly examine whether openness promotes the growth of urban wages in the inland areas of China, with an increase in the number of urban population and labourers. This paper does so. And then, it hypothesises the following four discussion points: (1) because of the profound industrial foundations and the effects of openness the wages of urban workers will increase with a large increase in the demand for labourers; (2) the effect of openness exceeds that of the indigenous industrial reform on the growth of urban wages; (3) the investment in automation equipment will form negative effects on the urban wage growth; (4) openness will reduce the use of automation equipment.

In a cross-industry panel context, the paper assesses the effects of three main determinants - the use of automation equipment, the scale of employment and the growth of productivity - on the urban wage growth of different groups. The analyses encompass different openness magnitude or groups: the group of closed industrial sectors, the group of openness industrial sectors, the group of industrial sectors with the majority of investment from the state or municipality government and the group located on the new city areas, *etc.*, for instance. In the relevant literature there is a debate about whether inland areas should take openness policies to promote their productivity growth. Besides, as articulated by Autor and Dorn (2012) which will be discussed towards the end of this chapter, differences in the use of automation equipment across different groups of industrial sectors that may depend in part on the level of its individual development stage (the endowments structure) or openness and in part on the institution do not readily fit in the structure of traditional growth frameworks. Thus, given the debates above, this chapter adopts an integrated approach to estimate and analyse the determinants of urban wage growth in different openness groups (e.g., Combes *et al*, 2008).

The chapter shows that the urban wage growth in Chongqing is strongly

affected by the accumulation of urban population, however, which level is too high. The accumulation level of population towards the urban wage growth is decreasing back to a normal level because of openness. Besides, open industrial sectors will get more increase in the growth of urban wages, compared with closed industrial sectors. Furthermore, openness will impel industrial sectors to use automation equipment more efficiently rather than just take that as the pursuit of blindness of investment. However, as the effective way of urbanisation, at least in this chapter's empirical estimation, it is not significant in building new cities based on openness. This might happen because of data is from a too short or inappropriate time span.

This chapter fills the gap in the literature about openness and wage growth of urban workers of various industries in the inland city of China. In order to avoid the endogeneity bias of estimation, an integrated wage function based on simultaneous equation is set up, the model of which is estimated through Two-Stage Least Squares (2SLS). The most important policy implication is that greater openness will make a healthier urban wage growth.

### **4.3 The Determinants of Urban Wage Growth and the Model Specification**

In this section, the determinants of urban wage growth are examined. To explain the growth of urban wages from a macro-angle, three broad sets of explanations can be proposed. First, the variance in wages across industries could directly reflect the skill composition of the workforce. Workers may group across industries so that the observed and unobserved productive abilities of the labour force vary; the metal products industry must be different from the transport equipment industry in terms of the skill requirements, for instance.<sup>23</sup> Thus, it can be normally expected that there will be a higher mean wage in more skill-intensive industries. Besides, as discussed in the last section, the skills required by specific industries are more important in determining a wage rate when a change in industrial upgrading or technical innovation is driven by the endowments structure. In other words, if there is more market competition or more openness factors in the economy, it will be closer to its optimal industries and will

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<sup>23</sup> Although each industry requiring different labour mixes is known, the differences within them cannot be identified because of data restrictions in this chapter. The analysis of this chapter is based on the mean value of each industry.

tend to have a more positive relationship between wages and skill requirements; or, *vice versa*.

In the context of globalization, the low educated jobs of manufacturing have transferred from advanced countries to developing countries over the past twenty or thirty years (Autor & Dorn, 2012). As mentioned above, the low educated (low skill or 'non-college') jobs can be partly replaced by computers that can readily perform repetitive production and monitoring activities. However, such replacement mostly takes place in advanced countries where it is possible to transfer massive labour pools from conventional manufacturing to modern service sectors. In developing countries like China, the extremely low cost of labour pooling is their comparative advantage which is still not developed sufficiently, rather than automated production. The well-developed comparative advantage of developing countries is only at lower level of productivity which is called low skilled manual production in developed countries. A situation of industrial upgrading and technological progress or high and new technology is yet to be seen in developing countries. Thus, most manufacturing production in China belongs to low skilled manual production in terms of the standard of advanced countries. Under these

circumstances, the major criterion of the model of good development not only focuses on the technological progress *per se* but also the true endowments structure and the effects of openness. That is to say, more computerized industries are not always superior to more skill-intensive industries, in terms of their market competitiveness.

On the other hand, through the prism of rural-urban division as formed by the government institution, the labour market in China has been segmented; the wages of urban residents which have been protected by official policies were often determined by the institution of rules of enterprises rather than by the market, whilst the wages of rural migrant workers were actually more regulated by market forces. So, because of these mixed effects it is hard to say there is any necessary connection in general between wages and the competition in the labour market (Knight & Li, 2005). Such relative issues will be discussed in the third main chapter. In this chapter, the aggregated data of each industry is used; it will effectively avoid facing the problem of labour market segmentation.

The skills-based explanations essentially assume that the average wage of workers in industry  $i$  is given by  $w_i = A_i s_i$ , where  $s_i$  denotes average

skills required by industry  $i$  and  $A_i$  denotes the average productivity of labour in industry  $i$ . This definition of systematic wage variation between groups of workers is a long-standing concern of labour economists, such as Krueger and Summers (1988), Gibbons and Katz (1992), Abowd *et al.* (1999). They all directly analyse the wage differences across industries on the ability of workers by using panel data.

The second aspect of explanations contends that wage growth across industries is caused by differences in non-human endowments. Workers in some industries may have a higher marginal product than in others because of geographical features such as location in coastal areas (closed to overseas markets), cultural features such as being more favourable for the market economy (earlier openness places). In effect, as analysed in the first section, the endowments encompass all of these factors. It also involves the factors of production such as public and private capital, local institutions and technology, *etc.*

It can be usually expected that a higher endowment gets higher labour productivity. However, in the context of China, it should be handled more carefully. For instance, Ju *et al* (2009) mention that the economic growth

and industrial upgrading or technological progress used to be an integrated issue of sustained economic development. That is to say, if there is no industrial upgrading or technological progress to form an optimal industry as conducted by openness, it may also have economic and income growth. Thus, a higher endowment may not be a necessary condition of labour productivity improvement. In other words, if the economic growth of any countries or areas violates its own development stage or endowments structure, it will still achieve short-run growth but not complete development and long-term sustainable growth. Thus, the conventional estimation on this point might have a certain kind of bias.

For some empirical studies, Chen *et al* (2009) used generalised a meta-frontier method to estimate the dynamics of China's regional productivity growth for the period of 1996 to 2004. They distinguish the differences between scale efficiency change and technical progress. They claim most changes in productivity were caused by technical progress rather than changes to the scale of economies in production. They also argued changes in scale efficiency had an adverse effect towards changes in productivity. They even considered CWDS had not gained any outstanding achievements in productivity in their sample period. It is true that there is a

lack of productivity in the inland areas of China. However, if the openness issue is considered, their conclusions will easily mislead people as to the effects of openness which emerged most in coastal areas. In effect, their results probably present the productivity distribution in regional areas of China, none of which can help people to understand the deep determinants of it. As mentioned above, the industrial upgrading or technical progress to form labour-intensive industry is because of openness which brings packaging advanced technology by integrated computer systems. Thus, the properties of such open industrial sectors may be lacking in the increasing return of scale or the effect of technology spillover. Thus, because Chen *et al* overlooked the key effects of openness, the results might underestimate the effects of technical progress in the coastal areas and exaggerate the scale efficiency in the inland areas. In addition, the bias of such estimation might be also highly related to the selected sample period.

Another relevant empirical paper was presented by Jiang (2011), who used the first-differencing transformations of 2SLS and GMM to assess the relationship between China's provincial productivity growth and openness.

Two aspects of the effects of openness were examined: the effects of direct growth and the effects of convergence. The model is an expansion of

Lucas's (2009) industrial diffusion method. This is a difficult issue in the foundation of the analysis, because the research objects of the Lucas model exactly exclude the case of China. It is possible that Jiang tried to distinguish different effects of openness by scale effects and pure economic growth on account of the above point that exhibits the China's difference. His results imply that there is a lack of technological improvement during the process of openness. There are two more fundamental reasons aside from the technology packaging. Firstly, China is a dual-track economy in the process of economic reform and development, a situation which extremely distorts or destroys the effect of increasing return of scale. Secondly, the core of the Lucas model depends on estimating the so-called human capital (or knowledge) gap between advanced and backward countries to judge the possibility of catching up, which could not be independent of local endowments structure.

Openness is to be considered as one of main factors to bring about the true endowments structure to the dynamic economic growth of specific industry sectors while estimating the determinants of the urban wage variation. First of all, following the conventional setting the endowments  $E_i$  affecting positively the productivity of labour, the wage is given by  $w_i = A(E_i)$ ,

which setting is at the heart of the work done by growth economists. There is a large amount of research on this topic (Temple, 1999). And then, because of the complex situation about economic growth in China mentioned above, this chapter will estimate the determinants of urban wage variation on different extents of openness, which means distinguishing the effects of openness on different endowments structure groups. The grouping details will be described later.

The third strand of arguments is about interaction dynamics. Because of data restriction, this chapter will not discuss it in detail and it will be carefully investigated by using production function in the next chapter.

This chapter uses employment numbers of specific industries to replace the interaction variation. Because localization economies and urbanization economies mainly emphasize the productivity gains from interactions between workers, or between firms, or between industries; the employment size is about 'where' the interactions take place, as a complement in this chapter. If micro data (for instance, firm-level data) can be obtained, this employment size variable will be more efficient (Abowd, Kramarz, & Margolis, 1999). Following the analyses above, this chapter assumes that the employment size is positive in relation to the wage rates which is

represented as  $w_i = A_i l_i$ , where  $l_i$  denotes average firm size in industry  $i$ .

The above three strands of thought are integrated into a unified framework and the skills, endowments and the size of employment combine together to determine local wages. Formally, the model implies that in equilibrium the average wage of industry  $i$  is given by  $w_i = A_i(E_i)s_i l_i$ . This unified framework encompassing the main explanations of the recent literature should provide this chapter with a sense of magnitudes about the importance of these three types of explanations in determining wage growth across industries. However, the key question remains as to how openness affects urban wage growth or what magnitude about urban wage losses is curbed by openness. Losses, from excessive or deficient institution interference, come from resource misallocation. For instance, cities are subject to exhausted scale economies, excessive congestion, and inefficient over-investment (Fujita, 1989; Au & Henderson, 2006b). This chapter will compare the urban wage gain or loss of open industries with closed industries. That grouping will also be described in detail after getting the equilibrium results of the above general model.

Based on the Cobb-Douglas equation, the output is in effective labour and

the other factors of production:

$$y_{it} = (A_{it}s_{it}l_{it})^b k_{it}^{1-b} \quad (1)$$

where the coefficient  $b$  is that  $0 < b \leq 1$ ,  $s_{it}$  denotes the average skills of industry  $i$  in year  $t$ , and  $A_{it}$  is the total factor productivity or worker productivity growth due to changes in technology in  $(i, t)$ . The output is denoted by  $y_{it}$ ,  $k_{it}$  represents the other factors of production. At the competitive equilibrium, the average wage of industry  $i$  in year  $t$  equal to the marginal product:

$$w_{it} = bA_{it}s_{it}l_{it}k_{it}^{1-b} \quad (2)$$

Then, using the first-order condition for profit maximisation with respect to the other factors and inserting it in the equation (2) yields:

$$w_{it} = p_{it}s_{it}L_{it}. \quad (3)$$

Wage growth across industries can reflect differences in average skills requirements and average employment size which is denoted by  $L_{it}$ , or

alternatively they can also reflect true productivity differences caused by endowments. Term  $p_{it}$  in the previous equation captures the true productivity differences which can work through total factor productivity  $A_{it}$  varying with openness extent. Besides, to make the analysis robust, we must distinguish between public and private enterprises and selected industries setup in new cities as special groups to be evaluated.

To take above wage equation to the data, each term needs to be specified.

Assume that the average skill of industry  $i$  in year  $t$  is given by:

$$\log s_{it} = \phi \log V_{it} + \delta_i + \epsilon_{it} \quad (4)$$

where  $\log V_{it}$  is a vector of time-varying average industrial skill characteristics,  $\delta_i$  is an industry fixed effect and  $\epsilon_{it}$  is a measurement error. The errors are assumed to be independent and identically distributed (i.i.d.) across periods and industries. Turning to  $p_{it}$ , which reflects true productivity difference in wage equation, assume that it is given by:

$$\log p_{it} = \beta \log P_{it} + \mu_t + \gamma_{it} \quad (5)$$

where  $\log P_{it}$  is a vector of time-varying productivity growth,  $\mu_t$  is time trend, and  $\gamma_{it}$  is the error. Also, the model needs to account for a labour function in producing a bell-shape to wages per worker and adds a quadratic component of the employment size. Rearranging the wage equation, taking logarithms, combining the above terms and adding a quadratic component yields:

$$\log w_{it} = \varphi \log V_{it} + \theta L_{it} + \rho L_{it}^2 + \beta \log P_{it} + \pi_t + \tau_i + \varepsilon_{it} \quad (6)$$

The error structure consists of  $\pi_t$  common shocks across all industries varying by year,  $\tau_i$  an industry fixed effect where controls for permanent differences between industries and  $\varepsilon_{it}$  an idiosyncratic error term. Moreover, term  $\log P_{it}$  is a problematic term because of an explicit endogenous problem, the reasons for which will be analysed below.

According to the expenditure method of gross domestic product,

$$GDP = CO + Inv + Gov + NX \quad (7)$$

where  $CO$  is private consumption,  $Inv$  is gross investment,  $Gov$  is

government spending and  $NX$  is net export. Because only the data of gross investment is to be found at the industrial level in this chapter, the following is a substitute for equation (7),

$$GDP = Inv_{prt} + Inv_{stat} + Inv_{fdi} + \xi \quad (8)$$

where  $Inv_{prt}$  is the investment from private sector,  $Inv_{stat}$  is the investment from public sector,  $Inv_{fdi}$  is investment from foreign investment enterprises and  $\xi$  is the error term. As mentioned above, there was 80 per cent growth of the municipality in the first ten years (1997-2007) from investments, thus the latter equation can become the best approximation. In addition, because the data of net export at industrial level is also unavailable, the variable  $Inv_{fdi}$  is the key variable to measure openness.

In addition, as a complement to the expenditure method, income approach of GDP is set up.

$$Pro = GDP - Wag - Tax - SA - Ret \quad (10)$$

where *Pro* denotes profits, *Wag* denotes wages, *SA* denotes statistical adjustments (including corporate income taxes, dividends, undistributed corporate profits), *Ret* denotes rents. The last two variables, which are also hard to obtain detailed data for, combine to form an error term  $\zeta$ . Rearranging the equation (10) is the following:

$$Pro = GDP - Wag - Tax - \zeta \quad (11)$$

So, in order to solve the endogenous problem, a structural model of simultaneous equation is built up which is a combination of a wage equation (6) and two GDP equations, (8) and (11).

#### 4.4 Estimation Techniques

Standard panel estimations rest on the strong assumption of exogeneity and estimations are unbiased only if the determinant variables are exogenous.<sup>24</sup>

Obviously, in the system above, the wage variable is not truly correlated

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<sup>24</sup> In general, Fixed Effects (FE) estimations are under the risk of omitted variable bias; the exogenous variable assumption might be violated and the bias of the endogeneity emerges because of the correlation between productivity and the residuals. The bias triggered by omitted variables, simultaneity or measurement error violates the exogeneity assumption and makes FE estimations of exogenous and endogenous regressors inconsistent.

with those determinants, especially the variable of productivity. Thus, the estimation will result in a pseudo correlation. The exogenous variable assumption is challenged by the fact that other effects outside the wage equation simultaneously affect the wage variable  $\log w_{it}$  and productivity variable  $\log P_{it}$ . In the current context, other determinants left in the error term may simultaneously affect such both variables because of the GDP equations. They may take the form of a common shock or institution change; except for the openness effects there are some other factors such as the case where tax reduction may stimulate productivity and increase wages, for example.

Based on this simultaneous equation system, the identification must be confirmed; the endogenous and exogenous variables must be found. According to the rule of simultaneous equations, the variables on the left hand side of the reduced model of each equation are endogenous variables, whilst the remaining variables on the right hand side are exogenous variables. Thus, endogenous variables are wages, GDP and profits. Exogenous variables are constant, skills, employment scale, public investment, private investment, FDI and tax. The number of excluded variables from each equation has to be greater than or equal to two because

the system has three equations, there are two exclusions for each equation. The key equation of the system, namely the wage equation, has four exclusions, which is over-identified. The next section, with respect to identification, will make further rigorous test to see whether the model is correct.

To identify the causal effect of determinants on urban wages, instrument variable (IV) estimation is used to correct the endogeneity bias, the causal interpretation of which can be valid under the 2SLS estimation. In the first stage, exogenous IVs are included to estimate the predicted value of the endogenous variable. In the system above, the variable of productivity growth and the error term in the wage equation are correlated so instrumental variables must be found for this endogenous variable. According to the 2SLS estimation, at this stage, it is to make an instrumental variable, which is a pure function of exogenous variables. Due to an assumption of the OLS method, the right hand side variables are independent of errors. Thus, it gets the predicted value of productivity, which is the IV and denoted by  $\hat{p}$ , through regressing the variable of productivity or GDP on a constant, public Investment, private investment, FDI and Tax. Because the  $\hat{p}$  just depends upon all the exogenous

variables, it is uncorrelated with the error term of the wage equation. Then, the predicted value of the productivity is included in the second stage regression to get consistent estimators. Thus, at this stage, the wage equation has to be estimated using  $\hat{p}$ .

#### 4.5 Data Issues

The data used to estimate the wage equation were from the CSB's Year Book.<sup>25</sup> The sample covers Chongqing's entire 38 industrial sectors over the years 2001 to 2011. All of the currency data is fixed at the 2001 price and divided by the number of employment in each industry. The in-use foreign capital is used for a proxy of FDI, which is denoted by  $Inv_{fdi}$ . In advanced countries, the routine activities were replaced by information technology, and low-skilled jobs have transferred to developing countries (Autor & Dorn, 2012). In this chapter, the value-added ratio of industry  $i$  in year  $t$  acts as the computerisation's proxy  $T_{it}$ , which is complement to the variable skill  $V_{it}$ . Because there is no workers' skill data at the

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<sup>25</sup> The data used were obtained from the official online data search website of CSB (<http://www.cqtj.gov.cn/>).

industrial level, the variable  $V_{it}$  is replaced by  $T_{it}$ . Table 4.1 exhibits the summary statistic of the main variable information of the observations of a panel of 38 cross sections used in this chapter for the wage equation estimations over the year 2001-2011. Of these, LogWage denotes the average wage of each industry in logarithmic form; LogProductivity denotes the GDP of each industry in logarithmic form; LogComputerisation denotes the expenditure of money on automation in logarithmic form; Labour denotes the average number of employment in each industry.

**Table IV.1 Summary Statistics for the Estimates of the Wage Equation**

Variable	Obs.	Mean	Std. Dev.	Min	Max
LogWage	415	9.638	0.544	7.214	11.39
LogProductivity	415	11.19	0.897	7.67	14.155
LogComputerisation	418	0.34	0.136	-0.471	0.791
Labour	418	2.834	4.985	0	39.06
Labour2	418	32.818	148.617	0	1525.684
Year	418	2006	3.166	2001	2011

Notes: Obs. represents the number of observations; Std. Dev. represents standard deviation. Besides, 1 unit Labour equals 10,000 populations.

#### **4.5.1 Grouped Data in Terms of Different Openness Magnitude**

Firstly, in order to compare the urban wage gain or loss of open industries with closed industries, two complementary groups were to be built. Of these, the open industries group is formed by those who can get continuous FDI investments from 2001 to 2011. An industry with continuous FDI, which benefits from the effects of openness, is considered as a proxy of industrial upgrading. If the FDI investment is not continuous during the year of observation, that industry will not be recognized as an industry characterised by industrial upgrading or technology innovation, or an industry that gets its true endowments structure, or an industry that breaks through its conventional 'sustainable way' of investment. In effect, this assumption is the same as Thompson's (2002) conclusion based on his observation of Hong Kong garment firms in China. One-off or even fitful FDI are considered as an arbitrage in this chapter, the behaviours of which will not bring any long-term productivity growth.

Secondly, China has its own particular economic structure, which at the end of the 1970s, was at the onset of its market reform. With respect to openness, the economy was essentially liberalised for non-state enterprises (NSEs) and insulated from full effects of FDI for SOEs to protect a

socialist ownership structure (Girma & Gong, 2008). Even though China joined the World Trade Organisation (WTO) in 2001, foreign investment enterprises still need to strive for more business space in China to compete more effectively against SOEs (Huang, 2003). Thus, the SOEs lack market competition under the protection and special requirements of government and the investment from SOEs or government is under soft constraint. In order to estimate the effects of the openness gap on urban wage growth between state and non-state industries under the dual-track system, there is a great need for a SOEs reference group. However, the estimation of this chapter is based on the industry level of data so the properties of enterprises cannot be distinguished directly. To solve this problem, an index of proportion of state investment in specific industries is created and arranged in order of size; the indexes that are greater than median formed a group, which is the proxy of SOEs' reference group.

Thirdly, because of labour surplus in agriculture and massive layoffs in SOEs, unemployment is always a major challenge for China's economic policy choice at this stage (Lemoine & Unal-Kesenci, 2004). The so-called high-tech parks were built continually to solve the unemployment problems. According to Tunzelmann and Acha (2006), the same industry may be

capital-intensive in the U.S. and labour-intensive in China, because of the differing economic environments. It is true that the high-tech park is the most labour-intensive park in China. To build the high-tech park has been one of the main ways of urbanisation. At the very beginning, the Pearl River Delta model, which only let migrant workers stay in the rural economy outside the central cities rather than the central cities per se (Lin G. , 2001), obtained pronounced success. Then, in order to move beyond the initial development model of urban-rural division, the updated version model in Suzhou, namely the Yangtze River Delta model - which uses foreign capital and external resources to integrate globalizing regional development with domesticating globalization (Wei, Lu, & Chen, 2009) - became main-stream. Chongqing adopts the latter model to set up new development zones as new cities around the exiting mega city. As mentioned in the second section, this is a policy attracting new incomers and balancing the overcrowded city centre. There are 16 industries to be chosen as a group such as electronic telecommunication, transport equipment, ordinary machinery and garments, etc., to reflect the industries in these new cities.

Lastly, Chongqing has become more open over time. Especially, in the last

four or five years, this economy has had a pronounced improvement in openness. For instance, the volume of foreign trade has soared by 473 per cent, the in-use foreign capital has increased more than tenfold and the re-export volume of non-local freights via Chongqing reached 32 per cent. Thus, in all groups above, two periods of time were distinguished as two subgroups: the lower degree of openness and the whole time span, which corresponds with the 2001-2007 and 2001-2011 subgroup, respectively.

#### **4.6 Results and Discussions**

The results on the whole samples are presented before turning to the different groups. Conversely,, in order to get rid of the effects of time across all industries and the fixed effects of each industry, two-way FE results are given for the case. For IV estimation, the LM statistic test of under-identification, the Wald test of the weak instrument and the Sargen-Hansen test of the restriction of over-identification are used to check model adequacy. The results are also given for each group.

**Table IV.2 Estimated Results for the Whole Samples of the Wage Equation**

	All	
	(1) 2001-2007	(2) 2001-2011
LogWage		
LogProductivity	0.627*** [0.000]	0.172*** [0.007]
LogComputerisation	-0.497** [0.016]	-0.230* [0.087]
Labour	0.099*** [0.000]	0.013 [0.405]
Labour <sup>2</sup>	-0.001*** [0.001]	-0.000 [0.458]
Year Dummies	Yes	Yes
Number of Obs.	232	232
Adjust R <sup>2</sup>	0.779	0.908
P-value of LM statistic	0.0000	0.0000
Wald F statistic	69.815	20.255
P-value of Sargan statistic	0.0014	0.0082
Notes: p-value in brackets		
*p<0.1, **p<0.05, ***p<0.01		

Table 4.2 presents the baseline results of the wage equation in two time span subgroups. The lower degree of openness subgroup presented in column (1), the variable of interest, the productivities of each employment, is positive and significant at a 1 per cent level. One unit rise of worker's

productivity is associated with an increase in Chongqing's urban average wage by 0.627. The coefficient on variable computerisation is negative and significant at a 5 per cent level. One unit rise of computerisation is associated with a decrease in the wage by -0.497. Another variable of interest, the size of employment is large at 0.099 with significance at a 1 per cent level. The quadratic component of the employment size is negative and significant at a 1 per cent level. It obviously finds a bell-shape to the urban wage growth as a function of industrial scale. To compare with the results of more openness of the whole data set presented in column (2), the coefficient on variable productivity decreases to 0.172 with significance at a 1 per cent level. The coefficient on variable computerisation is associated with a decrease in the wage by -0.23. The remaining parts of two variables are not significant. For the lower degree of openness subgroup, the under-identification test, the LM statistic test, gets the p-value 0, the value of which significantly rejects the null to indicate that the instruments are not correlated with endogenous variable. The weak-identification test, the Wald test, gets the F-statistic 69.815, the value of which cannot reject the null hypothesis that the instruments are weakly correlated with the endogenous regressors. For the estimation in column (2), the test gets the p-value 0 and the F-statistic 20.255 which rejects the null hypothesis at a

10 per cent level, which means no weak-identification at the 10 per cent level. The implication of the test results is the longer time span the better.

**Table IV.3 Estimated Results for the Two Complementary Groups of the Wage Equation**

	Closed industrial sectors		Open industrial sectors	
	(3) 2001-2007	(4) 2001-2011	(5) 2001-2007	(6) 2001-2011
LogWage				
LogProductivity	0.340*** [0.000]	0.119** [0.045]	0.620*** [0.000]	0.201** [0.024]
LogComputerisation	0.133 [0.616]	-0.130 [0.563]	-1.329*** [0.000]	-0.893*** [0.000]
Labour	0.203*** [0.000]	0.139*** [0.000]	0.088** [0.007]	0.005 [0.832]
Labour <sup>2</sup>	-0.008*** [0.000]	-0.005*** [0.001]	-0.001** [0.046]	-0.000 [0.947]
Year Dummies	Yes	Yes	Yes	Yes
Number of Obs.	183	183	156	156
Adjust R <sup>2</sup>	0.658	0.768	0.722	0.877
P-value of LM statistic	0.0000	0.0000	0.0000	0.0000
Wald F statistic	13.91	31.726	50.906	16.125
P-value of Sargan statistic	0.2103	0.2842	0.0467	0.3707

Notes: p-value in brackets

\*p<0.1, \*\*p<0.05, \*\*\*p<0.01

Then, according to the two complementary groups of closed and open

industries, Table 4.3 presents these two groups' results. First of all, in column (3), the weak-identification test gets 60.353, the value of which cannot reject the weak correlation the endogenous variable. In column (4), the closed industries of the whole time span group, the F-statistic is still large at 31.726. Thus, both of these closed industrial groups have the problem of weak-identification IVs. Nevertheless, both groups find the bell-shape of employment scale to the urban wage at a 1 per cent level. For the open industry groups, the subgroup of a lower degree of openness period still gets large at 50.906 to the F-statistic but the subgroup of the whole time span gets 16.125, which value rejects the null hypothesis of weak-identification at a 10 per cent level. Besides, the variable of interest, the productivities of each employment, is positive and significant at a 5 per cent level. One unit rise of worker's productivity is associated with an increase in Chongqing's urban average wage by 0.201. The coefficient on variable computerisation is negative and significant at a 1 per cent level. One unit rise of computerisation is associated with a decrease in the wage by -0.893. In columns (3), (4) and (5), they find a bell-shape to the urban wage growth as a function of industrial scale. As the control group of the closed industrial group, whatever the time span is, the increase in urban wages caused by rising of the productivity in the openness groups is two

times larger than the closed industrial groups. Back to the hypothesis (2), it is hard to talk. The openness groups exceed the closed industrial groups on the growth of urban wages, but because of openness the increase in indigenous urban wages are on the decline.

**Table IV.4 Estimated Results for the SOEs Groups of the Wage**

**Equation**

	SOEs	
	(7) 2001-2007	(8) 2001-2011
LogWage		
LogProductivity	0.381*** [0.000]	0.141** [0.035]
LogComputerisation	-0.977*** [0.005]	-0.855*** [0.001]
Labour	0.031 [0.620]	-0.065 [0.189]
Labour <sup>2</sup>	-0.000 [0.995]	0.004 [0.115]
Year Dummies	Yes	Yes
Number of Obs.	126	126
Adjust R <sup>2</sup>	0.589	0.753
P-value of LM statistic	0.0000	0.0000
Wald F statistic	42.497	21.959
P-value of Sargan statistic	0.0225	0.1044
Notes: p-value in brackets		
*p<0.1, **p<0.05, ***p<0.01		

The last two groups, the SOEs group and the new cities group, are presented in Table 4.4. Of these, columns (7) and (8) belong to the SOEs group. For the lower degree of openness subgroup, weak-identification is still a problem because the F statistic is high at 42.479. For the whole time span, the SOEs group pass the weak-identification test; its F statistic is 21.959, which value is significant at a 10 per cent level. The coefficients of the productivity are 0.381 and 0.141, which are slightly larger than the closed industrial groups' coefficients, 0.34 and 0.119, but much smaller than the open industrial groups' coefficients, 0.62 and 0.201. For the new cities groups in Table 4.5, columns (9) and (10), the both subgroups have weak-identification problem. Besides, the value of the coefficient of the lower degree of openness period is close to the open industrial subgroup in the lower degree of openness period. However, all the coefficients in column (10) are insignificant.

**Table IV.5 Estimated Results for the New Cities Groups of the Wage****Equation**

	New cities	
	(1) 2001-2007	(2) 2001-2011
LogWage		
LogProductivity	0.593*** [0.000]	0.048 [0.453]
LogComputerisation	-0.264 [0.283]	-0.177 [0.250]
Labour	0.107*** [0.000]	0.019 [0.210]
Labour <sup>2</sup>	-0.001*** [0.000]	-0.000 [0.224]
Year Dummies	Yes	Yes
Number of Obs.	178	178
Adjust R <sup>2</sup>	0.793	0.917
P-value of LM statistic	0.0000	0.0000
Wald F statistic	62.695	26.137
P-value of Sargan statistic	0.0000	0.0002

Notes: p-value in brackets  
\*p<0.1, \*\*p<0.05, \*\*\*p<0.01

In general, the coefficient on employment size, at 8.8%, is above most estimates in the literature, which are in the 3-8% range (Au & Henderson, 2006b; Combes, Duranton, & Gobillon, 2008). However, the trend of the scale efficiency is downwards over the openness process, which is the

opposite result of Chen *et al* (2009). Because of openness, the increment of the urban wages is decreased with one unit rise of the workers' productivity. This is perhaps related to the segmented labour market, which causes an insufficient level of competition and falsely high wages. Openness can gradually revise the false wages. In addition, even though automation decreases average urban wages, because of openness the computerisation is used more efficiently. This verified hypotheses (3) and (4), the investment in automation equipment would form negative effects on the urban wage growth, but openness would reduce the use of automation equipment. Moreover, the urban wages will go up with the increase in employment size. The urbanisation depends on building new cities based on openness policy, the empirical results of which are not significant at this stage.

#### **4.7 Conclusions**

This chapter has clearly derived a simultaneous equation model from the standard theoretical framework of the urban wage growth and grouped the data in terms of four different magnitudes of openness to estimate and analyse the relationship between the wage growth of urban workers of various industries and openness. The results of the empirical estimation

demonstrate that the wage growth of urban workers is positively related to a large increase in the demand for labourers; openness makes the increase in indigenous urban wages decline; openness impels industrial sectors to use automation equipment more efficiently rather than just take that as the pursuit of blindness of investment. This implies that greater openness can make for healthier urban wage growth and the labour-intensive manufacturing stage cannot be passed in Chongqing which has to follow the successful economic modes from the coastal areas of China. However, this chapter has not found enough empirical evidence in support of the theory of the benefit of building new cities towards urban wage growth. Further, it is still unclear about the direct effects of openness on the wage growth of urban workers, *ceteris paribus*. Nevertheless, these results reported here document the relationship between openness and the wage growth of urban workers of various industries in the inland city of China, though based on roughly grouping estimation, and therefore fills a gap in the literature. One thing is certain, if more data becomes available, a more accurate and comprehensive analysis will be possible.

## V. HIGH STAKE AGGLOMERATION: HAS CHONGQING URBANIZED TOO FAST?

### 5.1 Introduction

Various researchers have evaluated agglomeration scale economy in countries, but little attention so far has been paid to the effects of regional areas in not only the developed but also developing countries; let alone China's western mega-city. Over the last 10 years, Chongqing has undergone a spectacular economic transformation. This transformation has involved not only fast economic growth and sustained urban sprawl, but also major shifts in its sectorial composition of output, enhanced industrial specialization and a growing importance of private enterprises. Reallocation of resources across different sectors has been a key source of productivity growth. But, its rate of manufacturing industry concentration is lower than that in other developing economies, with similar levels of GDP per capita<sup>26</sup>. For large cities, if industrial concentration rates

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<sup>26</sup> For example, the level of GDP per capita of Chongqing in 2007 is roughly equal to the one of the Republic of Korea, with 2000 US Dollars (the current US Dollar at purchaser's prices) in 1982 (WorldBank, 2012). which has its cross province manufacturing industry concentration index .03 (Henderson, Lee, & Lee, Scale Externalities in Korea, 2001), compared with Chongqing's cross county index .01.

(specialisation) are low, urbanisation rates (diversification) are high (Rosenthal & Strange, 2004). In the last decade, Chongqing has experienced massive city-bound migration of rural residents; to the author's knowledge, it is the biggest such shift in human history, with 4.7m moving so far, with 3.2m in 2011 alone.<sup>27</sup> Why has it urbanized so fast? However, just looking further back, on the basis of its industry data and geographic information from 2001 to 2008, mega-city Chongqing has been Marshall-Arrow-Romer (MAR) scale economies (specialisation economies) that are only expected to boost the growth of small and specialized cities. So, we have to ask again, what kind of localisation economies as the determinants of economic growth could explain such a big change?

According to much research<sup>28</sup>, the combination of high growth and high urbanisation, on the one hand, and a growing impact of localisation (a.k.a. MAR) externality, on the other, is puzzling. Todaro and Smith (2009, p.

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<sup>27</sup> The data source is from the Report on the Work of Chongqing Municipality Government in Chongqing People's Congress (CQPC) in January 2012.

<sup>28</sup> Glaeser *et al.* (1992) find that specialization does not encourage growth. Henderson, Kuncoro and Turner (1995) suggest that specialization lacks a positive effect on growth for the high-technology industries. Combes (2000) implies that if specialization encouraged growth, it could only have happened in small cities.

330) in their *Economic Development* implied that the high growth and high urbanisation would result from diversity (urbanisation economies) rather than specialization (localisation economies), which contrasts to Chongqing's situation at present. In this chapter, we introduce Chongqing's abstruse phenomenon by showing empirical underlying evidences that have never been seen before in previous economic agglomeration literatures, and propose a preliminary explanation to get this puzzle resolved. To this end, this chapter aims to investigate the impacts of dynamic localisation and urbanisation economies on the total factor productivity (TFP) in the three sectors respectively at the county level during 2001 to 2008 by using panel model estimation. Besides, the role of local governments and their effects to reallocation of resources across sectors are also analysed in this chapter. This chapter applies growth accounting techniques to the investigation of the impact of specialisation and diversification on total factor productivity at the county level. A conventional production function is modified by using the overall local employment as the labour input and adding an additional input, industry diversify index. There two independent variables in the production function capture externalities of specialisation and diversification responsible for endogenous growth.

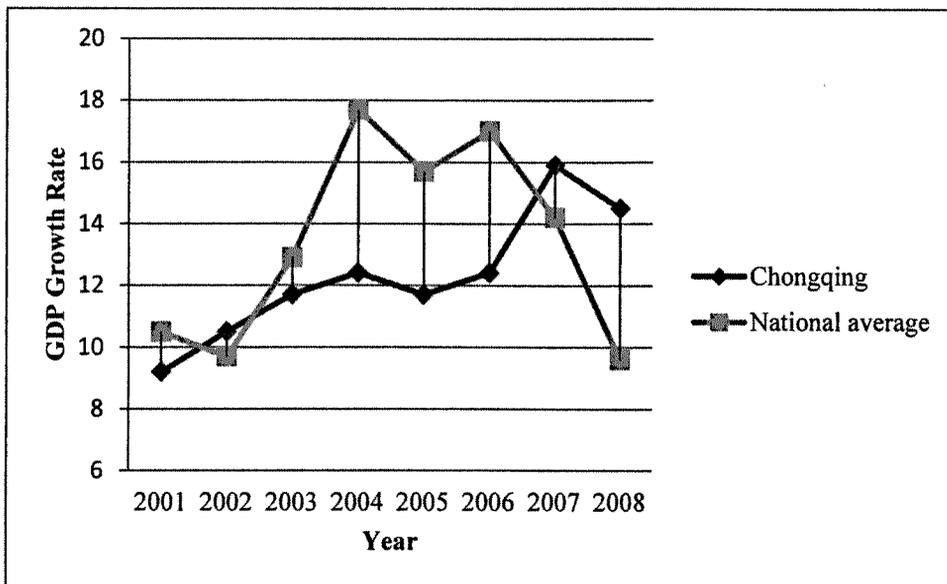
Over the period 2001 to 2008, Chongqing's economic growth was fast but inferior to national average, with annual growth rate 12.3 per cent compared with national rate 13.4 per cent. The GDP growth trend is plotted on Figure 5.1 below. At the same time, Chongqing had a relatively lower degree of openness or trade elements, compared with recent four or five years, the total amount of imports and exports is only 2 per cent in GDP compared with the national rate of 57 per cent in 2008; however, the annual urban population growth rate was relatively high, with 4 per cent compared with the national average of 3 per cent and it has just reached 50 per cent urbanized rate since 2008.<sup>29</sup> Furthermore, the situation of the emerging patterns of the achievements of the State-Owned Enterprise (SOE) reforms, the industrial geographic relocations and frequent leadership changes are also prominent. Moreover, each province in China has many differences whatever the extent of government intervention or of resources endowment or even of the government's ambition. Either of these could impact the urban development process and agglomeration, and so it makes sense to analyse the scale economies in Chongqing individually. Considering all of these determinants in Chongqing, it suggests that the capital share in value

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<sup>29</sup> The data source is from National Bureau of Statistics (NBS).

added is 0.32, with TFP 8 per cent increase every year, which is relatively high compared with the same level of per capita GDP economy. The all industry category localisation economies' elasticity to GDP is -0.28 and the urbanisation economies are insignificant. Compared with the level of per capita GDP of developed economies at the same stage, this is very rare. Synthesizing these results could suggest that the localisation economies in Chongqing not being able to afford the high growth of economic development anymore. Also, the share of employment in the indigenous industry is rather small, which partly results from SOEs reforms. This doesn't take into account the agglomeration effects from the gathering of people into mega-cities or competitive issues. The fast pace of urban expansion is achieved only because the strong government interventions offer huge financial supports and warrants.

**Figure V.1 Chongqing and National Average GDP Growth Rates**



Data Sources: the data is obtained from the Chongqing Statistics Bureau (CSB), *Chongqing Statistical Yearbook* [Pinyin: *Chongqing Tongji Nianjian*] 2009 online resources; national average data is obtained from the China National Bureau of Statistics (NBS) online data resources search.

The rest of this chapter is organized as follows: the next section will review the previous literature based on the theoretical framework of analysing agglomeration externalities. The third section will analyse Chongqing’s economic and geographic features related to scale economy. The fourth section will present the model specification and describe how the variables are constructed and what data is used in the empirical analysis. At the same time, it will describe model selection and check its robustness. The fifth section will report and discuss the empirical results. The final section will

make conclusions.

## **5.2 Literature Reviews on Localisation and Urbanisation Economies**

Over the past few decades, the concept of localisation economies coupled with urbanisation economies has been more popularly used to solve the association between urbanisation and development. But the idea of this concept can be traced back to very early years. Glaeser *et al.* (1992) claim that the earliest accurate discussion of agglomeration commencing from localisation is in Marshall's (1890) *Principles of Economics*, who said that the concentration of an industry in a city helps knowledge spillover between factories, and the growth of that industry helps that city grow vice versa. Another important influential discussion related to the spatial industry concentration is found in Jacobs' (1969) *The Economy of Cities*. In contrast to Marshall's analysis of urban specialization, Jacobs stresses the importance of urban diversity. Her argument is that diversity promotes ideas exchange.<sup>30</sup> Rosenthal and Strange (2004) review recent empirical

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<sup>30</sup> This is an analysis to the industry agglomeration, and can also be applied in the same way to people. The reason why people are attracted to the city is that it provides an environment in which

studies on this in developed countries which endorse Marshall and Jacobs' partitioning method and they summarise the result ranges of the elasticity of urbanisation economies to productivity ranges roughly from 3 to 8 per cent, and ranges of the elasticity of the corresponding localisation economies value were roughly from 3 to 5 per cent.

Localisation and urbanisation economies as formal concepts have been proposed by Walter Isard (1956), who has distinguished agglomeration scale economies into the above two forms.<sup>31</sup> But following that, according to Strange's (2009) arguments, the debate of what would be the best way to analyse the empirical data of urban development on localisation and urbanisation economies, especially those of the developing countries,

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people can exchange and innovate their ideas quickly. They also have the opportunity to learn from others and improve their own productivities. If they didn't, they would stay in their original places where they feel safer and live in low cost rather than push themselves into an unfamiliar place which is full of competition and high rents. As a result, the attraction of the city entails the city agglomeration.

<sup>31</sup> Interestingly, in Isard's (1999) old age, he abandoned the 'old-fashioned' way and used the method from physics and chemistry ways to analyse agglomeration instead and criticized the localisation and urbanisation economies or diseconomies as outmoded. Such method is an apparent novelty, but it is still too complicated to be examined in the situation of lacking data, which is the crucial restraint making this method far-fetched.

remains in dispute. One of the main reasons for this difficulty is that the traditional way (static analysis) has been replaced gradually by the dynamic focus. Based on the original structure, Glaeser *et al.* (1992) introduced the Romer (1986) and Lucas's (1988) dynamic view of cities on externalities<sup>32</sup>. This view explains simultaneously how cities form and grow and denote dynamic localisation economies as MAR spillover and dynamic urbanisation economies as Jacobs externalities. In thinking about the dynamic view, the analysis of localisation (MAR) and urbanisation (Jacobs) economies are still the appropriate ones to describe agglomeration. Moreover, MAR and Jacobs's effects can be measured within and between sectors respectively (Duranton G. , 2007; Combes, Duranton, & Gobillon, 2008). In addition, the localisation economies also closely relate to urban hierarchy (Da Mata, Deichmann, & Henderson, 2005) or change in urban boundaries (Walcott, 2007).

The formal definition of these two agglomeration externalities has been given by Todaro and Smith's (2009, p. 327) *Economic Development*: urbanisation economies are effects related to the general growth of a

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<sup>32</sup> It also can be described as endogenous growth theory.

concentrated geographic region; localisation economies are effects captured by specific sectors of economy, such as financial services or automobiles, as they grow within an area. Similarly, Duranton (2008) considers that strong localisation economies are expected to boost the growth specialized cities, and strong urbanisation economies boost that of diversified cities. More precisely, Strange (2009) suggests that the city's total employment, which used to measure the urbanisation economies as an index of demonstrating the formation of large cities and the level of employment in particular industries, is an index of the localisation economies that can determine the formation of industry clusters. Maarten and Verwijmeren's (2010) estimation is more comprehensive. Through measuring the intensity of human and physical capital within certain areas, as the variables holding both localisation and urbanisation externalities, they suggest that the density of general economic activity is associated with urbanisation effects.

For the relationship between specialization (localisation economies) and economic growth, Glaeser *et al.* (1992) use large industries in 170 U.S. cities between 1956 and 1987, based on the theories of the increase return of scale, and find that specialized cities, which are affected by localisation

economies, do not encourage growth. Correspondingly, Henderson *et al.* (1995) support that specialization lacks positive effects on growth by using data for eight manufacturing industries in 1970 and 1987. Duranton and Puga (2001) argue that the new industries derived from diverse cities will move to specialized cities after reaching maturity. Henderson (2010) claims that specialization can only support limited agglomeration and growth in most cases. However, Henderson *et al.* (1995) also emphasize that if the sectoral employment is constant, the mature industries will grow. Combes (2000) detects that only small cities can make economic growth by specialization. Rosenthal and Strange (2004) consider that if the city controls the total employment rather than the sectorial breakdown employment, the specialization will not support growth. But all of these conclusions are on the basis of developed countries which is much different from developing countries on the role of national government. According to Henderson's (2010) arguments, the heavy government interventions during urbanisation in developing economies are under-researched.

Having reviewed the classical papers on localisation and urbanisation economies, the recent empirical studies will be surveyed below. Rosenthal and Strange (2004) give the older static work a detailed review; however,

the discussion of this chapter focuses on the dynamic ones. There has been a renewal of interest in agglomeration on localisation and urbanisation economies since scholars introduced dynamic focus, especially in the field of empirical analysis in recent years.<sup>33</sup> Henderson *et al.* (2001) discover that localisation economies occurred in the Korean industries, more notably in mature industries. Combes *et al.* (2004) also find the same results from considering French panel data. They estimate that the large and traditional industries have a relationship between industrial concentration and growth. Further analysis has been carried out by Lall *et al.* (2004) for India, and Deichmann *et al.* (2005) for Indonesia and both support similar results. Overman and Venables (2005) give more evidence about localisation effect in their report which inspects a wide variety of countries and sectors. Au and Henderson (2006a; 2006b) argue that Chinese cities are a mix of localisation and urbanisation economies, based on the panel data analysis of city level over 1990 to 1997. Broersma and Oosterhaven (2009) suggest that the regional labour productivity in the Netherlands is affected by urbanisation economies. Baldwin *et al.* (2010) use the data in Canada and

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<sup>33</sup> The traditional debate in the empirical literature on agglomeration economies concerns whether they are related to the concentration of an industry or to the size of a city itself. In other words, the debate concerns the relative importance of localisation and urbanisation economies.

find that the metropolitan areas benefit from urbanisation economies. Fu and Hong (2011) also give the evidence to suggest the urbanisation effects in China. A detailed data source and results dealing with above literatures are set out in Table 5.1.

**Table V.1 Recent Empirical Studies on Agglomeration Externalities: A**

**Summary**

<b>Paper</b>	<b>Country</b>	<b>Time period</b>	<b>Findings</b>
Henderson <i>et al.</i> (2001)	Korea	1983-1993	Localisation economies (positive)
Combes <i>et al.</i> (2004)	France	1984-1993	Localisation economies (positive)
Lall <i>et al.</i> (2004)	India	1994-1995	Localisation economies (positive)
Deichmann <i>et al.</i> (2005)	Indonesia	1996	Localisation economies (positive)
Au and Henderson (2006a)	China	1990-1997	Urbanisation economies (positive) Localisation economies (insignificant)
Broersma and Oosterhaven (2009)	Netherlands	1991-2001	Urbanisation economies (positive)
Baldwin <i>et al.</i> (2010)	Canada	1989-1999	Urbanisation economies (negative)
Fu and Hong (2011)	China	2004	Urbanisation economies (positive)

Notes: for simplicity, we only report the key results which are associated with this chapter.

For the three sources of agglomeration economies (including localisation and urbanisation economies) that are suggested at the earliest by Marshall (1890), labour market pooling, spill-over in knowledge and sharing of inputs will be analysed separately based on Chongqing's environment. First, labour market pooling will be discussed. Strange (2009), gives the example of the experiences of Apple's program employees who maximize the benefits of finding the most appropriate work. Comparing this with Chongqing's technology workers reveals they have difficulty in developing their careers. According to Porter's (1990) national competitive development stage theory, Chongqing has not advanced beyond production base which results in a lack of high-technology skills posts. Meanwhile, the SOEs have a great deal of high-income posts that are largely unknown to the public until the employees have been chosen by the SOEs. The result is that high-income jobs are limited. The system for employment is very rigid due to the nepotism within it and therefore there is a constant lack of skills available on the labour market. Therefore high income becomes difficultly associated with competitive work and skilled labour. Second, if the good workers and the good-job vacancies do not match freely, and the job-finding is only a success under rent-seeking, the knowledge spillover is also failure. Moreover, the bad 'secrets of the trade in the air' not only

distort all resource prices but change good society culture into a bad one, which results in a biased work concentration within some work units. Third, Chongqing municipality government (CMG) invests a lot in many infrastructures, and although most of them are under primacy strategies, the sharing of inputs still work. Obviously, it is different from the normal way of major scholars' considerations that how the input sharing works, which is from a mutually benefits between the proximity firms in related industries. This study suggests that these three situations above not only happen in Chongqing but also in the whole country and always in the shadow of the Confucian society. However, as this is not the focus here, and as there is no ready information it will not be pursued further.

### **5.3 Chongqing's Industry Agglomeration and Research Hypotheses**

#### **5.3.1 Local Industry**

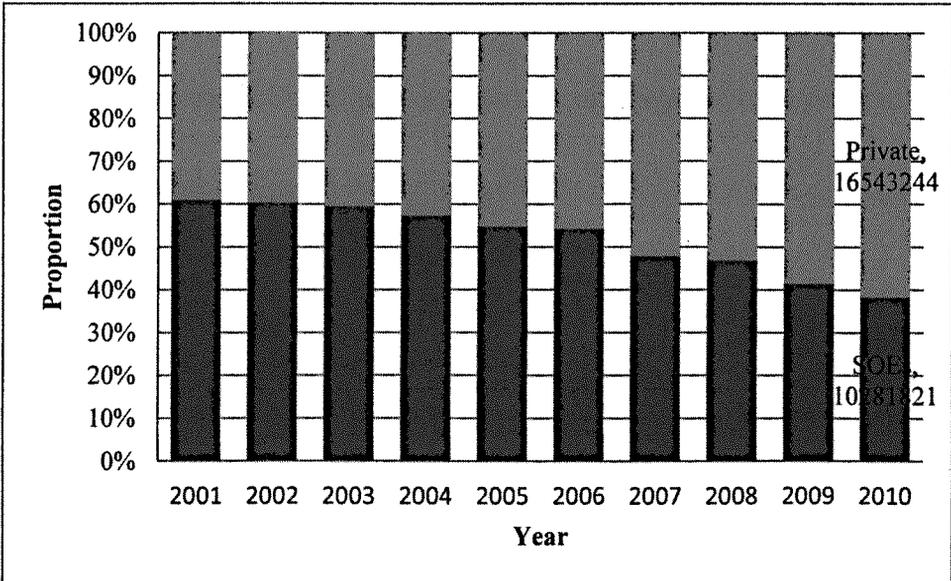
At the same time, Chongqing is an old industrial city. The contributed rate of value added in the industry sector of state-owned and state holding companies decreased 22.7 per cent from 2001 to 2010 and shrunk to 38.3

per cent in 2010. Figure 5.2 presents this situation. Industry in Chongqing was still dominated by heavy industry, including automotive, equipment manufacturing, and resource processing industries, which accounted for 28.3, 9.8 and 23.1 per cent respectively of the total industry value added.<sup>34</sup> As the previous chapter mentioned, the SOEs which form Chongqing's industrial base were developed in the 1950s and, during the Third Front Strategy, initiated in the 1960s. The important military industry has turned its production from military goods to mostly civilian products such as Jialing (Chinese: 嘉陵; pinyin: *Jiǎlíng*) factory's motorcycles and Chang'an (Chinese: 长安; pinyin: *Cháng'ān*) group's automobiles. In 2010, heavy industry accounted for 69.9 per cent of the municipality's total industrial value added. The secondary and tertiary sector accounted for 46.7 and 36.4 per cent of the municipality's total GDP, respectively.

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<sup>34</sup> The data is from Chongqing Statistical Yearbook 2010.

**Figure V.2 SOEs and Private Enterprises Contribution Proportion Changes**



Data Sources: data is obtained from CSB, table 12-5 Value-added of Industrial Enterprises Above Designated Size in *Chongqing Statistical Yearbook 2002-2011* (annual volumes) online resources.

### 5.3.1.1 Lack of indigenous industry development

However, a challenge remains to develop indigenous industries with more value added and higher levels of technological capability and to increase complex manufacturing and innovation. Almost all of the local pillar industries (some of them are resource-based industries and some of them are final consumer goods industries) compete only domestically rather than globally, and lack the capability for process innovation. Even though a

number of high-tech industries have recently located in Chongqing, it is still largely a production base for multinationals, attracted by Chongqing's many relatively low costs. According to Porter's (1990) competitive advantage theory, if Chongqing does not become a home base economy, its upside potential will reach its ceiling quickly.

#### 5.3.1.2 Chongqing's comparative advantage

If Chongqing's lack of indigenous industries and growth only depends on investment, then making the city more attractive to outside investors becomes crucial. According to China Daily's (2010) reports, however, with the rising of business costs in China's coastal regions, the trend is that low and medium value-added manufacturing are relocating to inland regions, where there are sufficient supplies of low cost business environment. This trend has become more prominent since 2009. Mayor Huang Qifan (2011) also claims that Chongqing with its low-cost endowment has more comparative advantages in attracting investment from outside, compared to other parts of western China. This is because of Chongqing's unique characteristics which include:

(1) Large pool of low-cost labour;

- (2) Sufficient water and energy resources;
- (3) Well-developed transportation infrastructure and low-cost logistics;
- (4) Abundant land banking and low-cost real estate rents;
- (5) Low taxation and low-cost financing.

### **5.3.2 The Metropolitan Advanced Economic Sphere**

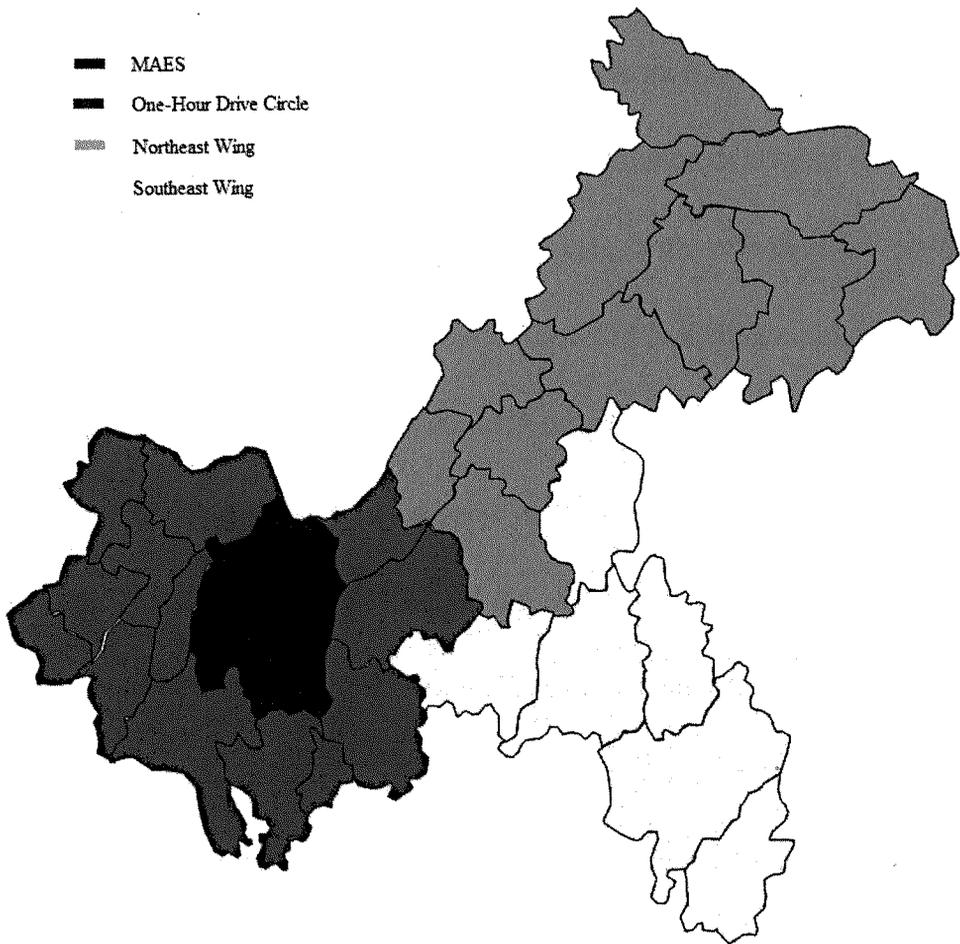
Chongqing Municipality includes forty counties- and prefectural-level administrative divisions, called counties, districts or cities. The territory of Chongqing has three main distinguishable areas which show its diverse demographic and socioeconomic characteristics. According to Chongqing official terminology, these parts refer to the ‘one-hour drive circle’, a smaller but rather compact urban group on its western part,<sup>35</sup> and the ‘two east wings’ (see Figure 5.3); with territories of mountainous reservoir areas and ethnical areas extending to the northeast and southeast. Of these, nine districts form the ‘one-hour drive circle’, these are called Metropolitan

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<sup>35</sup> Chongqing is a well-known mountain city, because it encompasses steep folded mountains. Its topography is made up of mountains and part of the basin formed by the Yangtze River and its tributaries. This brings the city into being an inherent urban group structure that forms the polycentric city. Of these centres each one is segmented by mountains or canyons.

Advanced Economic Sphere (MAES).

**Figure V.3 Chongqing's Economic Spatial Distribution**



Data sources: the data of geographic information is from CSB<sup>36</sup>

The MAES, the capital of Chongqing, is the richer area of Chongqing Municipality. It has contributed 89 per cent per of Chongqing local GDP

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<sup>36</sup> The author thanks Mr Deng Hang, who is an officer in CSB, for offering the data.

over the last ten years. Its permanent population reached 7.5 million in 2010 which is more than one-fourth of the entire municipality. Its surface area is 5,472 square kilometres, that is to say the population density is about 1,370 inhabitants per square kilometre. This is approximately 50 per cent higher than the average level of all Chinese metropolitan regions and similar to Beijing, but much lower than the population density of Shanghai and Guangzhou.<sup>37</sup> To give a relative idea with reference to some international mega-cities, the total population of Chongqing municipality is comparable to the whole population of Seoul, and the density of its MAES is nearly 50 per cent higher than some metropolitan regions like Paris and London. In addition, although the MAES of Chongqing is the richer area of Chongqing municipality, as mentioned above, if compared with four other national central cities, the productivity of Chongqing MAES is still comparatively low.<sup>38</sup> Although, its performance in productivity is higher

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<sup>37</sup> The source is from national statistical online information (<http://www.stats.gov.cn/tjsj/>).

<sup>38</sup> Productivity is measured by GDP per employed person. Chongqing was identified as one of China's five central cities in 2010, which were Beijing, Tianjin, Shanghai, Guangzhou and Chongqing. To make comparisons more meaningful, when comparing with the other four national centre cities, we only concentrate on the Chongqing data of its MAES. Nevertheless, Beijing has twice the productivity, Tianjin has 140 per cent, Shanghai has 180 per cent and Guangzhou has 160 per cent higher the productivity than the MAES of Chongqing in 2009.

than its neighbour Chengdu, the employment rate is lower than in Chengdu, whose rate is even higher than Shanghai, Beijing and Tianjin.<sup>39</sup>

### 5.3.2.1 Dynamic sectorial and territorial performance

In 2000, Chongqing was characterized by a considerably low level of urbanisation (only 33 per cent of the population urbanized). The largest metropolitan area in Chongqing, the MAES, had only 20 per cent of the entire population but 49 per cent of the entire urban population in its municipality. So the urbanisation rate is already relatively high in MAES which had reached 80 per cent. There was also a high proportion of industry value added in MAES which was about 63 per cent, and contributing 32 per cent of the whole municipality's total employment. Urban primacy, fostered by the government, was the aim of the formation of the municipality where Chongqing was expected to reform a large number of industrial SOEs and to serve as a main urban centre in facilitating the development of the less-developed western region.

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<sup>39</sup> We still use Chongqing's MAES to compare it with the whole Chengdu city. The entire data source is from a local statistical yearbook (<http://jtj.cq.gov.cn/html/tjsj/tjnj/>).

### 5.3.2.2 The areas outside of the ‘one-hour drive circle’

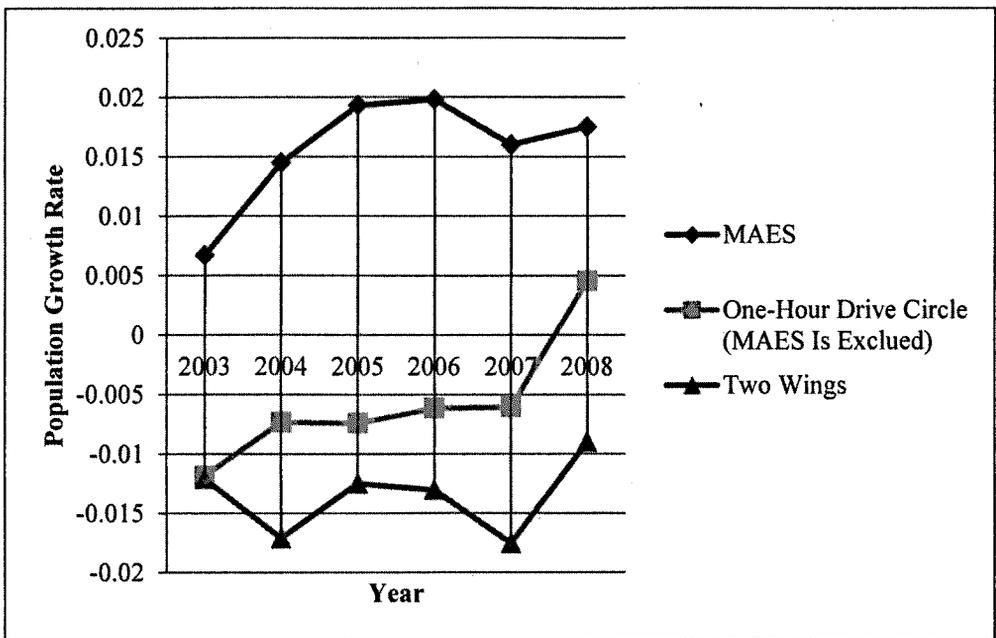
Chongqing’s ‘one-hour drive circle’ which is outside of the MAES remains under-developed. There is a disproportionate gap concerning the income and living standard between the MAES and the rest of the ‘one-hour drive circle’. The MAES’s GDP per capita in 2010 was 3.8 times higher than that in 2001. Its permanent population has increased by 13.2 per cent since the implementation of the local government ‘One Circle, Two Wings’ strategy in 2006 (see the population change trend in different economic geographical regions in Figure 5.4). However, the relatively negative demographic growth and lower income per capita in the remainder of the ‘one-hour drive circle’<sup>40</sup> poses challenges in terms of defining policies to properly connect Chengdu and Chongqing and to balance regional

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<sup>40</sup> In 2010, the total population of the ‘one-hour drive circle’ was 17.6 million. This is equivalent to 61 per cent of the whole population of Chongqing municipality. Of these, 10.1 million - about 35 per cent of the population of the entire municipality - live in the ‘one-hour drive circle’ but outside of the MAES. Compared to the MAES, the rest of the ‘one-hour drive circle’ population has kept the same level of population since 2006, the MAES having increased by 13.2 per cent during this period. The ‘one-hour drive circle’ GDP per capita has been similar to the whole municipality’s average since 2006, having nearly no improvement, but MAES’s per capita GDP being 2.2 times higher than that of 2006.

development.<sup>41</sup> The differences in the demographic growth rates show important dynamics of migration, with a tendency for the population to increasingly concentrate in the MAES.

**Figure V.4 The Three Regional Population Growth Rates**



Notes: this growth rate is the permanent resident growth rate minus the natural population growth rate which was only available from 2003. For instance, the population growth rate of MAES in 2003 is 6%.

Data Sources: data is obtained from CSB, *Chongqing Statistical Yearbook* 2003-2009 (annual volumes) online resources.

<sup>41</sup> The Chengdu-Chongqing economic zone has been approved by the central government as a pilot zone for overall reforms since 2011. Thus, fostering clusters of firms in the joint region has become even more important.

### 5.3.3 Research Hypotheses

Huge investment dominated by state-owned sectors through state-owned banks and government finance has attempted to offset the disadvantages of high distance logistics cost in these inland areas. These huge investments or subsidies result in twofold effects, both positive and negative. The positive effect is that these policies stimulate Chongqing's SOEs' reforms by splitting large numbers of inefficient workers to other new industries. For example, partial employment of highway constructors in newly formed Chongqing Expressway Development Corporation (CEDC) (which is the one of eight Urban Development Investment Corporations (UDICs) since 2001) come from laid-off workers of Chongqing Special Steel Plant (CSSP) which was the largest bankrupted SOE at the time<sup>42</sup>. Meanwhile, the increase in economic growth rates is made by using its advantages of backwardness. For example, as mentioned above, many low-cost factors have been implemented to make the city more attractive to outside investments. This is the reason that the economy has grown enormously in recent years. However, it might only last in the short or medium term,

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<sup>42</sup> The author heard this example from the then Vice-Mayor Haung Qifan's Lecture on Chongqing economic situation analysis in Chongqing University in summer 2008.

rather than the long term if the manner of investment-driven growth does not change. So, it is these negative effects - the lower productivity of indigenous industries, the lack of competitive job opportunities, *etc.* - which this chapter particularly concerns itself with. Each of these is due to the impact of the strong participation of the government in local economic activities.

Back to the conventional theoretical framework, based on Chongqing's context described above, Chongqing's externalities of localisation and urbanisation externalities to economic growth over the past 10 years will be examined. It predicts that (1) Chongqing has both localisation and urbanisation externalities, and that (2) the urbanisation externalities will be very small. Firstly, this chapter comprehensively examines Chongqing's industry development and urban agglomeration over the past ten years, the study of which fills the gap in the literature about industrial agglomeration in inland China. It applies agglomeration theory to the comparative study of different geographical groups and leadership changes groups. Secondly, this chapter uses dynamic localisation and urbanisation economies to observe Chongqing's fast urbanisation process and a conventional production function is modified by using the two main variables above.

Thirdly, this chapter provides conventional agglomeration research, which has gained the majority of its material from developed countries, within the context of the new phenomenon of developing areas. Fourthly, it gives Chongqing's municipality government a note of warning over fast urbanisation. This grants them strong evidence to impel bold reforms such as reducing interventions, fostering strong industrial clusters, formulating appropriate development strategies for each individual administrative units and enhancing the innovative ability in 'city proper', *etc.* Finally, this research gives a new understanding of China's manner of investment-driven growth as the government plays a very special and crucial role in the enormous transition process. However, due to outside pressure, the government attempts to improve things 'in one fell swoop' and this leaves a lot of hard work and many needed improvements.

#### **5.4 Empirical Method and Data**

The model in this chapter draws its inspiration from a value-added function to build up the criterion. Traditionally, a relationship between the output of an economy and its input of capital and labour was expressed by the following equation, which is concise and effective.

$$Y = A * F(K, L) \tag{1}$$

where  $Y$  is real value-added,  $K$  is the volume of capital which is evaluated by the stock of capital,  $L$  is the volume of labour, and  $A$  is an indicator of technology. This notion permits us to measure the effects of localisation and urbanisation economies in order to gain (for) productivity by replacing two main variables: the quantity changes of labour forces and the technology impacts of its own industry. Thus, the fundamental resolution is to go through the local productivity as a function of local inputs, including the quantity of capital stock, labour, and local technology spill-over. Using a log-linear form, Chongqing's real value added per production worker as the dependent variable is represented by  $\log GDP$ . The capital stock per production worker and the own-sector employment as the two main independents are represented by  $\log Capital$  and  $\log Employment$ . The base value-added type estimating is given by the following

$$\log GDP_{cnt} = \beta_0 + \beta_1 \log Capital_{cnt} + \beta_2 \log Employment_{cnt} + \beta_3 d_{cnt} + v_{cn} + \eta_t + u_{cnt} \tag{2}$$

where  $c$ ,  $n$  and  $t$  indicate county ( $c$ ), industry ( $n$ ) and year ( $t$ ).

#### 5.4.1 The Variables Construction

The county level of capital stock, In *Capital*, is the dominant variable of independent, and it is brought up as a critical source that is to explore the productivity changes in Chongqing. Following stereotyped techniques, perpetual inventory method (PIM), a series of the three sectors capital stocks at the county level are constructed and compiled by employing both existing literature and local official statistic data. The base calculation is given by the following

$$Capital_{cnt} = Capital_{cn(t-1)} \times (1 - \delta) + Investment_{cnt} \quad (3)$$

where  $c$ ,  $n$  and  $t$  indicate county ( $c$ ), industry ( $n$ ) and year ( $t$ ). This study adopted San Haojie's (2008) capital stock calculation results of Sichuan's in 2003 which included Chongqing's data and reported in the capital stock of provincial-level China in 1952-2006. The capital stock in a base year,  $Capital_{t_0}$ , is to be estimated directly, assuming that the weight of each

sector at the county level is approximately the same as GDP's proportion in that base year. It is noted that such estimations have some flaws. However, no data in Chongqing would allow anyone to estimate the initial capital stock at the county level so far. In addition, the rate of depreciation  $\delta$  adopts a constant 10 per cent that is also similar to the one San Haojie used in Sichuan from 2003 to 2006. The parameter  $Investment_t$  utilizes the investment in fixed assets of each unit from local official statistics in that very year. All the capital stock and investments were divided by the Consumer Price Index (CPI) as the annual capital deflator, with 2001 as the year base. A list of detailed estimated values of the county level capital stock from 2001 to 2010 is set out in the Appendix Table 5.5.

The county level three sector breakdown employment abundance,  $In Employment$ , is another main independent variable, and it is designed to measure the cross-sector employment dynamic within those counties. It represents the localisation economies which are measured by the overall local employment in its own industry. Rosenthal and Strange (2004) indicate that localisation externalities could be depicted as a single location for each industry agglomeration. In the automobile industry, for instance, the final assembling industries have concentrated in Yubei District

(Chinese: 渝北区; pinyin: *Yúběi Qū*) recently while some key parts and components factories have scattered all over the MAES. Just 10 years ago, however, Jiangbei District (Chinese: 江北区; pinyin: *Jiāngběi Qū*) was the dominant region of assembling factories rather than Yubei. The reason for the shift of the assembling manufacturing to Yubei is that it has huge undeveloped lands and a low cost of land rent, which satisfied the increase of automobile final manufacturing in Chongqing. So, the changes of local industry over time, which could be interpreted as the transitions of agglomeration economies within industries, could be measured by its own industry employment shifts which are reflected in the used panel data.

The county level industry diversity index,  $d$ , is the crucial independent variable; just as its name implies that it is used to gauge the magnitude of industry diversification. It represents the urbanisation economies which could be measured by many ways of calculation. Herfindahl index is the most popular method to be chosen by many empirical studies of economic geography (Ellison & Glaeser, 1997; Henderson J. , 2003a; Nembua, 2007; Alhowaish, 2011). Naldi (2003) also reports that the sensibility of Herfindahl index is the highest one, especially, when the dataset coincides with Zipf's law, compared with Gini, Bonferroni and Amato, which are

also the prevailing concentration indexes. Therefore, the Herfindahl-type index is constructed as our control variables. Furthermore, the standard approach is used, mentioned in Rosenthal and Strange's (2004) paper, to distinguish between sectors in the counties' own-sector from sectors outside of the counties' own industry. Thus, the normalization index equation that has been reflecting the urbanisation economies is given by the following.

$$d_{ct} = \sum_{n=1}^N \left[ \frac{E_{cnt}}{E_{ct}} - \frac{E_{nt}}{E_t} \right]^2 \quad (4)$$

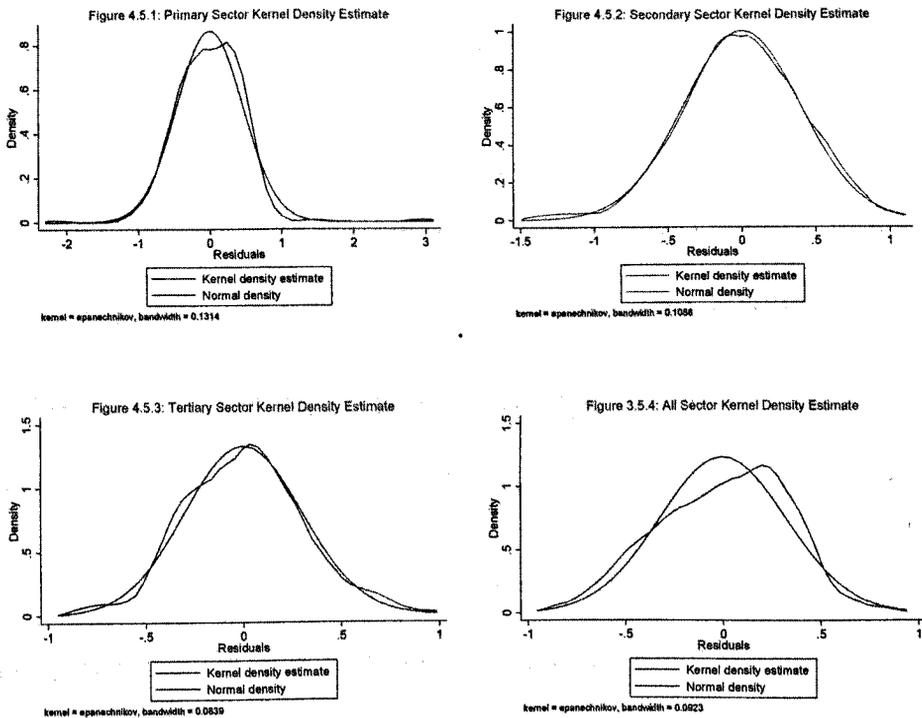
For counties  $c$ , the index of diversification (a.k.a. specification) is  $d_{ct}$  that has a minimum value of zero which stands for the county that is completely non-specialized, and the maximum value of two for a city completely specialized in one industry where employment is concentrated in another. As  $d_{ct}$  increase, diversity falls.  $E_t$  is total employment and  $E_{nt}$  total employment in sector  $n$ .  $E_{ct}$  and  $E_{cnt}$  are the corresponding local magnitudes.

#### 5.4.2 The Error Terms and Robustness Issues

The error term is made up of  $v_{cn}$ ,  $\eta_t$  and  $u_{cnt}$  which determine the econometric model selection and the robustness of results. Simple models are used to go through questions, even though the time and spatial variables are both inclusion of the dataset, the pooled Ordinary Least Squares (OLS) still could be used if it was consistent with its error hypotheses. On the one hand, from technique terms, we primarily reported such residuals' kernel density graph in Figure 5.5. The results are obviously beyond the underlying premise of OLS, which are leptokurtosis and fat-tail, compared with a normal distribution with the same mean and variance. It means the individual heterogeneity is very significant in the dataset. From conceptual and perceptible terms, according to Baltagi's (2008) overview, the unit-specific (a.k.a. heterogeneity) residual,  $v_{cn}$ , differs between units which are unobserved and correlated with explanatory variables. For example, the changes in externalities are related to changes in the output in the estimation, which means we should choose Two-Stage Least Squares (2SLS) model to remedy the unobserved effects in externalities changes by using within or between regression estimator. On the other hand, the time effects that will show the gains in TFP are also very important, and the OLS model cannot make the correct estimation. Thus, the two-way error component regression model is to be chosen to estimate the dataset.  $v_{cn}$  is

the individual effects with mean zero and variance  $\sigma_{v_{cnt}}^2$ , and  $\eta_t$  is the time effects with mean zero and variance  $\sigma_{\eta_t}^2$ . The error  $u_{cnt}$  varies with individuals and time, as a usual disturbance in the regression which are independent and identically distributed (i.i.d.) and independent of the explanatory variables.

**Figure V.5 Kernel Density Estimate**



Notes: the upper left is the figure of primary sector kernel density estimate; the upper right is the figure of secondary sector kernel density estimate; the lower left is the figure of tertiary sector kernel density estimate; the lower right is the all sector kernel density estimate.

Mutl and Pfaffermayr (2011) claim the Random Effects (RE) estimator is more efficient than the Fixed Effects (FE) estimator, especially in spatial empirical applications. In other words, a matrix-weighted average of the between and within estimation is more qualified than only producing within regression estimator to capture the individual effects in the model estimation. Nevertheless, the Hausman's (1978) specification tests significantly reject the null hypothesis which is the estimator  $\widehat{\theta}_2$  is indeed efficient. This is consistent with estimator  $\widehat{\theta}_1$  of the true parameters. It means the dataset is in favour of the FE estimation.

Thus, the two-way error component FE model is to be selected to reduce individual and time effects, including congenital location and resource endowment, etc. But given that the exogenous shocks are simultaneously with other effects in the error term, such estimation might be biased and inconsistent. For example, the government interventions are the most prominent features during China's economic growth and urbanisation process (Henderson J. , Cities and Development, 2010; Song, Storesletten, & Zilibotti, 2011). Of these, the leadership changes will bring the most shocks to local economies, because this year's shock or leadership change  $u_{cnt}$  may affect next year's input  $Capital_{cn(t+1)}$  or  $Employment_{cn(t+1)}$ .

The sufficient information cannot be found at county level leadership changes, but the municipality's leadership changes almost determine the leadership of the county level. During the time from 2001 to 2008, the Party chief has changed three times, from He Guoqiang to Huang zhendong in 2002, from Huang zhendong to Wang Yang in 2005, and from Wang Yang to Bo Xilai in 2007 respectively. The last change from Wang Yang to Bo Xilai is disregarded in the estimation, because the predetermined factor from the leadership change is emphasized to affect the next year, and Bo's ruling period almost can be thought of from 2008 which is the last year of our dataset, with no relevant effects. For the reason of balance, 2001, 2004 and 2008 are chosen to form a compared dataset, which assume the effects from a shock two or three years ago do not last to the present day.

### **5.4.3 Data Issues**

The Chongqing's data is a county level sectorial breakdown and a time series panel, which is primarily from the annual issues of the *Chongqing Statistical Yearbook* online resources, with major economic information for Chongqing's forty counties and three sectors (agriculture, industry and

services). Some data is relative to population information, which is gathered from the national *Population Census* of 2000 and the annually sampling of the 1 per cent population survey, with more accurate urban and rural permanent residents specifications. The base year value of capital stock and the depreciation rate ascribe the underlying estimation results from San Haojie's report in 2008. A detailed description of data resources for each variable is given in the Table 5.2.

**Table V.2 Variables Description and Data Sources**

<b>Variables</b>	<b>Description</b>	<b>Data Sources</b>
log <i>GDP</i>	Chongqing's real value added <b>per production worker</b> , dependent variable, in logarithmic form.	<i>Chongqing Statistical Yearbook</i> 2002-2009 (annual volumes) online resources
log <i>Capital</i>	The capital stock <b>per production worker</b> , in logarithmic form. Using PIM estimates. The base year is estimation from San's (2008) results. The depreciation rate adopts 10 per cent.	<i>Chongqing Statistical Yearbook</i> 2002-2009 (annual volumes) online resources; San's (2008) China provincial-level capital stock results in 1952-2006
log <i>Employment</i> (Localisation Externalities)	Overall local employment in its own industry (including migrant workers), in logarithmic form.	<i>Chongqing Statistical Yearbook</i> 2002-2009 (annual volumes) online resources
d (Urbanisation Externalities)	Herfindahl index is calculated by distinguishing between sectors in the counties' own-sector from sector outside of the counties' own industry.	<i>Chongqing Statistical Yearbook</i> 2002-2009 (annual volumes) online resources

A very critical issue dealing with Chongqing's economic geographical divisions should be laid out in advance, which will significantly affect the estimation results. As analysed above, it is more like a unified complex to the MAES, while they have their relatively self-determinative government. Two statistical calibres are set out, one is forty counties and another is a

MAES plus thirty one counties. They are denoted as 40C and MAESAC.

Following the analysis of variable construction and the above issues, four panel datasets of Chongqing's county level time series data for 2001-2008 were constructed.<sup>43</sup> They are 40C eight-year (2001-2008), 40C three-year (2001, 2004 and 2008), MAESAC eight-year (2001-2008) and MAESAC three-year (2001, 2004 and 2008), respectively, which are all balanced panel data. The summary statistics of the variables and observations are set out in the Appendix Table 5.6 to 5.9.

For other data issues, for example, where the quality of data is concerned. Although, China's local data are normally considered of high quality (Au & Henderson, 2006a), the integrity and accuracy of Chongqing's sectorial data has still been questioned. First, the approved volume of total employment may shrink the true employment size by ignoring partial employment that happened in private sectors. Secondly, for MAES data, the data was collected from an officially defined territorial range, rather

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<sup>43</sup> The dataset was constructed from 2001 to 2010. However, Chongqing's official statistics have not offered the year-end employment value to the three sector breakdown at county level since 2009.

Thus, the dataset has to be shrunk into a shorter one from 2001 to 2008.

than the real metropolitan areas that are normally defined by commuting rates,<sup>44</sup> which results in the vicinity areas of MAES, the same standard metropolitan areas, could not be counted in the ‘city proper’. So, it has to be confessed that at least the two constraints above cannot be avoided.

## **5.5 Results and Discussions**

### **5.5.1 Externalities**

The value-added functions are estimated for the externalities of industries at county level. The three sectors and the entire industries equations results were presented on each dataset in Tables, including 40C eight-year, 40C three-year, MAESAC eight-year and MAESAC three-year.

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<sup>44</sup> Commuting rates are not directly available in China.

Table V.3 Estimated Results for 40C Externalities and Productivity

	40C 2001-2008				40C 2001 2004 2008			
	Primary sector	Secondary sector	Tertiary sector	All	Primary sector	Secondary sector	Tertiary sector	All
<i>log Capital</i>	0.999*** [0.001]	0.377*** [0.000]	0.098 [0.246]	0.253*** [0.000]	1.090*** [0.000]	0.470*** [0.006]	0.109 [0.486]	0.377*** [0.000]
<i>Localisation</i>	0.320 [0.305]	-0.402*** [0.000]	-0.648*** [0.000]	-0.416*** [0.000]	0.707** [0.018]	-0.267* [0.084]	-0.590*** [0.001]	-0.209*** [0.109]
<i>Urbanisation</i>	3.515*** [0.000]	0.666 [0.462]	1.702 [0.160]	0.132 [0.569]	1.619* [0.076]	0.221 [0.899]	0.832 [0.718]	0.135 [0.761]
2002	0.106* [0.090]	0.136*** [0.000]	0.073* [0.059]	0.075*** [0.001]	----	----	----	----
2003	0.333*** [0.000]	0.249*** [0.000]	0.134*** [0.008]	0.153*** [0.000]	----	----	----	----

2004	0.481*** [0.000]	0.354*** [0.000]	0.192*** [0.001]	0.242*** [0.000]	0.578*** [0.000]	0.339*** [0.000]	0.185* [0.069]	0.211*** [0.000]
2005	0.557*** [0.000]	0.397*** [0.000]	0.400*** [0.000]	0.330*** [0.000]	----	----	----	----
2006	0.626*** [0.000]	0.454*** [0.000]	0.484*** [0.000]	0.401*** [0.000]	----	----	----	----
2007	0.852*** [0.000]	0.587*** [0.000]	0.561*** [0.000]	0.529*** [0.000]	----	----	----	----
2008	0.900*** [0.000]	0.750*** [0.000]	0.623*** [0.000]	0.640*** [0.000]	1.098*** [0.000]	0.681*** [0.000]	0.605*** [0.003]	0.539*** [0.000]
R2-adjust	0.635	0.792	0.758	0.906	0.790	0.783	0.696	0.902
N	320	320	320	320	120	120	120	120

Notes: p-values in brackets

\* p&lt;0.1, \*\* p&lt;0.05, \*\*\* p&lt;0.01

For the model 40C eight-year in Table 5.3, with respect to externalities, except for the primary sector<sup>45</sup>, only localisation economies are significant; urbanisation economies are only significant in primary sector. For localisation economies, a 1 per cent increase in local industry employment is associated with a  $\beta_2$  per cent decrease in output per worker, which is as opposed to Au and Henderson's (2006a) findings on China and other findings which state that localisation economies are positive.<sup>46</sup> The results show that all localisation economies in secondary, tertiary and the whole industry categories models are negative and significant at a 1 per cent level. According to Rosenthal and Strange's (2004) arguments, a negative localisation economies conveys the county share of employment in the industry is small. The absolute value magnitudes in Table 5.3 are even larger than the U.S.'s results that are estimated by Shefer (1973), using cross-section method for 1958 and 1963 *Census of Manufactures*, let alone to compare with other recent empirical results by using panel data methods. Because the bias that the cross-section methods caused cannot be correct,

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<sup>45</sup> The results of the coefficient of per capita capital stock in primary sector are abnormal value.

<sup>46</sup> For example, Au and Henderson (2006) argued that a 1 per cent increase in the local labour force is associated with a .033 per cent increase in output per worker in China, but this result is insignificant at a 10 per cent level. Other findings can be found in Rosenthal and Strange's (2004) detailed reviews on agglomeration externalities.

which is the bias that can be controlled by FE estimations, those obtained from cross-sectional methods are larger than those estimated from panel data (Henderson, Lee, & Lee, 2001; Rosenthal & Strange, 2004). It suggests that the absolute values of the results in 40C eight-year model are noticeably high. *Ceteris paribus*, based on the whole industry coefficient, if the entire industry employment rises from 1000 to 1100, output will decline by 4.2 per cent.

As mentioned above, to avoid the predetermined shock, or to consider the government interventions, estimation is then made as to report three-year results in Table 5.3. Compared with the eight-year model, the absolute value in secondary, tertiary and the whole industry categories are in a prominent decline. The entire industry localisation externalities elasticity is -0.21. The absolute magnitude is in close proximity to normal value, though it is still negative. That means the predetermined shock exists and the three-year estimation model is more efficient. In addition, with respect to externalities, except for the primary sector which has both localisation and urbanisation economies, the other two sectors and the whole industry categories are significant when dealing with localisation economies. In terms of urbanisation economies, primary sector is significant at a 10 per cent level.

The estimations for the MAESAC from 2001-2008 are presented in Table 5.4, where it has a main change, compared with the corresponding 40C results for externalities. The absolute values are all larger. Furthermore, urbanisation economies in secondary sectors are significant at a 10 per cent level, and primary sectors are localisation economies rather than urbanisation economies which are significant in the corresponding 40C model.

Then the MAESAC was experimented with in three-year in Table 5.4. For this model, only secondary and tertiary sectors are localisation economies and significant, and the results are still negative. They are -0.51 and -0.6, and are all significant at a 1 per cent level. They are both larger than the corresponding ones in 40C three-year model whose secondary sectors are significant at a 10 per cent level and tertiary sectors are significant at a 1 per cent level. All industries category's localisation economies are significant at 10 per cent level, with a S.E. of 0.052, and the absolute magnitude is similar to the 40C three-year model's estimation, but a little larger; a 1 per cent increase in the entire local industry employment is associated with a 0.28 per cent decrease in output per worker.

Table V.4 Estimated Results for MAESAC Externalities and Productivity

	MAESAC 2001-2008				MAESAC 2001 2004 2008			
	Primary sector	Secondary sector	Tertiary sector	All	Primary sector	Secondary sector	Tertiary sector	All
<i>log Capital</i>	0.118 [0.478]	0.119 [0.203]	-0.017 [0.831]	0.158*** [0.007]	0.498 [0.113]	0.204 [0.265]	0.078 [0.599]	0.322*** [0.006]
Localisation	-0.611*** [0.001]	-0.629*** [0.000]	-0.792*** [0.000]	-0.541*** [0.000]	-0.089 [0.802]	-0.513*** [0.002]	-0.604*** [0.001]	-0.276* [0.052]
Urbanisation	-0.418 [0.373]	2.529* [0.094]	2.269 [0.213]	0.127 [0.621]	-0.365 [0.726]	2.869 [0.294]	3.592 [0.319]	0.159 [0.766]
2002	0.033 [0.314]	0.134*** [0.000]	0.103*** [0.006]	0.082*** [0.000]	----	----	----	----
2003	0.105** [0.018]	0.242*** [0.000]	0.191*** [0.000]	0.167*** [0.000]	----	----	----	----

2004	0.238*** [0.000]	0.349*** [0.000]	0.270*** [0.000]	0.265*** [0.000]	0.377*** [0.001]	0.338*** [0.000]	0.210** [0.035]	0.224*** [0.000]
2005	0.270*** [0.000]	0.433*** [0.000]	0.453*** [0.000]	0.349*** [0.000]	----	----	----	----
2006	0.297*** [0.000]	0.530*** [0.000]	0.554*** [0.000]	0.432*** [0.000]	----	----	----	----
2007	0.513*** [0.000]	0.716*** [0.000]	0.652*** [0.000]	0.580*** [0.000]	----	----	----	----
2008	0.539*** [0.000]	0.919*** [0.000]	0.738*** [0.000]	0.702*** [0.000]	0.783*** [0.000]	0.856*** [0.000]	0.608*** [0.002]	0.575*** [0.000]
R2-adjust	0.877	0.840	0.821	0.923	0.827	0.823	0.767	0.906
N	256	256	256	256	96	96	96	96

Notes: p-values in brackets

\* p&lt;0.1, \*\* p&lt;0.05, \*\*\* p&lt;0.01

From the above results, five crucial ideas were extracted. First, as analysed above, the exogenous shocks really affect the year which followed the shock year. It provides solid evidence and is similar to many existing literatures regarding China's economic geographic research on government interventions (Au & Henderson, 2006a; Duranton G. , 2008; Henderson J. V., 2010). It especially reflects the vital effects of the change of the municipality chief leader to local economy. Secondly, MAESAC model is more sensitive than 40C model on testing the externalities. However, because the value is negative, it does not imply that the MAES as a unified complex is more agglomerative than nine districts' individual effects. Through using this method to distinguish the different geographic administrative areas, it conveys why Au and Henderson's results are so low. Because the dataset they used is from 1991 to 1998 *Urban Statistical Yearbook of China*, and the critical indicator commuting rates are not directly available even these days (OECD, 2007), let alone the data from of the last century, they have underestimated the extent of the metropolitan areas, which resulted in their lower estimation outcome. Thirdly, the 40C model's externalities coefficient is bigger than MAESAC's corresponding one, which supports the idea that small cities with higher industry activity grow more quickly, which is in line with general empirical studies on the cities externalities (Henderson, Kuncoro, & Turner, 1995; Combes P.-P. ,

2000; Henderson, Lee, & Lee, 2001; Rosenthal & Strange, 2004). Fourthly, all critical results present Chongqing as having localisation economies, which is contrary to Au and Henderson's (2006a) findings, which state that China has both localisation and urbanisation economies<sup>47</sup>, so the results suggest that Chongqing as the metro city should have more urbanisation economies. Finally, the negative results suggest that the productivity per worker decreases while the employment increases. It might give Chongqing a note of warning, that if it continues to tighten its government-dominant local economy, the localisation economies cannot afford the growth. Chongqing's industry needs to change the situation that is protected and has a lack of market driven forces.

### 5.5.2 Productivity

From the testing and analysis above, the key model MAESAC three year in Table 5.4 is robust and has been chosen to report the productivity. The variable  $\beta_1$  presenting the capital share in value added is 0.32 which is similar to Henderson *et al.*'s (2001) estimation results in Korea. The total productivity factors reflected in the time dummies  $\eta_t$  which are 8 per cent

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<sup>47</sup> Their results seem to show urbanisation economies have more effect on urban growth than localisation economies, because its localisation economies results are not significant.

a year over the years 2004 to 2008 for all industry categories, and are 11 per cent for secondary industry. These are huge productivity gains.

These results combining with the externalities results have drawn an interesting and complicated picture. Over the last ten years, Chongqing's urbanisation pace has been quickened by the government. The true reasons in this respect are not exactly know, but from the theoretical view, the level of urbanisation and income per capita are highly correlated (Harris & Todaro, 1970; Krugman, 1991; Fujita, Krugman, & Venables, 1999; Henderson & Wang, 2005; Henderson J. , 2010). It has been guessed that the government has attempted to improve the income per capita through raising the urbanisation pace. Even so, it is still not understood why the average GDP growth rate is lower than the national average, but the urbanisation pace much higher than national average. Because the underlying premise of urbanisation improvement is technology change or productivity rise (Krugman, 1991; Fujita, Krugman, & Venables, 1999). It could hardly be imagined that the productivity prominent improvement is from the technical worker level rigidity. But from these empirical results, the productivity is increased. There is no doubt about it being the investment effects. Chongqing should pay much attention to its industrial upgrading, because the income per capita cannot increase with rise of urbanisation without developing its indigenous industries (Porter, 1990).

Henderson (2010) suggests that manufacturing and service industries need agglomeration to require efficient production, which is only a necessary condition to agglomeration. The sufficient condition is free market economy and entrepreneurial skills. World Development Report (2000) details the sub-Saharan countries' urbanisation took place with no per capita income growth, which is analogous to Chongqing's situation. In effect, there is limited evidence to prove that the manufacturing industries benefit from mega-cities, but they can improve from the greater industry clusters (Glaeser, Kallal, Scheinkman, & Shleifer, 1992; Henderson, Kuncoro, & Turner, 1995; Duranton & Puga, 2001). The results convey the cluster's externalities are more significant after separating the MAES into nine districts, which means that these nine districts should have their own explicit development strategies. All in all, all of these are caused by the priority policy for urbanisation, so it is reasonable why Duranton (2008) criticizes the fast pace urbanisation.

## **5.6 Conclusions**

This chapter has clearly illustrated the reasons behind the fast urbanized Chongqing where the agglomeration effects are considered as negative dynamic localisation economies and gave robust empirical evidences.

These results suggest that the risk of economic growth in Chongqing has increased significantly and is likely to worsen. The urbanisation rates in China maybe a competition target among each province and the local leaders where they try their best to pursue them. They disregard the underlying premises of urbanisation that have been left waiting 'better late than never'. According to China Daily (2012), the CMG has begun to boost a new round of industry revitalization recently, which shows local authorities have realized the need of urbanisation. This view of agglomeration and urbanisation demonstrates that the effects of localisation or specialization only benefit the small cities. The mega-city, like Chongqing, needs urbanisation or diversity effects, which is hard to find evidence of to date and maybe also in the near future. Because of overly fast urbanisation and strong government interventions, the traditional industries' localisation externalities in Chongqing cannot afford the economic growth anymore and cannot offer enough job opportunities. Resources cannot be freely allocated, and the developing ability of urbanisation externalities becomes even more difficult. Another line of research worth pursuing further is to conduct comparison analysis between western inferior areas and coastal developed areas to give a more comprehensive picture of China's agglomeration features. As always, this investigation has a number of limitations to be considered in evaluating its findings, which have already been discussed and do not give unnecessary

details here. In general, these results of the Chongqing agglomeration externalities reported here are consistent with other similar studies dealing with developing countries urbanisation process with primacy strategies like India (Lall, Shalizi, & Deichmann, 2004). Chongqing has urbanized too fast, and it is going to suffer tough long term reforms.

## Appendix

**Table V.5 A List of Detailed Estimated Values of County Level Capital Stock from 2001 to 2010 (Billion RMB)**

Counties	2001	2002	2003	2004	2005
Yuzhong	36.31391	38.36106	41.65864	46.4057	51.27353
Dadukou	10.27608	11.23133	12.4924	14.37404	17.77784
Jiangbei	26.94885	29.23735	34.08364	40.14629	48.06975
Shapingba	29.73313	32.18179	35.64137	40.69579	47.43387
Jiulongpo	33.90432	36.97305	41.64946	48.74956	56.49368
Nanan	34.068	36.75925	42.0636	49.88905	60.52142
Beibei	13.01943	14.02736	15.51302	17.7482	20.80774
Yubei	39.34407	43.50375	49.35592	62.00213	78.32161
Banan	17.39676	18.55948	20.53198	23.91541	29.09593
Wansheng	2.132636	2.424742	2.917668	3.722371	4.596034
Shuangqiao	0.62357	0.701503	0.938243	1.188588	1.467629
Jiangjin	18.84832	20.59681	22.96625	25.52111	29.24471
Hechuan	13.15145	14.40929	16.42687	19.76872	24.89391
Yongchuan	19.55351	21.42262	24.01867	27.87996	32.83894
Nanchuan	8.718081	9.613783	10.95156	12.68198	14.91782
Qijiang	9.901706	11.01506	12.54566	14.69011	16.32834
Tongnan	6.015732	6.606658	7.656763	9.048756	10.62309
Tongliang	7.886185	8.989237	10.46054	12.44197	15.01072
Dazu	7.426423	8.152191	9.109272	10.39984	12.07658
Rongchang	6.263138	6.721884	7.544436	8.748552	9.981967

Bishan	7.133475	7.805918	8.845026	10.5991	12.83105
Fulin	21.82718	23.79813	26.36569	28.3894	30.54217
Changshou	14.31192	15.61054	17.3345	19.67626	22.64196
Wanzhou	30.42335	32.64628	35.69974	40.19664	45.66803
Liangping	9.582277	10.57924	11.90912	12.8569	13.89921
Chengkou	1.383124	1.472661	1.708905	2.057495	2.632895
Fengdu	7.119212	8.14147	9.422123	10.60817	11.97064
Dianjiang	6.466987	7.319558	8.450082	9.556464	10.8698
Zhongxian	6.994165	7.607499	8.591659	9.897833	11.62398
Kaixian	8.817286	9.796728	11.29227	13.56427	16.49784
Yunyang	8.523059	9.655523	11.12317	12.69413	14.50533
Fengjie	9.777171	11.41997	12.82996	13.54781	14.95281
Wushan	5.635155	6.32521	7.220519	7.545097	8.143387
Wuxi	1.996268	2.181081	2.439063	2.795197	3.302877
Qianjiang	9.019792	9.935872	10.96809	11.69276	12.49156
Shizhu	3.344276	3.697389	4.36742	5.459368	7.237101
Xiushan	5.831456	6.52235	7.232565	7.705129	8.466976
Youyang	6.061465	6.666748	7.280943	7.572009	8.158968
Pengshui	6.242287	7.145528	8.441885	10.77696	14.09056
Wulong	7.984815	9.055254	9.867048	10.90704	12.63409

Counties	2006	2007	2008	2009	2010
Yuzhong	56.0263	59.56779	64.7651	73.44314	85.95356
Dadukou	22.05595	27.4899	33.66747	42.3659	51.45436
Jiangbei	59.31461	75.03738	93.9745	117.0878	142.8372
Shapingba	57.51943	72.043	83.67307	100.2041	124.6869
Jiulongpo	65.99137	78.08239	90.46883	105.4448	123.1188
Nanan	74.24962	90.80506	108.4941	128.2502	150.6975
Beibei	25.2479	31.90161	43.014	59.32461	81.44988
Yubei	98.56068	120.8073	144.3075	167.8831	197.6952
Banan	37.77849	50.36345	65.8567	86.40408	110.4897
Wansheng	6.446891	7.198113	8.934785	11.79433	15.12009
Shuangqiao	1.761417	2.408366	4.044026	5.368803	6.918093
Jiangjin	34.39292	39.37243	48.56349	61.83716	80.19675
Hechuan	31.2518	36.67145	47.86945	65.93056	90.35663
Yongchuan	38.31755	45.21473	55.21347	69.3953	88.45707
Nanchuan	17.07311	26.49678	39.13748	55.26035	75.71425
Qijiang	17.98152	28.01	41.76837	60.58429	84.59434
Tongnan	11.76045	15.65486	20.77527	27.93026	38.47011
Tongliang	16.86146	19.54927	23.76193	30.21975	41.1657
Dazu	13.81937	15.89994	19.08433	24.42194	32.03305
Rongchang	11.60787	15.43511	21.93045	30.83661	45.52592

Bishan	15.61568	17.97742	22.49747	29.67409	39.63284
Fulin	33.60543	34.33427	37.27893	43.067	52.58099
Changshou	26.37469	29.22316	33.57216	38.15137	47.83664
Wanzhou	51.30825	58.9965	72.90524	92.85441	117.7693
Liangping	14.92738	16.86844	19.23498	23.26046	29.68909
Chengkou	3.509166	4.716886	6.389582	8.680664	11.74648
Fengdu	13.53772	15.97718	20.08046	28.32571	40.5114
Dianjiang	12.09528	13.73728	16.063	19.52134	24.53527
Zhongxian	13.8232	17.11902	21.29879	26.72244	34.09439
Kaixian	19.82283	24.28323	29.54177	35.43995	44.02306
Yunyang	16.57835	19.44402	23.52473	29.68407	38.23939
Fengjie	16.81442	20.06079	24.25175	30.94111	39.68291
Wushan	9.130448	10.87791	13.30297	16.23789	19.9644
Wuxi	4.170829	5.492992	7.395776	10.72528	15.68656
Qianjiang	13.84435	16.38349	20.33578	25.42818	32.9596
Shizhu	9.427831	12.69783	17.22833	23.38513	30.09349
Xiushan	9.282298	12.13472	16.16513	21.56575	29.41506
Youyang	9.094731	10.86414	13.19303	16.62223	21.03753
Pengshui	17.75802	18.5414	20.45867	25.17967	32.18839
Wulong	14.88662	19.67548	24.17584	28.71689	33.21147

Table V.6 Summary Statistics for 40C 2001-2008

Variable	Obs.	Mean	Std. Dev.	Min	Max
lnGDP	320	9.455	0.691	7.900	11.087
lnCapital	320	10.488	0.736	8.784	12.530
lnEmployment	320	3.620	0.603	1.008	4.601
D	320	0.076	0.096	0.000	0.578
Year2(2002)	320	0.125	0.331	0	1
Year3(2003)	320	0.125	0.331	0	1
Year4(2004)	320	0.125	0.331	0	1
Year5(2005)	320	0.125	0.331	0	1
Year6(2006)	320	0.125	0.331	0	1
Year7(2007)	320	0.125	0.331	0	1
Year8(2008)	320	0.125	0.331	0	1

Notes: Obs. represents the numbers of observations. Std. Dev. represents the standard deviation. lnEmployment represents the localisation externalities. D represents the urbanisation externalities. The Year variables are all in binary value.

**Table V.7 Summary Statistics for 40C 2001 2004 2008**

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
lnGDP	120	9.451	0.735	7.900	11.087
lnCapital	120	10.481	0.778	8.784	12.479
lnEmployment	120	3.622	0.590	1.109	4.587
D	120	0.076	0.101	0.001	0.578
Year2(2002)	120	0	0	0	0
Year3(2003)	120	0	0	0	0
Year4(2004)	120	0.33	0.473	0	1
Year5(2005)	120	0	0	0	0
Year6(2006)	120	0	0	0	0
Year7(2007)	120	0	0	0	0
Year8(2008)	120	0.033	0.473	0	1

Notes: the same with above Table.

**Table V.8 Summary Statistics for MAESAC 2001-2008**

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
lnGDP	256	9.243	0.567	7.900	11.083
lnCapital	256	10.235	0.546	8.784	11.886
lnEmployment	256	3.703	0.746	0	5.943
D	256	0.050	0.052	0	0.273
Year2(2002)	256	0.125	0.331	0	1
Year3(2003)	256	0.125	0.331	0	1
Year4(2004)	256	0.125	0.331	0	1
Year5(2005)	256	0.125	0.331	0	1
Year6(2006)	256	0.125	0.331	0	1
Year7(2007)	256	0.125	0.331	0	1
Year8(2008)	256	0.125	0.331	0	1

Notes: the same with above Table.

**Table V.9 Summary Statistics for MAESAC 2001 2004 2008**

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
lnGDP	96	9.239	0.626	7.900	11.083
lnCapital	96	10.226	0.605	8.784	11.886
lnEmployment	96	3.708	0.733	1.109	5.943
D	96	0.049	0.053	0.001	0.273
Year2(2002)	96	0	0	0	0
Year3(2003)	96	0	0	0	0
Year4(2004)	96	0.333	0.474	0	1
Year5(2005)	96	0	0	0	0
Year6(2006)	96	0	0	0	0
Year7(2007)	96	0	0	0	0
Year8(2008)	96	0.333	0.474	0	1

Notes: the same with above Table.

## **VI. MIGRATION IN CHONGQING: THE RURAL POOR BECOMES THE URBAN POOR?**

### **6.1 Introduction**

In the preceding two chapters, Chongqing's urban workers' wages and industry agglomeration were studied. Many useful findings were obtained. For example, it was found that: the increase in the demand for labourers is positively related to the wage growth of urban workers; the building of new cities does not have significant effects on urban wage growth at this stage; and, the specialisation in Chongqing is not able to afford the high growth of economic development. Essentially, this entire study attempts to answer the question of Chongqing's growth is sustainable. It is crucial to judge whether the process of growing demand for labour forces at micro level is consistent with previous macro statements. To this end, the relationship among urban threshold, government subsidies and incomer labourers must be understood. This is achieved by embedding the sharecropping theory developed by Steven Cheung in a migration behavioural framework to explain migrants' motivation for working and making the choice to transfer to urban areas. The relevant empirical results are estimated from data gained from in-person surveys.

As complementary data, two official household surveys, rural labour household surveys in rural areas and rural migrant workers household surveys in urban areas, in 2008 have been chosen.<sup>48</sup> The respondents were selected randomly in forty counties of Chongqing, with a total sampling frame of 20,000 rural households and 10,000 urban households. The government has only published a limited database version, which means it cannot be used to exert further empirical analysis. However, for general statistics it is sufficient. The in-person data, from a survey of small scale rural migrant workers households, was conducted in urban areas of Chongqing in July 2009, with a total sampling frame of 138. This survey data is used to carry out the empirical analysis. In addition, the interpretative type of rural-urban migration phenomenon of this chapter requires a knowledge of economic institutions and policy interventions.

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<sup>48</sup> The year 2008 is the first year after the CMG got direct support from Party Chief Hu Jintao who delivered his speech about Chongqing requiring to become the significant growth pole in West China, economic centre of the upper reach region of Yangtze River, and the municipality featuring coordinated urban and rural development. Of these, the coordinated urban and rural developments, as the formal policies, are being referred to for the first time. This makes the local government very eager to fulfil the requirements. These two surveys have been launched with understanding of this. In this chapter, if not otherwise instructed, all the general data of rural migrant workers in Chongqing in 2008 are from these surveys.

Thus, a blend of statistical, empirical, theoretical and institutional analysis is presented.

In recent years, the most remarkable economic transactions in Chongqing are surrounded by its large scale *hukou* (Chinese: 户口) or residency reform which gave more than 3 million rural migrants urban-*hukou* last year (2011)<sup>49</sup>. The aim, according to Chongqing Commerce News (2007), is to reach an urbanisation rate of 70 per cent or 22 million urban-*hukou* residents in 2020. This would be 1.6 times higher than the rate of urban-*hukou* residents at the end of 2011, and would mean a 5 per cent annual growth rate from 2012 onwards. Related to this, Chongqing took the lead in its public rental housing project which aimed to cover one-third of the city's population by 2015 (Xinhua, 2011). Rural-urban equality is the underlying premise of regional equality and overall income equality in

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<sup>49</sup> According to Mayor Huang Qifan's (2010) announcement in a press conference, the rural migrant workers who got the urban *hukou* are included in the 2 million who had 5 years Metropolitan Advanced Economic Sphere (MAES) experience or 3 years county level city experience, 300 000 who did not get the urban-*hukou* because of some historical problems, 400 000 who had graduated from senior high school or the equivalent or above, and the rest of the people who received urban *hukou* came from urban slums. The mayor emphasized that all transformations from rural-urban depended on their own volitions.

China (Lin, Wang, & Zhao, 2004). It can be conceived that all of these urban-rural balance strategies are undergoing change during a long term process of balancing inequality economies. The question is simple: why were these chosen strategies launched at this time? And why were the launching-forces so strong? What are the true reasons which push the government to intervene in the local economy so deeply? To answer these questions, the relevant literature about labour market features, especially for China in recent years will be surveyed, and the situation of Chongqing's migrant rural-workers and their effects to the whole economy will be presented. The third section will offer a theoretical model to explain the motivations of migrant workers of working and transferring in urban areas. The corresponding empirical evidence will be found in the fourth section. The fifth section will draw conclusions.

## **6.2 Surveys on Concepts, Literature, Events and the Situation in Chongqing**

Compared with the first twenty years after China's economic growth oriented around the reform and opening policies, many restriction laws on rural-urban migration have been abolished. The migrants have begun

having fully transferable rights and cities have begun largely extending urban areas (Wu & Yao, 2003). Reversely, the migration and urbanisation policies pertaining to a series of government subsidies are to reward rural migrant workers by starting to establish new social insurance and social assistance programs in the recent ten years (Cai, Park, & Zhao, 2008). There are many programs, such as the abolished Repatriating Regulations in 2003, the equal access to education for rural migrant worker's children in cities since 2004, the abolished agriculture taxes since 2006, the promulgated new labour contract law in 2007 and large scale residency reform and public rental housing construction started in some cities in the recent past two or three years. Some resolved and some continuous issues of rural migrant workers have been moved to a higher priority by the government.

The particularity of problems of rural migrant workers in China is tightly associated with the *hukou* system. It is necessary to recall the *hukou* system here. In a sense, the labour market in China, especially in recent years, is dominated by the *hukou* system. It has divided the whole population into two groups: agricultural and non-agricultural, with a hereditary residency that attaches a person to a particular place. *Hukou* per se was attached to a

lot of local social welfare, for example, access to education, health care, housing and compensation pay-out, *etc.* Importantly, the agriculture *hukou* was almost completely excluded from state-provided social services (Wang, 2005; Zhao Z. , 2005). In general, this *hukou* system gives different citizenship rights to different population groups. It thus became the biggest determinant of one's economic opportunities and behaviours. Of these, the most special ones are the rural migrant workers who are the urban-dwellers with agricultural *hukou*. In Chinese, they are called *nongmin gong* (Chinese: 农民工). This is a person who is recorded by the government only if he or she has left the place of registration in the countryside for more than six months.

Very few rural migrant workers settle down for a long time in cities, they are also called the floating population, and they return to their countryside during periods of unemployment (Zhao Y. , 1999; Hare, 1999). The 'floating population' can be generally classified into two manners or groups; one is working out of the province of their *hukou*, and the other is working in the province of their *hukou*. Chongqing, as a migrant-sending region, has both of these two specific groups, according to Chongqing Daily (2010), 50 per cent of them being the former group and 50 per cent of them being the

latter group. In the group of those who worked in Chongqing, only 9.7 per cent of them owned their own house in the urban areas, however, 87 per cent of migrants had a migration period of more than 6 months and 65 per cent had a whole year in 2008. According to the survey conducted by myself, which shall be explained later, there were more than 60 per cent of respondents living in Chongqing's urban areas for at least three years, and 77 per cent for at least two years. This suggests that the migrants who worked in Chongqing are more likely to be stable. This is strongly related to the fact that Chongqing is a migrant-sending region that has become more attractive to migrants within the municipality (as province-level). It also can be verified from official reports that the volume of migrants increased from 3 million to 4 million within the municipality in the recent three or four years.<sup>50</sup> There is an interesting explanation that the reasons which make rural migrants stay in the local province are because they can have cheaper rural health care and return to their homes easily, as they only have a feasibly short journey to and from the city (Economist, 2010). They can have the benefits of both sides.

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<sup>50</sup> Mayor Huang Qifan (2010) announced Chongqing had 4 million rural migrants working in Chongqing at the end of 2010, compared with Chongqing Statistical Bureau (CSB) estimation results of 3 million in 2008.

From the official survey, inconceivably, only 14 per cent of migrants in Chongqing were willing to accept the urban-*hukou* in 2008.<sup>51</sup> Compared with this, 53 per cent of the rural migrants still desired the government to offer help on health care, 48 per cent with lowering of living expenses, 35 per cent with housing, 30 per cent with children's education and 30 per cent with skill training. These results show, that the migrants did not have confidence in their careers even if they had believed that they could obtain an urban-*hukou*. They merely hoped to get more practical help from the government. To quote the Economist, "... few could even dream of getting on to the housing ladder" (2010). It is very strange, that on the one hand, the migrants want to get help, and on the other hand, they do not desire to acquire an urban *hukou*, even if it were offered to them. Could it be that the social welfare attached to the urban *hukou* has disappeared? What does this represent? Initially Knight and Li's (2005) paper provided inspiration. They consider that there is no necessary connection between wages and the labour market competition in China at that time. The wages of urban

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<sup>51</sup> This result is so significant that it can be confirmed by the Economist (2010) report on Chongqing's migrant issues, and from the survey conducted by myself in Chongqing in 2009 which also showed a very similar result, 16 per cent.

residents which have been protected by official policies were determined by enterprises' institutions rather than the market. Whereas the wages of rural migrant workers were regulated by market forces, which make the China's labour market severely segmented. In other words, to those rural migrant workers even those who received the urban *hukou*, they still not expect to find a good job like the urban indigenous people, because the labour market within the urban areas is also segregated (Zhao Z. , 2005). Thus, for rural migrants, the urban-*hukou* has already become non-essential. This point of view is very important.

Because of the underlying causes, Chongqing's puzzling situation is likely to be associated with another famous paradox; the striking phenomenon of the rural labour abundance when there was a migrant labour shortage in China in 2003. Especially, the turmoil of the labour market between 2009 and 2010, where there were sudden roller coaster changes from surplus to shortage. This has drawn the interest of many scholars, including Chan (2010), Knight, Deng, and Li (2011) and Cai and Du (2011), *etc.* Chan suggests three points to explain the migrant labour dearth. He considers that the most important issue is the migrant workers age structure problem.

He lays particular stress on younger migrants which are the source from

where the emerging sectors draw most of their workforce. At the same time, the pool size of these young migrants has dropped dramatically since 2010. This relates directly to the pressure of the labour market. Secondly, he believes another reason is the structural mismatch of skilled workers using the Guangdong example to support his idea. Thirdly, the central government stimulus package at the end of 2009 was recognized as the crucial reason which drew a lot of home-returning migrants. In comparison with Chan, the views of Knight *et al.* are likely to expose more meaning on fundamentality and non-territoriality. They stress the impact of the segmentation of the labour market on the paradox phenomenon, explaining that the institutional constraints, for example no opportunities to find relatively stable job in cities, create obstacles to migrants who try to living in urban areas. They conceive that the increase in migrant wages which is the most crucial issue needing to be solved in the urbanisation process might be related to two factors. One is the income increase in rural areas, and the other is the migrant workers' human capital increase. These two conditions are difficult for China to meet at present, which is another reason which explains China's paradox. Cai and Du find that all-agricultural sectors wages increased and the wages of unskilled and skilled workers have converged, which means China has passed the Lewis

turning point. Based on such ideas, the migrant labour shortage is the norm. Chan and Knight *et al.* both had doubts about this, because they do not believe that China's labour market is mature, which is the premise of Cai and Du. The labour market in China is in the maturing process, but it still needs overcome many barriers. For example, if the local labour market is mature, the CMG do not need to build such large scale public rental housing to support low-income groups, including the urban traditional low-income groups, the rural migrant worker groups and the new college graduated student groups.<sup>52</sup> It is closely related to the competition theory which is introduced as following: in the competitive environment the government should not exert over subsidies. But if the subsidies have positive effects, how could it be justified?

Before answering the questions above, this chapter is concluded as following. First, the migration issue is introduced under the competition framework, which explains some puzzling questions which are usually difficult to answer under the conventional theory. Secondly, the comprehensive analysis including theoretical, empirical, statistical, and the

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<sup>52</sup> The scheme details see Appendix A.

institutional analysis portray a whole picture, which strives to understand the existence of Chongqing. Thirdly, my survey shall be used with respect to rural migrant workers in Chongqing in 2009 which focus more on the specific questions. Finally, the research results reflect the real role of a strong local government and its behaviour reasons.

### **6.3 A Viewpoint from Competition Framework**

This section uses the share tenancy theory of Steven Cheung (1968; 1969) to explain the motivations of migrant rural-workers choice of working in and transferring to urban areas under a competitive environment. City and rural migrant workers have a contract to distribute the final returns on productions and benefit from urban expansion. For cities, the process to absorb migrants is the process to increase the urbanized ratio level, and the expansion rent is paid partly by the migrants. In general, the urban sector provides capital and the migrant worker provides labour, and all these inputs combined help the urban expansion. The assumption is based on a fully competitive environment which is likely to be conveyed in China's migration labour market.

The conventional impression is that the inherent urban threshold will not result in the inefficient resource allocation (Lewis, 1954; Todaro, 1969). In the important essay of Lewis called the Economic Development with Unlimited Supplies of Labour, he discovered that the gap between wages 'capitalist' and 'subsistence' earnings could be explained in many ways through urban threshold: the city congested costs, the rural migrants' psychological costs, the city's management costs, the cost of unskilled workers increases productivity and the social prestige costs, *etc.* Due to this, he notes that even if the rural labourers could compete with urban citizens, they will not.<sup>53</sup> But he still considers that the supply price of rural labour will rise and be associated with the increase of marginal products in the modern sectors by the market determination. Todaro illustrates an example from Kenya in 1964 to suggest that the government intervention on the urban threshold during the urbanisation process will result in inefficient economic results. It conducts a false probability on the rural labour supply. For China, Au and Henderson (2006b) find empirical evidence to show that the intervention of migration from rural to rural or urban to urban, and rural

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<sup>53</sup> With respect to this, the outward manifestation is very similar to China's situation to date. The evidence will be given and explained later.

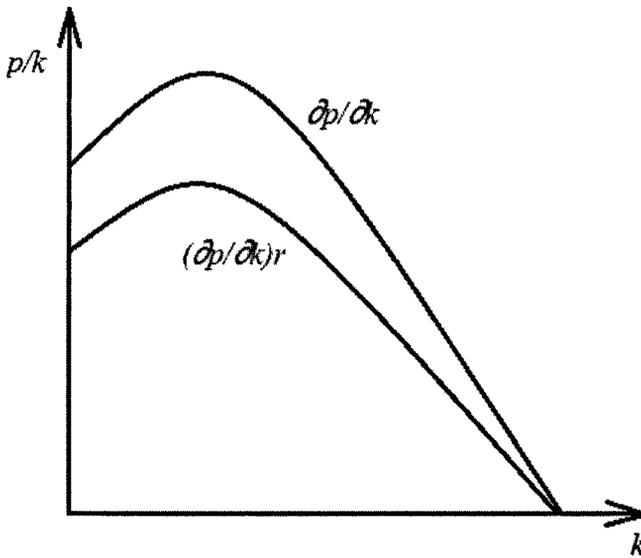
to urban, setting artificial barriers to urban threshold results in GDP growth rate losses. The interventions which are in favour of eliminating distorted restrictions will be welcomed. Knight *et al.* (2011) improve and add constraints to Lewis's labour transferring model to give answers. They find new constraints to the urban threshold, for example, the segmentation of labour market, the outside shocks, spatial differences and urban primacy, *etc.* which will form obstacles to rural-urban migration. They consider that if the government give pertinent interventions to release those qualifications, it will improve economic growth and resource allocation. However, these models should be still based on the underlying premise of a competitive environment for analyse, which they are not. It is necessary to clarify the micro level mechanism which initially affects the migration motivation, and then mixes other subsidiary conditions. Otherwise the inefficient argument above would be shown as illusory. So, implications of the above statements will be tested against the competition framework.

As analysed above, further inquiry into the choice of migration and various stipulations of city on urbanisation is required. If the government overrules the market process of allocation, the resource allocation will differ. This chapter will argue that the implementation of subsidies should be careful;

some subsidies are erroneous, which is attributable to neglect of competition. To explain this, firstly, it is assumed that the only migrant input is labour in advance. Let  $k$  denote the input capitals of the city and its industry sector held by a rural migrant worker, and  $p$  is the output products. In Figure 6.1, the horizontal axis represents the measurement of the modern sector's capital,  $k$ ; those capital's efficiency,  $p/k$ , is measured along the vertical axis. The curve  $\partial p/\partial k$  which represents the marginal product of migrant labour with a certain amount of capital by the modern sector, diminishes as  $k$  increases. The curve  $(\partial p/\partial k) \times r$  represents the marginal rent of capital where  $r$  is a ratio of capital price charged by the modern sector. The vertical distance between  $\partial p/\partial k$  and  $(\partial p/\partial k) \times r$  is the marginal migrant's wage.  $(\partial p/\partial k) \times (1 - r)$  is assigned as the change in migrant's wages with respect to a change in capitals used by the migrant. The area between  $\partial p/\partial k$  and  $(\partial p/\partial k) \times r$  represents the total labour income received by the migrant, and the areas below curve  $(\partial p/\partial k) \times r$  represents the total rent (capital income) collected by the modern sector. If the migrant's income is as high as or higher than his alternative earning, he will stay to supply labour as long as the marginal productivity is greater than zero, with all labour inputs. To maximize wealth, the modern sector will raise the rental percentage until the

migrant's income from labour supply in this unit equals his alternative earning.

**Figure VI.1 An Ideal Share Contracting Per Migrant Worker**



However, normally, to deal with the predetermined ratio  $r$ , in order to maximize wages, the migrant must choose to supply less. So, the only way is to shift down along the marginal line  $\partial p / \partial k$  to zero to commit less rental share. But, the ratio  $r$  is not only determinate by inherent issues and by modern sectors owners, but also it will be affected by the migrant's choice. In order to explain this, the vertical competition curve  $M_1$  is added which represents one rural migrant worker. Similarly, the analysis is based

on the premise of wealth maximization subject to the free market competition, without wage restrictions. But, the cost of transaction is not the consideration condition here. The X-axis of the vertical curve  $M_1$  indicated the total scale of capital belonging to one unit in the modern sector. Assuming one product can be made under which it hires number of  $n$  migrant workers to produce one product line.<sup>54</sup> Gathering the capitals of several migrant workers will result in a higher total rent. Vertical lines  $M_1, M_2 \dots M_n$  are dividing lines of the amount of the other inputs to the first, second, and  $n$ th migrant workers respectively. As the number of workers increases, the marginal product shifts upwards, relative to the situation where there is only one worker. Thus, the curves  $(\partial p / \partial k)_1, (\partial p / \partial k)_2, \dots, (\partial p / \partial k)_n$  are the marginal productivities for each worker, and  $(\partial p / \partial k)_1 \times r, (\partial p / \partial k)_2 \times r, \dots, (\partial p / \partial k)_n \times r$  are the corresponding marginal rent curves for each unit. The income for each rural migrant worker is represented by the area between the respective  $(\partial p / \partial k)_n$  and  $(\partial p / \partial k)_n \times r$  curves for the workers. The modern sector

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<sup>54</sup> As mentioned above, the huge segmentation in China's labour market makes rural migrant workers became the majority part of the competition market. They are also the most favourite objects to manufacturing industries, because they are low-cost. The Chinese average unit labour cost in manufacturing was about 3 per cent of the same average in the United States in 2006. [Findings by Erin Lett and Judith Banister, cited in Chan (2010).]

owners will make the integral of marginal rents a maximum. This implies that the income of each worker will be just on the margin for his or her's alternative earning rate.

As the worker numbers increase, the relative capital distributed to each worker becomes smaller. However, the rental percentage charges must be lower for the migrant worker's marginal alternative earnings, in order to prevent the worker from giving up the work. The relative decrease in  $(\partial p/\partial k) \times r$  will lead to a lower rent received from each worker, which is good for the workers, but if the capital distributed per worker continues to decrease, the total rent from the capital will finally decline. So, in order to maximize the modern sector's wealth, it requires the simultaneous determination of worker numbers and the rental percentage. In other words, with the modern sectors giving the capital and migrant workers inputting the labour force, the match by the modern sector owners and the migrant rural-workers will include the rental percentage and the amount of labour input which are consistent with the final equilibrium.

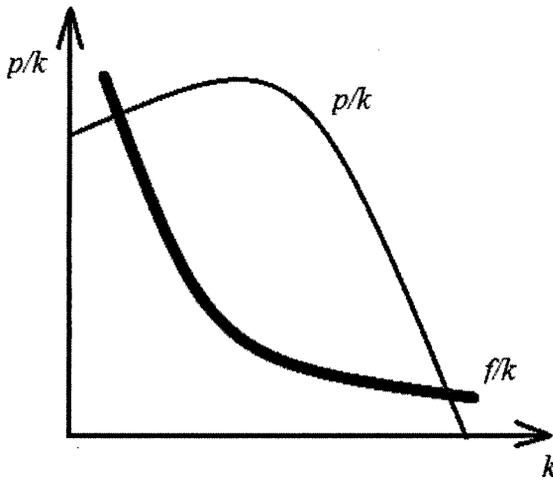
In Figure 6.2, the curve  $p/k$  represents the average product with one modern sector employed. The curve  $f/k$ , or the fixed total migrant

working cost divided by capital, reveals the cost of migrant inputs (other than capital). It is assumed that all other inputs are created by the migrant; the  $f/k$  curve is the total cost other than capital divided by the respective capital. It includes the cost of migrant's labour, housing and training *etc.* That is,  $f/k = (c_m \times m + c_h \times h + \dots)/k$ ; where  $f$  is the total fixed cost and where  $c_m, c_h, \dots$  are the labour prices of migrants,  $m$ ; the prices of housing,  $h$ ; ... Since the migrant inputs are constant, the  $f/k$  curve is a rectangular hyperbola.<sup>55</sup> The total amount of migrant inputs  $f/k$  also defines the urban threshold to each migrant which is stipulated. Moreover, it is essential because the migrant would commit less if only the rental percentage were prescribed. Given any rental percentage, only a portion of every unit of outputs will go to the migrant.

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<sup>55</sup> It is the combinations of efficiency and capital associated with equal levels of migrants' constant input.

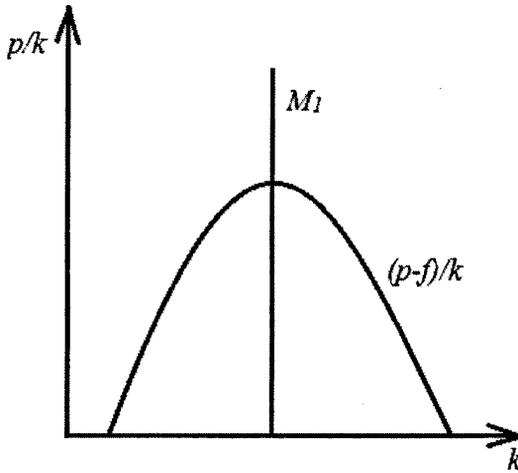
**Figure VI.2 The Average Product and Urban Threshold for Per Migrant Worker**



The vertical difference between  $p/k$  and  $f/k$  assigns  $(p - f)/k$ , see Figure 6.3, the rent per capital. If working decisions were made entirely by the migrant, it would be to his interest that the cost of incremental migrant input be less than the associated marginal product. This would result in a condition inconsistent with the equilibrium. Nevertheless, under mutual agreements, the total amount of migrant inputs will be the amount which yields the highest  $(p - f)/k$ , or which yields the highest rent per unit of capital. For every upward shift of  $f/k$  as a result of increasing the stipulated amount of migrant input, there is associated an upward shift of

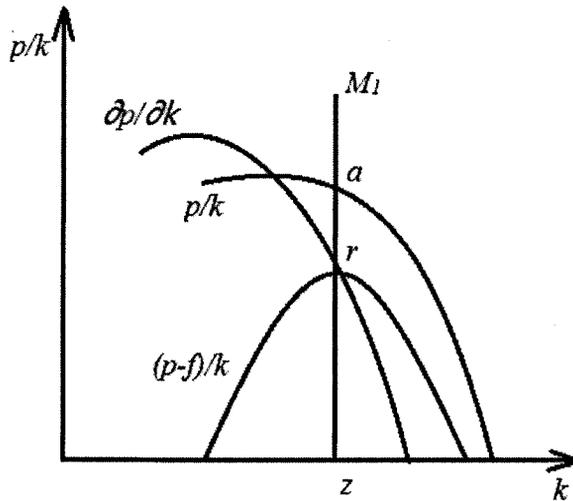
$p/k$ . The highest  $(p - f)/k$  is obtained when the marginal upward shift of  $f/k$  and  $p/k$  are equal, or when the marginal product of migrant input equals the marginal migrant cost. The migrant can maximize his income. The relevant value of  $(p - f)/k$ , or average rent, for decision making is thus the highest one derived from the alternative pairs of  $f/k$  and  $p/k$ . To state it more precisely, the highest value of  $(p - f)/k$  defines the cost of capital. The equilibrium capital scale assigned to the migrant,  $M_1$ , in Figure 6.3, is where  $(p - f)/k$  is at a maximum. Maximizing the rent of capital will maximize the migrant income or  $r$  value from the modern sector's total capital. With the equilibrium migrants used capital determined ( $M_1$ ), the equilibrium rental percentage equals  $(p - f)/k$  divided by  $p/k$  (at  $M_1$ ). That is, rental percentage,  $r$ , equals  $rz/az$  as labelled in Figure 6.4. Given this equilibrium percentage,  $r = \frac{\partial p}{\partial k} / \frac{p}{k}$ , it plots the marginal rent curve,  $(\partial p / \partial k) \times r$ , as this percentage of  $\partial p / \partial k$  at every point.

**Figure VI.3 The Curve  $(p-f)/k$  Defined by Vertical Difference between  $p/k$  and  $f/k$**



Since the migrant has to pay a certain percentage of the total product, as indicated by  $(\partial p/\partial k) \times r$ , the cost of capital is no longer a constraint dealing with the amount of the factors the migrant will use. To maximize his income, the migrant prefers to employ the capital to the point where  $\partial p/\partial k$  is zero. But the modern sector owners, on the other hand, will limit the migrant's hold on  $M_1$ , and convey this to other migrants in a similar manner.

**Figure VI.4 The Determination of Rental Percentage**



Additionally, following the Lewis and Todaro cases and it is denoted as the LT case, other costs may also be shared by the migrants and the modern sector in real circumstances. In these cases, the threshold  $f/k$  represents the combined cost. Given  $f/k$  and  $p/k$  as in Figure 6.2, the  $f/k$  minus the modern sector input cost, for example, some positive government subsidies, the value will be lower, thus defining a higher  $(p - f)/k$  curve. This higher curve measures not only the cost of rent, but also the modern sector's other cost (government subsidies) of rent. The rental percentage charged by the modern sector will accordingly be higher, with and upward shifts of  $(\partial p/\partial k) \times r$  by the same percentage at every point.

Thus, it does not matter whether the modern sector owners required the migrant to input more labour and charge a lower percentage or whether the modern sector invests in productive factors himself and charges the migrant a higher rental percentage. The investment will be made if it leads to a higher income. Thus, for any match the migrant does not have to possess the required amount of input. But, these results are only the first half of the story, because the transaction cost and the risk preference were not taken into account. According to Stiglitz's (1974) conclusions, the LT case will be an equilibrium system if and only if all modern sectors and rural migrants are risk neutral. In other words, more risk averse modern sectors may have a smaller number of migrant workers than less risk averse sectors. So in this case the economy is inefficient. The conclusions of Au and Henderson and Knight *et al.*, which are denoted here as AHK conclusions, closely parallel the conclusions reached by the competition views which considered them risk averse. AHK's analytic approach is different, and it is likely to avoid explicit explanation. Considering the risk preference of each part is the distinguishing factor between the LT and the AHK cases. It is recognized that the protected sectors by making segmentation of the labour market (for example, urban sectors) or urban primacy (for example, megacities like Chongqing) *etc.* will have less risk averse, which makes

them pay fixed rent to attract more rural migrants. Inversely, the group of rural migrant workers are more risk averse. They will receive an extra fixed wage when the economic environment is not good. Chongqing has a strong local government because of strong political support from Beijing. Thus, it is a much lower risk averse economy under which it has extra rent to distribute. Empirical evidence will be given in order to convey how the migrants' choice on working and transferring occurs during the urbanisation and rural-urban migration process.

## **6.4 Chongqing's Empirical Evidence**

### **6.4.1 Other Studies**

In this section, various information will be examined on the increase of migrant workers' wages and their decision making with respect to urban citizenship in order to explain government interventions on urban threshold. To this end, this section comprises of two steps. First, the evidences are given that the factors affect the local migrant worker wages in Chongqing; secondly, the factor which might affect migrant transferring decision makings will be discussed.

First, literature on migrant wages issues shall be reviewed. In recent years, many researchers were interested in examining migrant wages and the effects on migrant wages (Zhao & Wu, 2007; Du & Pan, 2009; Kong, Meng, & Zhang, 2010; Knight, Deng, & Li, 2011). Zhao and Wu used the data from the Ministry of Agriculture based on a rural household survey over the years 2003 to 2006 to estimate migrant wages. They reported that the average nominal wage increased by 6.9 per cent annually, and real wage increased by 3.9 per cent correspondingly. Knight *et al.*'s argument complemented Zhao and Wu's study. It argued that over the same period, the average migrant wage rise was actually less than the rural household income growth which was benefited by the agriculture taxes and fees reduction, the decline in demand for labourers in rural areas, and the remittance of migrant. Du and Pan used China Urban Labour Surveys (CULS) in 2001 and 2005 to examine the impact of minimum wage regulation on migrant workers' behaviour and wages. They reported that the nominal migrant wages increased by 9.7 per cent annually and the real wages increased by 8.4 per cent annually. They proved that the wages of migrants declined because of the minimum wage. Kong *et al.* used China Household Income Project (CHIP) survey in 2007 and 2008 to examine the

effect of the global economic recession on migrant labour. They reported that the wages increased by 15 per cent over that year. Knight *et al.* also used CHIP data in 2002 and 2007 to examine migrant wages and explain migrant wage behaviour. They reported that the raw migrant real income increased by 10.4 per cent for wages annually, and by 12.7 per cent for self-employment. They found many factors had positive effects on migrant wage increase, including the income level in villages, the predicted city wages, education levels, training, city experience and gender, *etc.* Related to this, some studies found older workers, women, and the less educated have a significant effect on migrant employment and wages (Giles, Park, & Cai, 2006; Maurer-Fazio, 2007). In addition, Sylvie *et al.* (2009) suggested that the main factors for explaining the wages differences are, compared with urban resident workers, rural migrants are younger and less educated.

Migration decision making is closely related to migrant wages, but the issue becomes slightly broadened, which include political factors and individual motivation issues. Zhao (2005) reviewed that age, gender and marital status are important variables in the migration decision. He also argued that the labour market segregation makes it very difficult for the migrants to get a job in the formal sector. Although education increases and

improves migrant employment, the demand of unskilled workers rather than skilled workers indirectly increases the migrants education costs. Many potential migrants from rural areas create competition for available jobs, which keeps the real wages of unskilled labourers at very low levels (Cai, Park, & Zhao, 2008). Liu (2008) uses CHIP survey 1995 to describe the existence of human capital externalities in rural areas that have a discouraging effect on rural-urban migration, which leads to poorer human capital or lower educated people as migrants. The reason this is mentioned is to explain that education is a mixture of negative and positive factors throughout. Knight and Yueh (2009) also consider the increase of human capital of migrant workers 'surprisingly small' over the years 2002 to 2007. In addition, productive investments in rural areas were not a significant factor to affect migration, whereas migrants prefer investment in housing and other consumer durables (De Brauw & Rozelle, 2008). Thus, from the reviews above, it can be perceived that the migration decisions face complicated situations, especially, in the recent years. Migrants will face more significant problems when making the decision on whether or not to accept the urban *hukou*, with urbanisation accelerating.

## 6.4.2 Data Description

My rural migrant workers household survey was conducted in Chongqing in July 2009. The time scale of the survey is from July 2008 to July 2009. During this time the migrant workers suffered the most severe loss of jobs around the coastal areas as a result of the global financial crisis<sup>56</sup>. At that time, a large number of migrants returned to their home or province of *hukou*. A few months later, the huge labour shortage appeared in China in the early months of 2010 (Chan, 2010). The survey included a total of 102 households and 138 respondents (the real observation is 137, because there is an observation that is imperfect.) in fourteen counties. The counties were selected randomly and by considering the demographic distribution.<sup>57</sup> The

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<sup>56</sup> According to Cai and Chan, there were 23 million migrant workers laid off.

<sup>57</sup> The samples of my survey considered geographic and demographic distribution. This is similar to the government's official survey on rural migrant workers in urban areas where the ratio of selected respondents from 'one-hour drive circle' to the 'two wings' region was 8:2. My ratio is 7:3. There are eight selected districts in the 'one-hour drive circle' region, including Shapingba, Yubei, Jiangbei, Yuzhong, Jiulongpo, Changshou, Jiangjin and Hechuan; there are six selected counties or prefectural-level cities in the 'two wings' region, including Pengshui, Wulong, Zhongxian, Kaixian, Wanzhou and Liangping.

selection of households also followed random sampling methods.<sup>58</sup> The questionnaires were designed by myself (see Appendix B). Basic questions were to survey information about schooling, years of living in urban areas and their employment situation, *etc.* Expenditure questions were posed with the objective of measuring household annual spending. Questions about housing were regarding living areas and conditions. In addition to standard questions asked, in this survey I also asked emotive questions such as “*Are you happy in your life?*” and “*Are you willing to accept the urban hukou?*” *etc.*

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<sup>58</sup> My survey process can be described briefly as following. Firstly, we went to CSB to seek help. They offered me two official surveys from 2008 which were mentioned above. They also gave me advice with respect to select samples. I selected the counties randomly, and went there to find local community government. I narrated my aims and got their support. I asked them about basic information in the local community. I selected households at random. The local government official helped me to find their contact details. I contacted to them to ask if I could interview them. A government official accompanied me to go to the household because of security issues. I drove there myself, so there were no communication problems. Normally, one survey lasted half an hour to one hour. I described my aims in detail to gain their trust first, because some of my interviewees were being interviewed first the first time. Nevertheless, I still experienced one failed interview when the respondent who worked for a food factory in *Jiulongpo* District (Chinese: 九龙坡区; pinyin: *Jiǔlóngpō Qū*) considered my questions a threat to him and an invasion of his privacy.

### 6.4.3 Checks of Robustness in the Survey's Basic Statistical Results

The number of male respondents were 81 accounting for 58.7 per cent and the number of female respondents were 57, accounting for 41.3 per cent of interviewees. This percentage is similar to the government's official survey where it was 61.7 and 38.3 per cent. Table 6.1 presents household summary statistics and the corresponding values compared with official survey in 2008. The average size of the surveyed households was 3.39 people, which was similar to official surveys in 2008. Of these, 1.93 people were living in urban areas (not reported in Table 6.1). The average size of farmland possession per household was 4.12 *mu* (.28 hectares) which is similar to Zhao's (1999) estimation in Sichuan province of .29 hectares. This is significant larger than Chongqing's official results of 3.3 *mu* (.22 hectares). Per labourer wage per month was 1752.4 RMB which was slightly larger than the official report of 1683.84 RMB in 2008. The average hours migrants worked was 61 hours per week which is similar to Du and Pan's (2009) report.

**Table VI.1 Household Summary Statistics**

	Mean		Std. Dev.
	2009	2008 (official)	2009
Household Population	3.39	3.4	1.37
Land ( <i>mu</i> )	4.12	3.3	3.78
Per Labourer Wage (RMB)	1752.4	1683.84	1604.67

Source: the data in 2009 is from the author's rural migrant workers household survey in urban areas. The data in 2008 is from the Chongqing Municipality Statistical Bureau's migrant household survey.

Notes: Std. Dev. represents standard deviation.

The length of migratory work is reported in Table 6.2. 60 per cent of interviewees worked as migrants for more than eight years, nearly 90 per cent of them for at least three years. But this indicates the existence of large gap between mine and the government official survey which is more like a normal distribution. According to my survey, there were 26.5 per cent of respondents who have own a house in the urban areas, which is significantly higher than the 9.7 per cent of the official survey report mentioned above. The respondents' education level was based on four components which are primary school, middle school, high school and university education. 9.8 per cent of interviewees only had a primary school education, 53 per cent of them had a middle school education, 29.5 per cent of them had a high school education and 7.6 per cent of them had a

university education. The government official survey showed that 25.9 per cent of their interviewees had a primary school education, 48.7 per cent of them had a middle school education, 21.7 per cent of them had a high school education and 3.7 per cent of them had a university education. The male respondents' average age was 33.8; the female respondents' average age was 35.44. There was no data referring to age in the government's official surveys, but it is presumed that the general age is younger than the government official survey due to a higher education level in my survey. The proportion of manufacturing and construction sector is 59.12 per cent which is nearly twice as high than the official results of 32.32 per cent. Thus, my survey's samples of urban experiences, house ownership, education and experience in the industry sector are better and higher than the government's survey. This bias maybe caused by different sampling methods. My survey was conducted by selecting migrant households in residential communities. Because migrants living in communities tend to have higher incomes than those living elsewhere, the difference might produce some upward bias in the migrant wage judgement.

**Table VI.2 Length of Migratory Living in Urban Areas**

	<b>Less Than 3 Years</b>	<b>3-8 Years</b>	<b>More Than 8 Years</b>
2009	10.9	29	60.1
2008 (official)	30.6	42.5	26.9

Source: the data in 2009 is from the author’s rural migrant workers household survey in urban areas. The data in 2008 is from the Chongqing Municipality Statistical Bureau’s migrant household survey.

Notes: the all entries are in percentages.

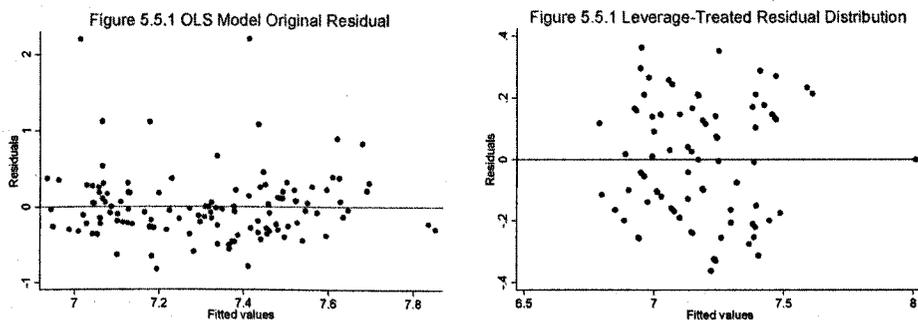
**6.4.4 Data Construction and Cleaning**

Based on the survey data, a cross-section dataset of Chongqing’s rural migrant workers in urban areas in 2009 is constructed. Two models were built to examine migrant wages and migrant decisions. The wage function is estimated by Ordinary Least Squares (OLS), and the decision function is estimated by ML Probit (a.k.a. probabilistic migration models). Firstly, the variables will be briefly described as following. For the wage function, the migrants’ wage being in log form as the dependent variable is *lnwage*. The wages that the respondents considered they would have obtained if they had remained in the village are used to proxy the migration opportunity cost, denoted as *lnopportunity*, which are the critical variables of interest. Control variables are also included, such as the urban

experience and education (schooling years). For the decision function, the answer to the question “*Are you willing to accept the urban hukou?*” are used as the dependent dummy variable, *migration*, and the independent variable is similar to the wage function.

The dataset is cleaned and constructed by the following two steps. First, observations with some missing values were dropped. Secondly, the outliers were dropped. In technical terms, the cross-section OLS estimation has had a very strict hypothesis, and the residual is expected to be as close as possible to the normal distribution. So, leverage statistics are used to find outliers and drop them. In economic terms, for example, the observations of self-employment in the samples are few. They normally have a very high income per month compared with the wage employment migrants, thus they have a high leverage value that have to be dropped. The changes were reported between the original residual distribution and leverage-treated residual distribution in Figure 6.5.1 and 6.5.2.

**Figure VI.5 The Changes between the Original Residual Distribution and Leverage-Treated Residual Distribution**



Notes: the left is the figure of OLS model original residual; the right is the figure of leverage-treated residual distribution.

**Table VI.3 Summary Statistics for Wage Function by OLS**

Variable	Obs.	Mean	Std. Dev.	Min	Max
lnWages	129	7.30	0.49	6.36	9.62
lnOpportunity	137	6.84	1.19	6.21	11.51
Experience	137	10.08	5.82	0.00	25.00
Experience2	137	135.25	133.09	0.00	625.00
Schooling	137	9.49	3.06	0.00	19.00
Training	137	0.80	2.54	0.00	24.00
Male	137	0.59	0.49	0.00	1.00
MC	137	0.59	0.49	0.00	1.00
Married	137	0.81	0.39	0.00	1.00

Notes: Obs. represents the numbers of observations. Std. Dev. represents the standard deviation. MC represents the manufacturing and construction sector. There are some variables in binary value including Male, MC and Married.

**Table VI.4 Summary Statistics for Decision Making Function by****Probit**

Variable	Obs.	Mean	Std. Dev.	Min	Max	Skew- ness	Kurt- osis
Migration	88	0.19	0.40	0.00	1.00	1.55	3.42
lnOpportunity	137	6.84	1.19	6.21	11.51	1.74	4.97
lnCapital	78	9.46	0.99	5.01	11.20	-1.19	6.82
Experience	137	10.08	5.82	0.00	25.00	0.27	2.59
Experience2	137	135.25	133.09	0.00	625.00	1.47	5.24
Schooling	137	9.49	3.06	0.00	19.00	-0.06	4.68

Notes: Obs. represents the numbers of observations. Std. Dev. represents the standard deviation. Migration is a binary value.

**6.4.5 Other Issues**

Various robustness tests were conducted on the proxy for the wage function for migrants. Ramsey (1969) RESET test was used to select and examine whether the OLS model omitted important variables. It dropped the variable *experience2* and *experience2<sup>2</sup>*, and *training<sup>2</sup>* and *training<sup>3</sup>*, owing to a possible co-linearity between these two pairs. The *F* statistic is .613 which is extremely insignificant in rejecting the null hypothesis (this model has no omitted variables), which means the wage function can have a good explanation about migrant wages. Table 6.3 and 6.4 give the summary statistics of major variables used in OLS estimation

and ML Probit estimation for Chongqing in 2009. Table 6.5 presents the pair-wise correlation matrix of major variables in the wage function model. Some variables were dropped in advance, for example, the variable *age* has co-linearity with *schooling* and *experience* in the model. The final model's correlation test shows that almost all the variables are not significantly correlated with other control variables, which implies that the multi-co-linearity problem is not a major issue in this study.

**Table VI.5 Pair-Wise Correlation Matrix for Wage Function by OLS**

	lnOpportunity	Experience	Experience2	Schooling	Training	Male	MC	Married
lnOpportunity	1.0000							
Experience	-0.0122 (0.9126)	1.0000						
Experience2	-0.0957 (0.3864)	0.9486* (0.0000)	1.0000					
Schooling	-0.700 (0.5267)	-0.1714 (0.1189)	-0.1701 (0.1218)	1.0000				
Training	0.2038 (0.0630)	0.0097 (0.9301)	-0.0428 (0.6990)	0.0373 (0.7364)	1.0000			
Male	0.0835 (0.4502)	-0.1396 (0.2053)	-0.0965 (0.3824)	0.1282 (0.2453)	0.1259 (0.2538)	1.0000		
MC	-0.1069 (0.3333)	0.0851 (0.4414)	0.0862 (0.4358)	0.0739 (0.5043)	0.0841 (0.4468)	0.0000 (1.0000)	1.0000	
Married	0.0376 (0.7341)	0.2405 (0.0275)	0.2500 (0.0218)	-0.4453* (0.0000)	-0.0444 (0.6886)	-0.2151 (0.0491)	-0.0659 (0.5512)	1.0000

Notes: p-values in parentheses, \*p<0.01

## 6.5 Results and Discussions

Table 6.6 suggests that the pattern of wage increases tends to significantly give the migrant workers more opportunity cost, urban experiences, education, and male. Opportunity cost represents the migrant workers' income of the worker who stayed in village, which has significantly positive coefficients of 8.3 per cent. *Ceteris paribus*, if the function was estimated with wages expressed in levels and not logs, this coefficient implies that an increase of one unit in opportunity cost would cause migrant behaviour to raise migrant wages by a significant 5 per cent. The evidence suggests that migrants with higher village opportunity costs will find jobs in city which pay more. The implication is not only supports that a rise in the rural supply price will result in higher migrant wages, but it is also consistent with other empirical studies (Knight, Deng, & Li, 2011).

**Table VI.6 Estimates of Wage Function by OLS on Migrants in Chongqing in 2009**

<b>Explanatory Variable</b>	<b>Estimated Coefficient</b>	<b>Standardized Coefficient</b>	<b>Definition of Variable</b>
Inopportunity	0.083*** [0.004]	0.241	Log form of opportunity cost
Experience	0.025* [0.062]	0.486	Urban experience ( years)
Experience2	-0.001 [0.396]	-0.220	Urban experience squared
Schooling	0.032*** [0.001]	0.303	Years of schooling
Training	0.108*** [0.006]	0.226	Training time (months)
Male	0.299*** [0.000]	0.516	Dummy variable Male = 1
MC	0.009 [0.842]	0.016	Dummy variable MC = 1 (working in manufacturing and construction sectors)
Married	0.135*** [0.045]	0.181	Dummy variable Married = 1
Intercept	5.855*** [0.000]	----	----
N	84	----	----
Adj. R-sq	0.515	----	----

Notes: p-values in brackets; \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ ; standardized coefficients are the regression coefficients obtained by first standardizing all variables to have a mean of zero and a standard deviation of one.

No evidence was found about the significance of the urban experiences variables which are to measure the years since migrating. These are an inverse-U shaped relationship as usual. The implication of the inverse-U shaped relationship in urban experiences is a hypothesis that as the urbanisation develops in China, there is a cycle of migrant moving

tendencies driven by the existence of rural-urban segregation. At first the migrant workers increase their urban experience, and then they have to come back to their villages because they cannot get support from the cities when they cannot find work opportunities. These jobs normally need younger migrant labour forces, therefore the younger migrant workers are continually flowing into cities to fill those place. Thus the average urban experience decreases. This situation seems not to be real in Chongqing. The coefficient of urban experience squared is negative, but it is extremely small and insignificant. The coefficient of urban experience has a significant 2.5 per cent which is similar to the results of Knight *et al.*'s (2011) 2.4 per cent.

Schooling is the proxy of education years. The results show a return to a year of education is positive and significant but very low, with only a 3.2 per cent rise in wages. This is similar with other studies (Giles, Park, & Cai, 2006; Maurer-Fazio, 2007). The implication of this result reflects the low quality of jobs that migrants take. Robustness tests were conducted on the proxy for the model. Since the age of the migrants was negatively correlated with the explanatory variables such as education or urban experiences<sup>59</sup>, excluding the education and urban experiences variable the

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<sup>59</sup> The pair-wise correlation value between age and education is -.473 and significant at a 1 per cent

model was re-estimated and the coefficient of age was reported as 0.1 per cent and extremely insignificant. Compared with formal education, the training had a surprisingly large effect on the outcome of migrant wages. The coefficient of training was 10.8 per cent and significant at a 1 per cent level different from zero. According to the survey, the probability of migrants who gained training was 22.6 per cent. The training courses were offered almost by all the work units or factories whose jobs normally have a relatively higher requirement of more 'skills' compared with unskilled jobs. So that it is reasonable that more training means higher wages. On the other hand, the training factors have larger effects than formal education factors, which confirm that those jobs are all not very high quality. This means anybody can work at this job as long as they gain some simple training. Males have the usual positive and significant coefficients to wages, which is similar to other studies (Giles, Park, & Cai, 2006; Maurer-Fazio, 2007). This is also consistent with Chongqing's existence as heavy industry and infrastructure construction booming cities need male labour force.

Strangely, manufacturing and construction workers do not receive more wages than workers in the residual sectors such as services and are

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level. The value between age and urban experiences and age and urban experiences squared are .374 and .392 respectively, with both significant at a 1 per cent level.

insignificant, which is inconsistent with other empirical studies in a national context such as Knight *et al.* (2011). But it seemingly confirms the previous chapter's discussion that Chongqing's industry externalities cannot afford the economic growth, which is the reason why the migrant workers who worked in secondary sector were still low income. Furthermore, if marriage increases by one unit, this improves migrant workers' wages by 13.5 per cent, and it is significant at a 5 per cent level, which is also different from other studies in a national context or in opening coastal areas. Chan (2010) considers that the married migrants cannot continue to work in the export-oriented manufacturing in the east because they cannot offer corresponding assembly jobs which have high labour intensity. In fact, the probability of migrants returning is up to 56.9 per cent in my survey, but the proportion of returning with married status after 2003 is no more than 10 per cent. Thus, in Chongqing's case, the significant positive marriage coefficient to the wages can be explained as they have more responsibility and incentives to their families.

**Table VI.7 Estimates of Decision Making Function by Probit on Migrants in Chongqing in 2009**

Explanatory Variable	Estimated Coefficient	Definition of Variable
Inopportunity	-0.464* [0.077]	Log form of opportunity cost
Inbalance	0.010 [0.956]	Log form of migrant's income balance from July 2008 to July 2009 (balance = income - expenditure)
Experience	-0.059 [0.609]	Urban experience ( years)
Experience2	0.003 [0.554]	Urban experience squared
Schooling	0.066 [0.312]	Years of schooling
Intercept	1.663 [0.442]	----
N	69	----
Wald Chi2	3.96	----

Notes: p-values in brackets; \*  $p < 0.1$

Probit estimation for the cross-section Chongqing rural migrant workers in urban areas in 2009 is presented in Table 6.7. Before estimating, the migration decision makings or the decision of acceptance of urban *hukou* can be predicted as very puzzling, as theoretically analysed above. This means the real reasons based on our dataset cannot be precisely captured because it contains many unobserved factor. This also makes this statistic estimation ineffective. One of these results which were chosen from many tests which were conducted conveys that there was one factor which was

significant: the log value of opportunity cost. The coefficient was  $-.464$  and was significant at a 10 per cent level, meaning that a 1 per cent increase in opportunity cost is associated with a  $.464$  per cent decrease in the probability of accepting the urban *hukou*. The implication of this result is that the income in rural areas is crucial to migrant transferring decision making. It also suggests that the migrants who come from poorer places might have more possibility to choose to stay in the urban areas or to accept the urban *hukou*. This contrasts with the previous analysis that the migrants who come from richer places or who have higher incomes if they stay in their villages might have more possibility to gain higher wages. In other words, poorer migrants in Chongqing are more willing to move into cities, but they might still be poor; richer migrants are richer than those poor migrants in the urban areas, but they do not want to accept the Chongqing urban *hukou*, because they also cannot really blend into this city.

According to the theoretically analysed model above, the poorer groups of rural migrants have less risk averse than the richer groups in the modern sector, and on the contrary, the richer groups of migrants get extra fixed wages. But to distinguish who is poorer and who is richer is difficult for the modern sector or the government. Other factors, for example urban experience, enhance the wages of both rich and poor migrants. In addition,

a mass of public rental housing project is a kind of cities subsidy to all migrants, which directly reduces the urban threshold, and the curve  $f/k$  will shift down to  $f'/k$ . This is different from endogenous or fully competitive environment where when  $f/k$  shifts down the whole city scale will shrink. But under the external effects,  $f'/k$  will make  $(p - f)/k$  shift to a higher  $(p - f)'/k$ , which means  $r$  becomes larger and the total rent of city becomes larger. In these circumstances, the megacity Chongqing is less risk averse. In effect, the poorer group is the most group the city needs; however, the proportion is small compared with those in richer groups, and they are difficult to distinguish. Thus, making big subsidies become the optimizing choose for the government who is eager to expand its urban areas quickly, because it can partly increase migrant worker wages and partly increase city rents and lower the risk aversion. It is speculated that if the government directly invests in the manufacturing or construction sectors, it can also increase migrant wages more directly. The rent of the city which is represented by the government will not change or decline. So, why does the government deny the opportunity of increasing its rent? On the other hand, if the government really engaged in investing or operating those secondary industries, more soft constraint problems would appear which makes the initially weak industries worse. So, the public rental housing is a timely and a good idea. Moreover, the demand of improving education and health or medical care

is more important to migrant. In other words, the government has chosen relatively easy way to attract migrants to settle down in cities. It has been proved to be very efficient. Chongqing has transferred 3 million rural migrants into urban citizens in 2011.

## **6.6 Conclusions**

This study has modified a conventional migration theoretical model, and it has used my survey to examine the rural migrant workers' transferring behaviours. This research also has reflected the government's behaviour. Many of the empirical results here are consistent with other similar studies conducted nationwide (Giles, Park, & Cai, 2006; Maurer-Fazio, 2007; Knight, Deng, & Li, 2011). For example, the effects of the income when remaining in the village, years of schooling, and gender on migrants wage behaviours are included. Many of the results also have characteristics belonging to the city of Chongqing, which is consistent with the previous discussion about urban economic agglomeration. For example, to work in the manufacturing and construction sectors insignificantly affects migrant wages. Furthermore, by using the theoretical conclusion and Probit analysis, the income in rural areas is crucial to migrant transferring decision making. It is concluded that Chongqing's government interventions and large subsidies are related to an increase in city rent and a decrease in risk

aversion. These results suggest that Chongqing's large urban expansion needs vast amounts of migrants to settle down into the city steadily and that the massive subsidies are likely to solve this problem and increase urban attraction. Chongqing is accelerating its industrial development which is very capital intensive (Liu & Cai, 2004). How can it create enough job opportunities remains a big question. There is still a lack of dynamic analysis on Chongqing's migrants' transition issues because of data constraints. As always, this investigation has a number of limitations to be considered in evaluating its findings. Its sample scale is relatively small. But, through comparison with the government's official large scale sample data and the results of other studies, it can be concluded that the research results are robust. The CMG is a strong local government, who has very large ambitions about its economic development. However, there is still a need for more reform in order to avoid the rural poor becoming the urban poor.

## **Appendix**

### **A: The Scheme of 'Public Rental Housing' (PRH, or *gongzu fang*)**

- *Chongqing will (eventually) build affordable accommodation (PRH) for 2.4m people. Some of that is being fast-tracked.*
- *Under the scheme, those earning less than Rmb3,000 a month can*

- apply for a PRH unit.*
- *Occupants will rent the unit at a low price (probably at around 80 per cent of commercial rent, says StanChart).*
  - *Rents in PRH units will rise more slowly than market rents, so that they end up at around 60 per cent of commercial rates.*
  - *After 3 years, tenants will have the option to buy – at a price that covers the land and financing costs. This could be less than half market value.*
  - *If occupants do buy and then decide to sell, the price will be set by the local government – thus removing the incentive to fake income to secure a spot.*
  - *The scheme is aimed at migrant workers, graduates and low-income urbanites. (Noble, 2011)*

**B: An Extract from the Questionnaire**

...

11. Educational level

- (1) Finished college and above
- (2) Entered in college, but not finished
- (3) Finished junior college
- (4) Entered in junior college, but not finished
- (5) Finished technical secondary school

(6) Entered in technical secondary school, but not finished

(7) Finished upper middle school

(8) Entered in upper middle school, but not finished

(9) Finished lower middle school

(10) Entered in lower middle school, but not finished

(11) Finished primary school

(12) Entered in primary school or below

...

18. How many years have you lived in an urban area by the end of July in 2009? (Please deduct the time when you went back home to the country side and when you lived in other rural areas.)

...

22. How many months of vocational training have you received by the end of July 2009?

...

30. What was your monthly income on average from July 2008 to July 2009 from your current job (Yuan)?

31. What was your total (net) income from other sources (monthly average, Yuan)

...

73. Household annual total consumption expenditure

...

90. Generally speaking, are you happy in your life?

(1) Very happy

(2) Happy

(3) Just so so

(4) Not very happy

(5) Not happy at all

(6) I don't know

...

119. Are you willing to accept the urban hukou?

(1) Yes

(2) No

...

## **VII. CONCLUSIONS**

### **7.1 Summary of Findings**

This study has carefully discussed a series of important issues about urbanisation and migration by using Chongqing during the past ten years as a case study, in three quantitative and qualitative studies. It has examined three main dimensions by focusing on the wage growth of urban worker and the effects of openness, the dynamic localisation and urbanisation externalities to Chongqing's economic growth and the motivations of transferring migrant workers.

The first main chapter (Chapter 4) examined an integrated wage function to evaluate the relationship between urban workers' wages and their relevant determinants, based on panel data for Chongqing of 38 industrial sectors over the past 11 years. It fills the gap in the literature about openness and the wage growth of urban workers of various industries in the inland city of China. The results of the empirical evaluation demonstrate that the wage growth of urban workers is positively related to the increase in the demand for labourers. Openness impels industrial sectors to use automation

techniques more efficiently. However, the effects of productivity on wages in the group of open industrial sectors are double those in the group of closed industrial sectors. There is no evidence in support of theory of the benefit of building new cities towards urban wage growth. Thus, it conducts a paradox that the urban population should quickly go up without the effective way of accumulation, building new cities. The further answers of the paradox were discussed in the following chapters.

The second main chapter (Chapter 5) illustrated the core problems behind fast urbanisation in Chongqing. The negative dynamic localisation economies show that the risk of economic growth in Chongqing has increased significantly. This view of agglomeration and urbanisation demonstrates that the effects of localisation only benefit the small cities. The traditional industries' localisation externalities in Chongqing cannot afford the economic growth anymore, because of overly fast urbanisation and strong government interventions. Resources cannot be freely allocated, and the ability to develop urbanisation externalities becomes even more difficult. Thus, the so called harmonious 'Chongqing model' has no economic basis.

The third main chapter (Chapter 6) introduced a theoretical framework of migrants' behaviour and used an in-person survey to examine the determinants of transferring decision-making. It got a handful of results, for example, the effects of the income when remaining in the village, years of schooling and gender to migrant wage behaviours, *etc.* which have significant effects on wages. Many results are unique for Chongqing such as the insignificant effects of the work opportunities of the manufacturing and construction sectors on migrant wages. Furthermore, the results of the theoretical and probabilistic migration model show that the Chongqing municipality government's (CMG) interventions and large subsidies are related to an increase in city rent and a decrease in risk aversion. This implies that Chongqing's large urban expansion needs vast amounts of migrants to permanently settle down into the city and that the large subsidies are likely to solve this problem and increase urban attraction.

## **7.2 Limitations and Future Research**

In this thesis, as in all research, there have been a number of limitations to be considered in evaluating the findings. The main limitations are set out here. In Chapter 4, it was acknowledged that there were data limitations.

The employment numbers between State-Owned Enterprises (SOEs) and private enterprises since 2009 have not been separate statistics. In addition, in 2008 GDP figures were obviously adjusted due to private enterprises statistics data being added. However, at the same time, the authorities adjusted some other related key statistics to maintain consistency. In Chapter 5, the data of county level capital stock is not available. The value that was used in this Chapter was re-estimated from other scholars' provincial level estimation, which means it is unavoidably imprecise. In Chapter 6, there is also a lack of data and a relatively small scale sample, meaning that we cannot conduct dynamic analysis on Chongqing's migrants' transition issues.

For future research, an improvement to be made would be to enrich the data; another improvement worth pursuing further would be to conduct an analysis comparison between western inferior areas and coastal developed areas. In addition, if the data permits it, an improvement would be to decompose the different group of migrants to analyse their behaviour.

### **7.3 Policy Implications**

Alongside the hopeful prospect of Chongqing's urbanisation and rural-urban migration, in terms of large amounts of investment and plenty of preferential policies, the urbanisation rate will also stay. However, a few critical challenges exist. The CMG should carefully evaluate and implement its urbanisation and industrialization based on the following considerations. Firstly, that export-oriented industry will become the main pillar to support urban economic growth. This is good, but it will increase the risk of population steadily gathering when the global market fluctuates. Secondly, Chongqing's economic growth will be faced with a dilemma. On the one hand, Chongqing must grasp the current opportunity to attract more investment to enhance its industry and to get greater global market access; on the other hand, the new incoming industries will seriously squeeze indigenous industries' growth space. Thirdly, Chongqing's sustainable development cannot be supported by only two or three pillar industries, and this will increase Chongqing's development risks. As a large city, Chongqing needs diversity in development. The satellite cities on the industrial cluster should have their own unique development plan. Fourthly, Chongqing's development is still overly dependent on capital-intensive industries; it should create more labour-intensive jobs to satisfy its development. Fifthly, the urbanisation rates should not become a

competition index of local government in China (especially in those developing regions), otherwise it would be very dangerous. Local government should pay much more attention to the quality of urbanisation, rather than the quantity. Last but not least, the large SOEs in China should reform further otherwise it will essentially damage the existing labour market.

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