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Labor mobility under the background of industrial relocation

Thesis submitted for the degree of PHD

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For my grandpa

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Abstract

Due to the high land price and consumption levels, the demand for resources and cheap labour, as well as the environmental problems in the east, enterprises and industries that had previously gathered on the coast have begun to relocate or semi-relocate to the central and west of China. Simultaneously, the relax of the household registration allows migrants to move wherever they please, which is driving the development of the labour market and industrialisation due to labour mobility and labour reallocation. As a result, analysing labour mobility in light of enterprise relocation is important in terms of balancing regional development and reasonable population policies. This thesis posits that despite the coastal area of China being dominant in the labour market since the 1990s, an "east-to-central and west" labour migration tendency, accompanied with enterprise relocation, has occurred.

The whole thesis is organised based on the principle of "put forward the question—analyse the question—solve the problem". In order to study the relationship between industrial relocation and labor mobility, the research methods will combine the theoretical research and empirical studies with both quantitative and qualitative analysis. Despite the traditional method of obtaining evidence----questionnaire, this thesis uses in-depth interviews to improve the authenticity and objectivity.

Fist of all, the interaction value model was used to analyse the regional migration pattern in China, whereby it was concluded that the "gradient eastern-ward one-way migration" has been replaced by a "stronger eastern-ward and weaker western-ward bidirectional migration". Simultaneously, the future prediction of the interprovincial migration, based on the constrained gravity model, confirmed this returning tendency. After a brief introduction of industrial relocation in China, the general relationship between industrial relocation and population migration was analysed, which offers a direct impression in terms of the influences of industrial relocation on mobility. Besides, determinants of respondents' intentions to go back to their places of household registration are investigated, and results show that personal attributes, working condition, social participation and job satisfaction as well as location can all predict respondent´s return intentions in the in-migrated region, while none variables related with location and job satisfaction are significant in the out-migrated region. This is followed by

the analysis on influences of industrial relocation on people's willingness to migrate with job, personal attributes, working condition and industrial relocation are all associated with their willingness to move, especially the enterprise relocation factors such as in-migrated enterprises in employee´s resident or working places and range of industrial relocation. The interviews with the staffs in Foxconn also confirm the impacts of industrial relocation on workers' intention to migrate. This thesis, studying the relationship between industrial relocation and labor mobility, attempts to promote provide theoretical basis for migration policy and regional balanced development.

Resumen

Debido al alto precio y consumo del suelo, la demanda de recursos y mano de obra barata, así como los problemas ambientales en el este, las empresas e industrias que se habían concentrado previamente en la costa han comenzado a reubicarse o semi reubicarse al centro y al oeste de China. Simultáneamente, la relajación del registro doméstico permite a los migrantes moverse donde quieran, lo que está impulsando el desarrollo del mercado laboral y la industrialización debido a la movilidad laboral y a la reasignación laboral. Como resultado, el análisis de la movilidad laboral a la luz de la reubicación de empresas es importante en términos de equilibrio entre el desarrollo regional y las políticas de población razonables. Esta tesis postula que, a pesar de que la zona costera de China es dominante en el mercado laboral desde la década de 1990, se ha producido una tendencia a la migración laboral " de este a centro y a oeste", acompañada de reubicación empresarial.

Toda la tesis está organizada en base al principio de "planteamiento de la cuestión-analizar la pregunta-resolver el problema". Para estudiar la relación entre la reubicación industrial y la movilidad laboral, los métodos de investigación combinarán la investigación teórica y los estudios empíricos con análisis cuantitativos y cualitativos. A pesar del método tradicional de obtención de evidencia ---- cuestionario, esta tesis utiliza entrevistas en profundidad para mejorar la autenticidad y la objetividad.

En primer lugar, el modelo de valor de interacción se utilizó para analizar el patrón de migración regional en China, por lo que se concluyó que " la migración de un solo sentido hacia el este" ha sido reemplazada por una "zona oriental más fuerte y más débil del oeste-migración bidireccional". Simultáneamente, la predicción futura de la migración interprovincial, basada en el modelo de gravedad restringida, confirmó esta tendencia recurrente. Después de una breve introducción de la reubicación industrial en China, se analizó la relación general entre la reubicación industrial y la migración de la población, lo que ofrece una impresión directa en términos de las influencias de la reubicación industrial en la movilidad. Además, se investigan los determinantes de las intenciones de los encuestados de volver a sus lugares de registro familiar, y los resultados muestran que los atributos personales, las condiciones de trabajo, la participación social y la satisfacción laboral, así como la ubicación, pueden predecir las intenciones de retorno del encuestado en el región migrada, mientras que ninguna variable

relacionada con la ubicación y la satisfacción laboral es significativa en la región migrada. Esto es seguido por el análisis sobre las influencias de la reubicación industrial en la voluntad de las personas de migrar con el trabajo. Los atributos personales, las condiciones de trabajo y la reubicación industrial están asociados con su disposición a mudarse, especialmente los factores de reubicación de la empresa, como las empresas inmigradas en los lugares de residencia o trabajo de los empleados y el rango de reubicación industrial. Las entrevistas con el personal de Foxconn también confirman los impactos de la reubicación industrial en la intención de los trabajadores de migrar. Esta tesis, que estudia la relación entre la reubicación industrial y la movilidad laboral, intenta promover una base teórica para la política de migración y el desarrollo sostenible regional.

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Chapter 1 Introduction

The reason behind studying migration under the background of industrial relocation was that when searching for articles online regarding population migration, the topic of industrial relocation seemed to attract the most attention. Furthermore, it appeared that Chinese policy makers have been trying to balance the development in different regions of the country by relocating industrial production from prosperous zones to less developed areas (Li and Bin, 2010). In 2010, the State Council of China published the "Guidance on the industrial transfer to the central and western regions", which stated that the central and western regions should take advantage of their rich resources, low material costs and great market potential so as to undertake industrial transfer and accelerate their industrialisation and urbanisation process and, meanwhile, promote the economic transformation and upgrading of the coastal areas. In September of 2010, the State Council also published "Guidance of The State Council on industrial relocation of central and west China" in order to offer some guidance relating to promoting enterprises relocating from the east to the west. Industrial relocation is one effective way in which to optimise spatial distribution and allow for rational industrial division, and is an inevitable requirement in terms of promoting industrial reconstruction and accelerating the shifts in economic development. In fact, the speed of this relocation from eastern areas to the central and western areas did increase gradually, alongside the adjustment of industrial divisions and international investment. Thus, relying on their abundant resources, low material costs and potential market, the central and western regions were able to accept this relocation. This process does not only help accelerate new industrialisation and urbanisation, as well as promote coordinated regional development, yet also helps to push forward the transformation and upgrading of coastal areas and optimise national industrial division. Simultaneously, the Chinese Premier, Keqiang Li, in June of 2014 emphasised its importance since he believes that Industrial relocation is a means to promoting China's economic upgrading. In the same year, China's National Development and Reform Commission (NDRC) and the Ministry of Commerce (MOC) jointly released the "Catalogue of Priority Industries for Foreign Investment in Central and Western China", whereby foreign-invested projects included in the catalogue are entitled to

preferential policies granted for foreign-invested projects under the encouraged category.[1] Moreover, in 2017, the state council again proposed to support the central and western regions in undertaking industrial transfer and developing export-oriented industrial clusters, from which the central and western regions were able to benefit from "The Belt and Road" policy[2], attracting foreign investment and regional industrial transfer.

Such vigorous regional development plans and industrial relocation will therefore inevitably lead to element flows and economic distribution between regions. Of course, population migration will be a significant consideration in relation to this. For example, how the migrants behave under the background of industrial relocation will become a key topic for migration research, which will also stimulate increasing research interest in the future.

Migration is an important component of demographic change (Andrienko and Guriev, 2002; Bell, Blake et al., 2002; Henry, Boyle et al., 2003; Dennett and Stillwell, 2010; Shen, 2012). The success story of "Made in China" in the last quarter of the century is inextricably linked with the story of migrant workers toiling for subsistence wages so as to produce exports (Chan, 2013). In fact, China witnessed huge, rapid social and economic development and progress after the reform and opening up policy, thus, population migration, whether from the scale or strength, is one of the reasons for this rapid development. That is to say, the story of migration since 1978 is the story of modern China; migrant workers have transformed China's economy. Through compiling statistics from the population census (from 1990 to 2010) and the population sample surveys (1987, 1995 and 2005), it is easy to see that there was an overall growth of migration every 5 years. Between 1982 and 1987, there were 305.3 million migrants in total, while this number reached 341.2 million between 1985 and 1990 and 364.2 million between 1990 and 1995. However, the fastest increase occurred during 1995-2000, where there were 1312.2 million migrants in these five years (Wang & Ye, 2004). Kam Wing Chan (2012) stated that, "some 230 million Chinese spent most of the year away from their home town or village from 1990 to 2005", which was almost a third of all people globally estimated by the UN to be migrating within the borders of their own country[3]. Despite this huge number,

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[1]
http://www.china-briefing.com/news/2013/05/16/china-updates-catalogue-of-priority-industries-for-foreign-investment-in-central-and-western-regions.html

[2] The Silk Road Economic Belt and the 21st-century Maritime Silk Road, also known as The Belt and Road (abbreviated B&R), One Belt, One Road (abbreviated OBOR) or the Belt and Road Initiative is a development strategy and framework, proposed by the Chinese paramount leader, Xi Jinping, that focuses on connectivity and cooperation among countries; primarily between the People's Republic of China and the rest of Eurasia. It consists of two main components, the land-based "Silk Road Economic Belt" (SREB) and oceangoing "Maritime Silk Road" (MSR). The strategy underlines China's push to take on a bigger role in global affairs, and its need for priority capacity cooperation in areas such as steel manufacturing (Wikipedia).

[3] http://www.economist.com/node/21548277

migrant workers in China have shown their increasing interest in returning to their homes. There is even a shortage of migrant labourers in coastal China, especially in the southern areas (such as Guangdong etc.). It is not uncommon to see return migration from central and western China to the east. For instance, Cai (2000) observed that return migrants in northern Jiangsu account for about one quarter of all out-migrants. Murphy reported that 36% of rural migrants from the inland provinces of Jiangxi, Anhui, Hubei, and Sichuan have returned (Murphy, 2002). Zhao's selectivity and reasons for return migration in China surveyed 941 rural-household in six provinces, determining that the proportion of return migration is more than 38% (Zhao, 2002). While Bai & Song (2002) proved that more than 28% of migrants from rural Sichuan and Anhui have returned after working in urban areas for an average of 2.9 years. Further, Liang & Wu (2003) determined that around one third of the migrants from Sichuan to Guangdong have returned (Wang & Fan 2006). Moreover, Liu & Yan (2013) used the data from a questionnaire and established that there were two kinds of return migration from Shenzhen to Zhumadian—business returns and housing returns; whilst some regions of Anhui have been proved to witness obvious population returning (Zang & Luan, 2016).

Practically, population migration cannot only inspire social vitality, accelerate economic development and modernisation, as well as ease the structural contradictions of the labour force in urban areas by offering sufficient labour for the process of rapid economic development, yet also speed up urbanisation so as to lower the gap between regional economic development level and the income. Further, this process can improve the regional population structure in order to achieve a reasonable population redistribution. On the one hand, studying labour mobility under the background of industrial relocation enables us understand the new characteristics of migration in recent years; while on the other hand, it can help with establishing the relationship between industrial relocation and labour mobility. This research is very important from both theoretical and empirical aspects. From a theoretical point of view, this research can reinforce the importance of an institutional perspective in terms of understanding migrants' decision making processes, especially in economies that are undergoing structural transformations. Empirically, the results highlight the significance of industrial relocation in determining labour mobility, which could promote rational distribution and balanced development among population and industries. For policymakers, the findings here suggest that reducing institutional barriers may be the best strategy for enabling rural migrants to succeed and contribute to rural economic development (Wang & Fan, 2006).

1.1 Background

Since the reform and opening up policies, China has witnessed great changes in terms of economic and population development. In the realm of the national economy, the free-market economy has replaced the previous planned economy, which has thus led to rapid economic increases; besides, the government has adopted various regional development plans and national policies that have helped balance economic development. In the realm of population policy, China has the famous stringent birth control policy (known as the one child-per-family program that requires urban couples to have only one child), but since 2016, this policy has raised the number of children per family to two. This was mainly due to the aging problem in China and the household registration system[4], which has controlled the movement of migrants from rural areas to urban regions.

China's population aging structure change is not an ongoing aging process, but has changed from a relatively young population structure to the elderly population rapidly. In 1953, the Chinese population mainly consisted of adults, but there were the younger population was higher; while in 1964, the young population dominated the structure (more than 40% of the population was aged between 0-14 years old but only less than 4% were the age of 65); then, with the decline of mortality and birth rates, the age structure of the population has been dominated by adults again, and this was typical in 1982. By the 1990s, the median age of population further increased, the number and proportion of elders continued to grow and the aging process continued to accelerate 2000 (when China did the fifth population census), China's population aged 65 and above reached 88.21 million, accounting for 6.96% of the total population, . Since then, China has become a country with aging problems; the sixth census in 2010 shows that China's population aged 65 and above has reached 8,87%, an increase of 1.91 percentage points over 2000, thus population aging problems are worsening.

Year	①% for population aged between 0-14	②% of population aged 65 and above	①/②	Medium age of population
1953	36.3	4.4	12.1	22.7
1964	40.7	3.6	8.8	20.2
1982	33.6	4.9	14.6	22.9
1990	27.7	5.6	20.2	25.3

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[4] The detailed information about the household registration system will be explained later; there is a special title for the Chinese Hukou system (the household registration system).

2000	22.9	7.0	30.6	30.8
2010	16.6	8.9	53.6	35.2

Note: The table comes from the ¨ China 's Population Aging and Its Economic and Social Impacts¨ of Dong Keyong.[董 克 用 ．中 国 人 口 老 龄 化 及 其 经 济 、社 会 影 响．中 国 人 民 大 学 公 共 管 理 学 院， 2016.] http://www.euchinasprp.eu/images/documents/Component1Cn/AGINGDKYCN.pdf

Firstly, it is interesting to discuss the regional develop plans and national policies that can affect industrial relocation and migration. For instance, the PRC State Council launched the Western Development Strategy, the Rise of Central China Plan and the Northeast Area Revitalisation Plan in order to develop industry-specific plans, create industry-specific catalogues of preferred technologies, and announce new incentives so as to attract investment to the central and western regions for the purposes of regional equilibrium. Moreover, the household registration system is one of the most important government policies with regard to controlling the movement of migrants in China. Though all these plans or policies have limitations, they also provide important guidance for foreign companies looking to expand into the Chinese market and gain access to potential customers in untapped regions, as well as enterprise relocation (labour-intensive industries moving from the coast to the peripheries or mid-west of China) being a positive thing. Furthermore, these policies attempt to realise the concepts of rational migration distribution that matches the industrial development of China.[5]

The western development

After the reform of China in 1978, the eastern coast experienced rapid development, yet the central and western regions lagged behind hugely. Thus, in order to achieve a balanced regional development and reduce regional differences, a Leadership Group for Western China's Development was created by the State Council in January 2000, led by former Premier, Zhu Rongji. It is China's first comprehensive regional development plan, directed by the central government, so as to boost the economies of the western provinces. The main components of the strategy include the development of infrastructure (transport, hydropower plants, energy, and telecommunications), enticing foreign investment, increasing efforts with regard to ecological protection (such as reforestation), the promotion of education, and the retention of talent flowing from richer provinces.

The Chinese economic reform (simplified Chinese: 改革开放; literally: "reform and opening-up") refers to the programme of economic reforms termed "Socialism with Chinese characteristics" in

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[5] https://www.chinabusinessreview.com/economic-development-policies-for-central-and-western-china/

the People's Republic of China (PRC) that was started in December 1978 by reformists within the Communist Party of China, led by Deng Xiaoping. (Wikipedia) Economic reforms introducing market principles began in 1978 and were carried out in two stages. The first stage, in the late 1970s and early 1980s, involved the decollectivisation of agriculture, the opening up of the country to foreign investment, and permission for entrepreneurs to start businesses. However, most industry remained state-owned. The second stage of reform, in the late 1980s and 1990s, involved the privatisation and contracting out of much of the state-owned industry and the lifting of price controls, protectionist policies, and regulations, although state monopolies in sectors such as banking and petroleum remained. The private sector grew remarkably, accounting for as much as 70 percent of China's gross domestic product by 2005 (Engardio, 2005). The success of China's economic policies and the manner of their implementation has resulted in immense changes in Chinese society. Large-scale government planning programmes, alongside market characteristics have greatly decreased poverty, while incomes and income inequality have increased, leading to a backlash, led by the New Left. In an academic scene, scholars have debated the reason for the success of the Chinese "dual-track" economy, and have compared them to attempts to reform socialism in the Eastern Bloc and the Soviet Union; as well as the growth of other developing economies (Wikipedia).

The western development strategy has proved to be one of the most important actions for continuous economic development in the 21st century. The objective was not only to support building basic infrastructure, but more importantly, to develop encouraged industries in the west of China, including industries such as new energy, equipment manufacturing, new materials, biotechnology, pharmaceuticals, aerospace and defense, and information technology (IT) and so on. Consequently, this offers millions of employment positions. In addition, the construction of three potential economic clusters --the Chengdu-Chongqing economic zone, the Guangxi-Beibu Gulf economic zone, and the Guanzhong-Tianshui economic zone-- will encourage economic development in the surrounding areas and, over time, will connect with widespread growth across the western region.

In the last 20 years, the gradually increasing economic gap between the western, central and coastal regions of China have affected its social and economic integration among regions. While the implementation of the "western development strategy" can be argued to achieve four primary positive effects. First, it will effectively promote the development of the western region, and gradually narrow the gap between eastern and western China; second, it will accelerate the development of the various resources in the western region and provide support in terms of economic development; third, it can drive the "domestic demand" in large-scale infrastructure construction in western China in order to lead to the continuous development of various industries, leading with the construction industries; four, it will view Central Asia as a bridge to pushing the open-up policy of the western   region, thus opening up

the "Eurasian Continental Bridge" on the basis of the ancient "Silk Road" and include Central Asia, Russia and Eastern Europe in the vision of China's foreign economic activity.

The rise of central China plan

The Rise of Central China Plan was announced by the Premier, Wen Jiabao, in 2004. It is a policy which aims to promote the development of the central economic zones, linking the eastern and western regions and coordinating overall growth. Until 2009, it held the clear goal of transforming central China into a production base for four major industrial areas. It encompasses 6 provinces—Henan, Hubei, Hunan, Jiangxi, Anhui, Shanxi. The main components of the strategy include upgrading of the industries, as well as encouraging industrialisation and urbanization, based on existing infrastructure. Furthermore, it promotes the development of modern agriculture, especially in major grain producing areas; strengthening the construction of large-scale coal bases, power plants in Shanxi, Henan, Anhui; accelerating the restructuring of steel, chemicals, non-ferrous metals to building material bases, etc.

So as to support the 2009 plan, the PRC Ministry of Commerce (MOFCOM) in May 2010 issued the Central China Foreign Investment Promotion Plan (2009-2014) and six related provincial sub-plans. Each provincial plan contains a foreign-investment promotion strategy that focuses on specific industries. Grain production, energy and raw materials, equipment manufacturing, and high technology were four of the main industries that were thought to attract foreign investment and labourers[6]. Moreover, increased infrastructure and fragmented logistics' networks have been planned for a better business environment in this region. Indeed, impressive economic growth in the central region appears to be generating domestic demand and driving policymaking toward the region.

The household registration system

China's *hukou* (the household registration) system has imposed strict limits on ordinary Chinese citizens changing their permanent place of residence since it was instituted in the 1950s. Beginning with the reform period in the late 1970s, and accelerating during the late 1990s, national and local authorities have relaxed restrictions on obtaining urban residence permits. For more than half a century, the hukou (household registration) system in China has segregated the rural and urban populations[7], initially in geographical terms, but more

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[6] https://www.chinabusinessreview.com/economic-development-policies-for-central-and-western-china/
[7] Up to 1982, the total population of cities and towns. Cities had to have a population of at least 100,000 inhabitants or command special administrative, strategic, or economic importance to qualify as cities. Towns were

fundamentally in social, economic, and political terms. It is the foundation of China's divisive dualistic socioeconomic structure and the country's two classes of citizenship. Under this system, some 700–800 million people are, in effect, treated as second-class citizens, deprived of the opportunity to settle legally in cities and of access to most of the basic welfare and state-provided services enjoyed by regular urban residents. In fact, the Hukou system in China has witnessed several periods of changes and development. During these periods, the controls and limits have differed greatly.

Up to 1982, the total population of cities and towns. Cities had to have a population of at least 100,000 inhabitants or command special administrative, strategic, or economic importance to qualify as cities. Towns were either settlements with 3,000 inhabitants or more, of whom more than 70 per cent were registered as nonagricultural, or settlements with a population ranging from 2,500 to 3,000 inhabitants, of whom more than 85 per cent were registered as nonagricultural. For the 1990 census, the urban population included: (1) all residents of urban districts in provincial and prefectural-level cities; (2) resident population of "streets" (jiedao) in county-level cities; (3) the population of all residents' committees in towns. For the 2000 census, the urban population was composed of the population in City Districts, with an average population density of at least 1,500 persons per square kilometre, other population in suburban-district units and township-level units meeting criteria such as contiguous built-up area, being the location of the local government, or being a Street or having a Resident Committee. For the 2010 census, the urban population included all urban residents meeting the criterion defined by the National Bureau of Statistics of China in 2008, i.e., the criterion used in the 2000 census plus residents living in villages or towns in outer urban and suburban areas that are directly connected to municipal infrastructure, and that receive public services from urban Municipalities (World Urbanization Prospects 2014).

From the 1950s to the 1970s, the Chinese *hukou* system has categorised citizens according to both their place of residence and eligibility for certain socioeconomic benefits, these can be defined in three ways: resource distribution, migration control, and the monitoring of targeted groups of people. Household registration has hugely restricted migration since the end of the Great Leap Forward (1959-61). It specified that all who lived in rural areas, and were not state employees, were to be treated as agricultural householders and were not eligible for grain

either settlements with 3,000 inhabitants or more, of whom more than 70 per cent were registered as nonagricultural, or settlements with a population ranging from 2,500 to 3,000 inhabitants, of whom more than 85 per cent were registered as nonagricultural. For the 1990 census, the urban population included: (1) all residents of urban districts in provincial and prefectural-level cities; (2) resident population of "streets" (jiedao) in county-level cities; (3) the population of all residents' committees in towns. For the 2000 census, the urban population was composed of the population in City Districts, with an average population density of at least 1,500 persons per square kilometre, other population in suburban-district units and township-level units meeting criteria such as contiguous built-up area, being the location of the local government, or being a Street or having a Resident Committee. For the 2010 census, the urban population included all urban residents meeting the criterion defined by the National Bureau of Statistics of China in 2008, i.e., the criterion used in the 2000 census plus residents living in villages or towns in outer urban and suburban areas that are directly connected to municipal infrastructure, and that receive public services from urban Municipalities (World Urbanization Prospects, 2014).

rations and other daily necessities from the state, whereas urban residents and state employees were treated as members of urban or non-agricultural households and were eligible for guaranteed grain rations (Cheng & Selden, 1994). In 1958, the Chinese government stipulated the Ordinances of Household Registration for Chinese Residence, which required those who wished to move to urban places to have permission from the destination city (Zhang, 1988). Before the late 1970s, a limited amount of interprovincial migration had been allowed to take place. Such population movement, however, was not based on migrants' calculations of costs and returns, but rather depended upon socioeconomic planning strategy, or the military and ideological considerations of the government (Ma & Wei, 1997). One of the economic strategies was to develop the inland provinces in the 1960s and 1970s, called the "three-front construction," which mobilised considerable population from coastal areas into the underdeveloped interior provinces (Naughton, 1988; Linge & Forbes, 1990; Yabuki, 1996). During approximately the same period of time, another programme; the urban-to-rural youth transfer, also known as the youth rustication ("上山下乡", in pinyin: shang-shan xia-xiang); was carried out. It was a resettlement scheme transferring urban graduates of secondary schools to rural and remote border areas during the Cultural Revolution (1966-1976) (Bernstein, 1977).

From the 1970s to the 1990s, economic development increased labour demand in urban areas, while technical development created a surplus of rural labourers. Hence, to accommodate these pressures, the Chinese authorities implemented reforms that enhanced the mobility of rural residents through the use of a temporary residence system. Since the late 1970s therefore, the long-standing restricted migration policy has been relaxed, with the introduction of economic reforms that aim at nurturing a free-market mechanism in China's socialist economy. This policy has not only partially reduced the population pressures in rural China, but has also facilitated urban-to-urban migration. In response to the emerging rural surplus labourers and to the increasing mobility potential, a more significant change in internal migration policy was made by the State Council of China in 1984. According to this State Council directive, permanent migration from villages to towns was officially sanctioned. The provision specified that those who could meet the following requirements should be allowed to register as town residents or with non-agricultural status. These requirements are: (1) to provide food grain and accommodation on their own, and (2) to engage in some industrial or commercial activities in the market town (excluding towns that are the county seat) (Centre for Population Studies, CASS, 1986). An increasing number of rural residents have been moved to nearby towns on a temporary and permanent basis. There they can easily purchase their food grain and other daily necessities from the free markets (He, 2002).

Since the late 1990s, Chinese authorities have deepened and expanded upon prior hukou reforms. These reforms include: relaxing limitations on migration to small towns and cities, streamlining *hukou* registration in some provinces and large cities, and instituting many individual reforms aimed at addressing the abuse of migrants. Since late 2004, central authorities have also made efforts to eliminate discriminatory local regulations that limit urban employment prospects for migrants.

With the end of implementation of these two programs in the late 1970s, return migration to the origins in the coastal provinces occurred in the 1980s due to the emphasis on the open door policy (Banister, 1987). The implication of such return flows is apparent since they constitute an important part of the interprovincial migration during the period 1982-90. Such return migration flows may have brought some distortion to China's interprovincial migration system.

1.2 Hypothesis

When companies and enterprises gathered on the coastal side of China, labourers and workers of the inland areas, with a lower chance of securing a job and workplaces, are more prone to moving from the west to the east for employment (the east also needed these cheap workers), with the upgrading of enterprises over time, high consumption and high pollution, enterprises began to transfer to high-tech and environment-friendly Industries. Thus, the inland regions in the central and western of China gradually accepted these displaced industries, which required huge numbers of cheap workers. At this time, these workers don't need to move a long distance for employment and some staff even moved from the coast to inland for opportunities. The hypothesis of the thesis can be explained as: even though the coastal area of China dominated the labour market since 1990s, an "east-to-central and west" labour migration tendency, accompanied with enterprise relocation, especially in the manufacturing industries, began to occur.

Specifically, mingrants are supposed to present an "east-to-central and west" return tendency with enterprise relocation in China, and this trend would be enhanced in the future development. However, most of the migrants move out of their hometown for jobs, and labour mobility may exhibit various patterns with the relocation of one certain enterprise. At the same time, factors like personal attributes, social factors, political factors and elements related with industrial relocation can all influence labor mobility. Employees who are part of the masses and from a non-agricultural household registration and who work a long time are more willing to

relocate due to their jobs. And migrants, whose residences or working places have in-migrated industries and whose companies have an intention to relocate to the same city, express more interest in transferring with his work. This "east-to-central and west" mobility contributes significantly to the coordinated development of the regional economy and can help to reduce regional differences in the eastern and western regions.

1.3 Research questions

Further, this thesis will attempt to answer the question of how the labourers migrate under the background of enterprise relocation. For this purpose, some detailed questions need to be answered:

1 What is the regularity and characteristics of the population migration during this period? Do they present new characteristics?

2 Following this migration pattern, what are the future trends for population migration in China? Will the migrants from the western and central China areas of continue to stay in the eastern part or go back to their hometown with the westward industries?

3 How do the industries distribute in current China? Is it related with the "labour shortage" in the coastal region?

4 Which kinds of factors or determinants can impact upon people's intention of going back to their hometown?

5 How did the enterprise relocation affect labour mobility? This is also the question regarding the mechanism between relocation and labour mobility. Thus, can we use the enterprise relocation to predict labour migration? If yes, how does it work?

1.4 Objectives

The principal objective is as follows: combining the concepts of labour migration and industrial relocation, this thesis will analyse the flowing process and mobility models of labour forces under the background of enterprise relocation since the 1990s. How these influences occurred, as well as the impacts of this mobility, will also be examined, so as to offer some clarification regarding balanced regional development and reasonable arrangements for workers, alongside creative relevant population policies.

There are also some specific goals that this thesis is aiming to achieve.

First of all, to provide more clarification of the concepts of migration and floating population, as well as the influencing elements and factors linked with mobility. It is important to note that the migration of labourers and changes within industries are dramatically affected by the social background and urban development policies, thus different periods have quite different characteristics. At the same time, summaries and conclusions of theories and models relating to labour mobility and communication flows are significant in terms of understanding their evolution and the development of academic comprehension of these areas.

Secondly, theories and opinions regarding mechanisms of enterprise relocation on labour force mobility will be summarised to help with general information and concepts linked to the effects of relocation on labour mobility in order to understand the ways in which labour flows are influenced by various factors.

Thirdly, an analysis of the general labour mobility tendency and patterns in different types of enterprises, especially the manufacturing industries in China since the 1990s, will be conducted. There will also be an attempt to establish how labourers have migrated in relation to enterprise relocation; thus, dividing China into three parts, based on the labourers of different enterprises and the known characteristics and movement patterns for each part; thus being able to ascertain the mobility differences between high-skill labourers and so-called common workers.

Fourthly, this thesis hopes to enunciate the evolutions and histories of the manufacturing Industries in China, as well as the overall situation, evolution, development and movements of labourers specifically at Foxconn. The most important source of information here will be the questionnaires and analyses, which will be used to explain the mechanisms and impacts of enterprise relocation on labour mobility in a practical sense, yet based on theoretical analyses.

Finally, the influences upon labour mobility during this period are extremely essential. Additionally, the impacts of labour mobility on regional economic development, social improvement, as well as its function in terms of extending/reducing the regional gap, will be discussed. Consequently, some suggestions and recommendations will be offered in terms of national development policies, rational labour mobility methods, future development and contributions to urban planning.

1.5 Concepts and data sources

1.5.1 Definition and concepts

-- Migration related concepts

Mobility refers to the movement of people from place to place, or job to job, or social class to social class (Australian Bureau of Statistics, 2007). Geographic mobility, population mobility, or more simply mobility is also a statistic that measures migration within a population. Population mobility refers to the geographic movement of people where there has been a change in the place of usual residence . It has a large impact on many sociological factors in a community and is a current topic of academic research[8]. It varies between different regions depending on both formal policies and established social norms, and has different effects and responses in different societies. Population mobility has implications ranging from administrative changes in government and impacts on local economic growth to housing markets and demand for regional services[9].

Population migration is the spatial change of the population's distribution. It is one of the most important aspects relating to human development. In order to understand the characteristics and development patterns of labour mobility under the background of enterprise relocation, it is essential, first of all, to understand the definition of migration. The Oxford English Dictionary defines the term "migrate" as moving from one abode to another, especially in a different country. While the Multilingual Demographic Dictionary explains migration in line with a more common and accepted definition: migration is the spatial mobility or geographic mobility between two regions. The administrative unit left by the migrant is the place of origin or place of departure; the unit to which the migrant goes is the place of destination or place of arrival. The concept of migration is often not applied to moves made by persons without a fixed place of residence, for example, nomads are excluded from the count of migrants in many countries (Multilingual Demographic Dictionary, 2017).[10]

However, the definition of migration in different regions or countries may differ, and there is no definition that can be expected to predict what might occur in the future. Based on different research purposes, for instance, the definitions may be quite different. For instance, for geographic research, what is popularly done is that population migration is regarded as the movement by people from one place to another with the intention of settling temporarily or permanently in the new location (Wikipedia). White & Woods (1980) considered those persons who move their home permanently as migrants, but this is not available for those who preserve their homes in the migrated place. Kaur (2003) believed that shifting from a residential place to another place is migration, regardless if it is a for period of time or

8 Population Mobility:Migration in a Global Economy (2013). Harvard College.
9 Wikipedia. Geographic mobility. https://en.wikipedia.org/wiki/Geographic_mobility
10 http://www.demopaedia.org/tools/spip.php?page=generate_dictionary&edition=en-ii&format=html#chapitre8

permanent, while voluntary movements are also included. Migration is the temporary or permanent move of individuals or groups of people from one geographic location to another, for various reasons, ranging from there being better employment possibilities to persecution. Moving people from place to place for living or working purposes is referred to as migration (Huzdik, 2014). There are also other definitions from the formal or informal perspectives, and normally from these definitions, we can see their special development policies. For example, the Office of Population Censuses and Surveys of Great Britain (OPCS) defines a migrant as a person who has entered a country from abroad with the intention of residing for more than six months (Alam, 1995).

As is now well known, migration in China is highly regulated, and it has played a huge part in the national industrialisation strategy (Chan, 2009). Chinese researchers have basically tended to follow the migration definition of Wikipedia, yet considering the special conditions in China, migration has two different primary categories: the Hukou migration and floating population. The Hukou migration (Hukou qianyi) is a movement that is officially documented by a permanent change in an individual's place of household registration; floating population (Renkou liudong) is a temporary population movement. The latter refers primarily to migrants in China without local household registration status through the Chinese Hukou system[11], it concerns not only rural migrant laborers but also contains people who travel for business, education, tourism, and visiting relatives.

Understanding the household registration (Hukou) system and its relationship to migration is always the first important thing for internal migration analysis. It seems that China's hukou administration system has generated population migration as only hukou migration (migrants with residential changes). That is to say, people who are going to change their residences permanently or formally need to obtain approval for hukou change from the local authorities (Chan & Zhang, 1999). It is easier for urban residents to change their hukou within the same city or town and for rural residents to move within rural areas, but crossing city or town movements (meaning Household registration change), especial from rural Hukou to urban Hukou, are strictly regulated and require approval by the public security authorities. Therefore, due to the difficulty of transferring household registration, the hukou migrants are normally far more skilled and much less numerous than the floating population (Wang, 2005).

If Hukou was used as a "passport" for rural people migrating from rural areas to urban regions before the reform and opening up period, it has become an entitlement mechanism for

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[11] https://en.wikipedia.org/wiki/Migration_in_China

migration since the mid-1980s, after the economic reforms and relaxation of migration controls took place. There was a sharp increase in "renkou liudong" (population movements or "floating" population), implying a "temporary" move to a destination where the person is not supposed to, and is legally not entitled to stay permanently (Liang, 2001; Fang & Dewen, 2003; Fan, 2005). According to the "Floating population in China Development Report", compared with the 6.57 million floating migration in 1982, this number reached 18.1 million in 1987 and this was followed by unstoppable growth, whereby there were 253 million floating population in 2014, accounting for one fifth of the total population of China. These rural migrants are allowed to move to and work in cities, but they cannot have a hukou in the destination where they stay, so they are ineligible for many local benefits and rights, which ordinary local urban residents qualify for automatically. Only those migrants with urban household registration can access the social benefits and rights that other local residents have. However, Kam Wang (2008) introduced another concept, which refers to the broadest and most widely used definition of the floating population: anyone in the destination without local hukou can be considered floating population, regardless of the length of their stay in a place (either overnight or several years), as well as tourists, people on business trips, traders, sojourners, and peasant migrants, both employed and unemployed. In Wang's view, they were all floating population. However, this concept is frequently used in newspapers and other media channels, and should therefore be treated only as a rough concept.

However, researchers and statistical agencies normally use the non-hukou migration on a largely de facto basis through the use of various sample surveys and population census (Liang and White, 1997; Ling, 2001). However, the large number of people moving internally, as well as the circulatory and temporary nature of some of them, hugely complicates efforts to measure the movement accurately and to address its many implications (Chan, 2013). In this thesis, data from both census and population investigations will be used. Moreover, population migration or labour migration will all be mentioned in line with the general concept of migration in China—the non-hukou. There are advantages for using this form of the concept. On the one hand, the census and other investigations all collect migration information based on this concept, hence, as a result, data is more readily available. Yet, on the other hand, the relaxation of migration controls decreases the differences among urban and rural household registration. In fact, large parts of these individuals cannot apply for local household registration where they stay. As a consequence of this, they cannot enjoy the social benefits and rights, therefore it is hard for them to gain access to the public infrastructures, such as hospitals and schools. The kids and old families left behind ultimately lead to the famous

"home alone children/elders" problems. Nevertheless, the situation was partially changed when the government tried to reduce the differences between urban and rural households. For example, Shenzhen became a city that only had urban citizens in October of 2004, after which more than 30 provinces or cities introduced policies so as to cancel out the agricultural households in 2016[12]. What's more, from 2017, the central government has enacted a policy to cancel out all the rural household on a national level. However, it is important to remember that cancelling out the rural households doesn't mean the previous rural residents lose their land or other benefits. In contrast, it helps to break the urban and rural dual structure, so that rural residents can enjoy the same benefits and treatments as the urban residents in terms of education, fertility, employment, social security, housing, land and demographic systems.

Wikipedia has a clear definition for those left-behind children in China (Chinese: 留守儿童; pinyin: liúshǒu'értóng), it is the phenomenon of parents from the country's rural areas leaving their children when they move to urban areas to seek work. Children are left in the care of relatives such as grandparents, family friends or others. In some cases the carer may be unsuited or unable to give adequate care for physical or financial reasons, leading to developmental issues, such as vulnerability to becoming a victim of human trafficking, becoming involved in criminal activities or suffering depression. A census identified over 60 million left-behind children with 40 percent of these under the age of 5, and 70 percent seeing their parents less than once a year.

Left-behind elders refers to those parents who have stayed at home while their children (or all children) have left their places of household registration and have moved to other regions (normally urban areas) in order to work, do business or conduct other activities for a long time (usually more than six months). These elders live a simple but difficult life in rural areas; they either live in poor environment, or bear heavy manual jobs, or are taking on the responsibility of raising and educating their grandchildren and so on. What's worse, some of them even suffer from the exclusions, they cannot go anywhere in their leisure leisure time.

In fact, moving for jobs is the most important reason for population migration, which can be called as "labor or worker mobility". It is the geographical and occupational movement of workers (Long, 2011). Increasing and maintaining a high level of labor mobility allows a more efficient allocation of resources and balanced socio-economic development, it has proven to be a forceful driver of innovation (Gregory, 2010). The European Union (EU) is most active in trying to increase its labor mobility by helping qualified workers easily cross state and national boundaries to find "best fit" employment, so that it can ensure individual, corporate and national economic growth. North Americans, on the other hand, traditionally enjoy a high

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[12] http://www.sohu.com/a/115611224_407808

level of geographical labor mobility within their own country13. When the Chinese government released the household registration system, labors got more chances to move from rural to urban areas, or from central and west of China to the east for occupations. In order to understand well these movements, the definition of labor mobility in China can be described as the labor movement between regions, industries, departments, companies or even jobs for chasing higher benefits.

-- Industrial relocation concepts

It is necessary to understand the basic concept of "industrial relocation" first when analysing the relationship among industrial relocation and labour mobility. From doing a review of policy and academic papers and from discussion with stakeholders, it has become clear that a single, clear cut definition of the term does not exist, thus reflecting upon the loose boundaries of the concept. In simple terms, enterprise relocation can be understood as enterprises' location changes. However, Bianchi and Mariotti (2003) extended this concept and considered the "subcontract" to be the main form of industrial relocation, yet ultimately, it failed to receive universal identity. While Bai (2003) held it as a special form of location adjustment, claiming that it is linked with the spatial changes in industrial value chains. It can mean either complete relocation (that means closing all the activities in the current enterprise and moving to other location) or partial movement (Wei & Bai, 2009). For example, a company may only choose to undergo branch establishment or the transfer of headquarters and R&D departments. Practically, industrial relocation can be classified in two senses: the location of the business activities (in the home country or abroad) and the way these activities are managed (outsourced to third parties or kept under own management).[14]

1.5.2 Data sources

--Migration pattern data

Statistical data is a basic necessity for migration research. As previously mentioned, Chinese migration data can be divided into Hukou migration and floating population data. The Hukou migrants' data is normally collected via the statistic yearbooks and demographic yearbooks, as well as the public safety agency, while floating population data appears in various censuses. Due to the limitation of such documents and statistical data, it wasn't until 1990 when the

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[13] http://www.investopedia.com/terms/g/geographical-mobility-of-labor.asp
[14] DG INTERNAL POLICIES OF THE UNION-Policy Department Economic and Scientific Policy. Relocation of EU industry—an overview of literature. IP/A/ITRE/NT/2006-14.

government listed population migration in the fourth population census and researchers started to investigate migration comprehensively. The 1990 census considered those who have left their residence over 5 years since 1 July 1985 to 1 July 1990 as migrants (Shen, 2012). Similar to the census in 1990, the fifth population census added some more detail, for example, in addition to inter-provincial migration, there was also data regarding the number and direction of intra-province (city or town) migration. The 2000 census considered the following people as migrants: those whose usual place of residence had changed in the 5-year period from 1 November 1995 to 1 November 2000. Due to well-known inconsistencies between household registration and the residence of many individuals, the current place of residence was considered the usual residence of the migrants if they had left their place of household registration for over a year in the 1990s (Shen, 2012). The sixth census in 2010 also contained both inter-province and intra-province data. Furthermore, between the third, fourth, fifth and sixth census, the National Census Office also conducted three population sample surveys, which mentioned population migration information. These surveys are also useful as official data for migration study in China (Wang & Ye, 2004). Currently, there are a huge number of research projects relating to migration analysis based on the census of 2000 and 2010, as well as the population sample survey of 2005.

With the development of economic reform and globalisation, the adjustment of industrial structure, rapid growth of labour supply and a lack of non-agricultural jobs in combination have all led to new characteristics of migration, especially after the 1990s. Besides, during this time, the government has implemented the household registration system in China. While, in some places, there has been no big differences with regard to urban Hukou or rural ones, which has also brought about various regional migration. As a result, studying the migration patterns after the 1990s enables us to better understand the new features of recent China, which are significant in terms of regional equilibrium. Data sources in this article concerning interprovincial migration come from the Population Census of 2000 and 2010 and the 1% population survey of 2005, undertaken by the State Statistical Bureau of China (since the 2015 population survey is not available now, and between 2010 and 2015, there were no important policies introduced that can affect population migration, thus the migration didn't exhibit new patterns. These documents collected data relating to inter- and intra-provincial migration during a 5-year period concerning those aged five years old and over. Normally, those considered migrants had left their place of origin at least six months prior and had been in the new place for five years or less. A 31*31 interprovincial migration data matrix can be derived for the migration pattern calculation, but Hong Kong, Macao and Taiwan are not included due

to a statistical shortage.

Table 1 Population census and sample surveys in China

	A	B	C	D	E	F
Nane	1% of the population sample survey in 1987	Population Census of 1990	1% of the population sample survey in 1995	Population Census of 2000	1% of the population sample survey in 2005	Population Census of 2010
Date	1982.7.1--1987.6.30	1985.7.1--1990.6.30	1990.10.1--1995.9.30	1995.11.1--2000.10.30	2000.11.1--2005.10.31	2005.11.1--2010.10.31
Defination	Those who registered their residence in the new place; and those who did not but left their place of origin at least six months before	Those who registered their residence in the new place; and those who did not but left their place of origin at least one year before	Those who registered their residence in the new place; and those who did not but left their place of origin at least six months before and had lived in the new place equal to or less than five years	Those who registered their residence in the new place; and those who did not but left their place of origin at least six months before and had lived in the new place equal to or more than five years	Those who registered their residence in the new place; and those who did not but left their place of origin at least six months before	Those who registered their residence in the new place; and those who did not but left their place of origin at least six months before
Age	All	Five years old and more	All	Five years old and more	All	All
Size	1% of the population	Total	1% of the population	9.5% of the population	1% of the population	10% of the population
Date of migration	Yes	No	Yes	Yes	Yes	Yes

-- Empirical analysis data

The data for the migration mechanism analysis came from the CLDS survey (China Labour-force Dynamics Survey) from 2012, and the rest of the data is from the newest survey in 2016, all conducted by the Centre for social survey at Sun Yat-sen University. These surveys are rotation research and are conducted every two years (the pre-research was held in 2011, while up to October of 2016, the first national survey and two rounds of rotation surveys have been carried out). CLDS was designed to concentrate on the status quo and evolution of Chinese labourers, which covers the areas of education, work, migration, health, social participation and so on. In order to ensure the randomness of selecting samples, this survey used a computer to select potential research areas at random. That is to say, the computer selected different number of cities as the sub-unit of selection (capital city and key developed cities), then counties (or villages), followed by household. According to the different size and economic development of the county (or village), some 75, 100 or 150 samples of households were chosen. Each household was coded by a unique number based on field investigation (the field investigation

was made to ensure that each household was not empty). In order to assure the randomness and accuracy of the samples, as well as to save more samples for the rotation research for the next period, this survey asked interviewers to gain as much access to each sample as possible. If they wanted to drop this sample, they needed to, at least, visit and be rejected by one same household more than 3 times, then they could ask for a new sample.

The mechanism analysis can be divided into two parts: the determinants of return migration and impacts of industrial relocation on labour mobility. For the former analysis, individuals were chosen with work experience dating back to 2011, who were also working out of their hometown and who were asked about their return intention to their place of household registration. For the latter, the research unit consisted of employees whose enterprise has the intention to relocate, semi-relocate or restructure in the future. All samples covered 29 provinces (municipalities, except Hong Kong, Macao, Taiwan, Tibet and Hainan), and respondents were aged between 15 and 65.

1.6 Methodology

The whole thesis is organised according to the principle of "put forward the question—analyse the question—solve the problem". In order to reveal the essence of the topic in detail and analyse the main mechanism more precisely, the research methods will combine the theoretical research and empirical studies with both quantitative and qualitative analysis. For global descriptions, secondary data will be used; for more in-depth information, primary data will be collected. It is also necessary to undertake a brief examination and introduction of the background relating to enterprise relocation and government policies; besides, surveys relating to migration, alongside theoretical analysis and empirical analysis are quite important. Also undertaken will be a theoretical analysis and study summary in order to explain the mechanism and relationships between labour mobility and industrial movements. Simultaneously, the content of the thesis will be based on empirical evidence. However, traditional methods of obtaining evidence, such as a questionnaire, has some disadvantages, especially in relation to the authenticity and objectivity of the questionnaire. Thus, to improve the authenticity and objectivity, in-depth interviews will be mainly used.

The inside mechanism of this thesis is based on the relationship between enterprise relocation and labour mobility. In China, the coastal and eastern areas attract international investment and enterprises prefer these regions due to the unbalanced regional development policy. Industries concentrate in these areas, while labourers from the center or west move here for

employment. However, there is a "reserve flow" at the same time. Industries and enterprises move from the east to the central and western regions due to cheaper wages, resources and land, therefore local labourers in these areas can avoid moving long distance for jobs, though some choose to move back from the coast at a later date. During this mobility process, labourers possess special characteristics.
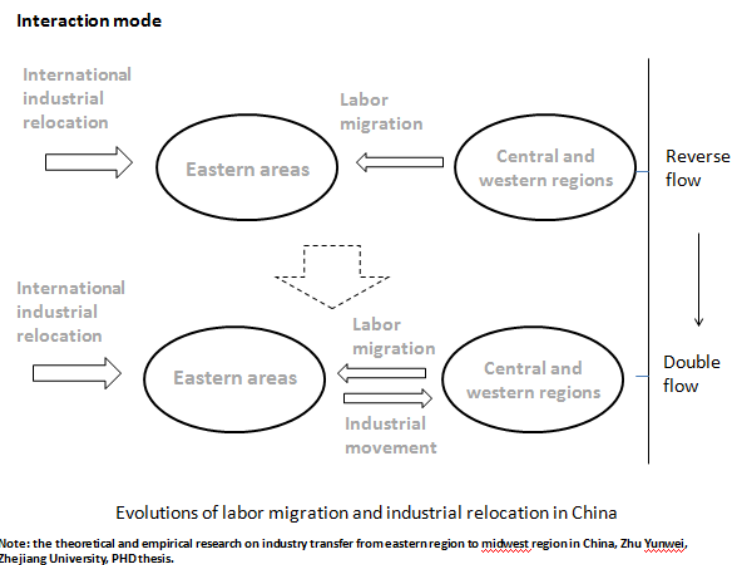
Figure 1 Evolutions of labor migration and industrial relocation in China

1.7 Structure and interpretation

Based on the general analysis above, the thesis can be divided into three sections--theoretical analysis, empirical analysis, conclusion and discussion-- which is comprised of six chapters.

The first section is a theoretical analysis, which includes the global introduction of the whole thesis, the explanation of concepts, and the literature review. The general introduction is comprised of the background of the research, objectives, the methodology and the structural analysis. Among them, the methodology section can be separated into the mechanism analysis and data sources' description. The literature review and theoretical summary are main aspects of this section, the materials and information of which came from published books, articles and magazines, academic programmes and reports, and news articles. While, the review interpretation contains both theoretical and empirical literature. For instance, the theoretical evolution and development of migration research, as well as the empirical literature on the determinants of migration, migration patterns, and further, specific reviews relating to the relationship between migration and industrial relocation.

The second section is the empirical analysis. The idea of this section is to attempt to analyse the general migration tendency and regularity in China since the 1990s. After which, the mechanism of the population and influences of industrial relocation on labour migration will be discussed. Next, one of the most famous electronic manufacturing companies – Foxconn, will be used as a case study in order to examine the relationship of the main concepts on the company. Data for the migration tendency and prediction will mainly come from Statistical Yearbook of China, the Labour and Employment Yearbook, Economic Yearbooks and other yearbooks and census; while the mechanism analysis uses data from the China Labour-force Dynamics Survey (CLDS), questionnaires and face-to-face interviews (which were used to collect data for the Foxconn company analysis).

For the conclusion and discussion section, implications for urban planning and development and suggestions for population policies will be made to show the contribution of this research in terms of urbanisation, industrialisation and social development. Moreover, this section will provide a final conclusion in relation to all the information discussed above.
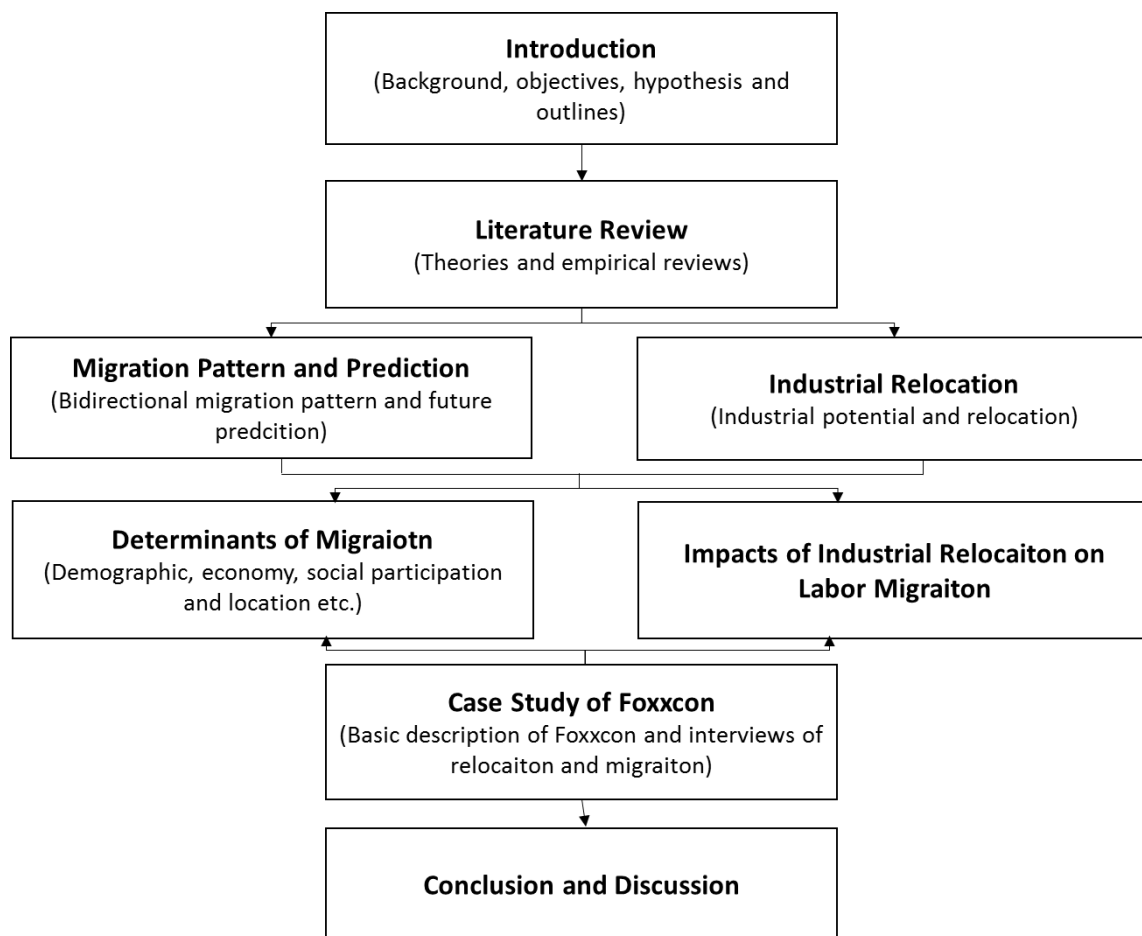
Figure 2 Total structure of the thesis

Chapter 2 Literature Review

The "law of migration" from Ernst Georg Ravenstein in 1885 has proved to be the earliest identifiable theory with regard to migration research. Based on this theory, researchers of population geography, political geography and economic development and some other areas have since put forward some related theories. Some of the most famous and applicable theories include the Neoclassical Economic theory, the New Economics of Migration theory, the Dual Labour Market theory, the Social Network theory, the Word System theory, the Structural theory and the Transnational theory. Through summarising the most important theories, Massey et al. (Massey, Arango et al., 1993; Massey, Arango et al., 1999) distinguished theoretical approaches to international migration into two categories: the initiation and the continuation; while Schoorl and Jennissen also gave an overview and evaluation of these theories by following the same method (Schoorl, 1995; Jennissen, 2004).

Karl Marx and Friedrich Von Engels (Marx, Engels et al., 1972) believed that the directions and patterns of labour mobility differed hugely in line with the development of society as a whole and economic conditions. For example, the industrial reserve force originated from rural areas in industrial England, while it was from urban areas and Refuges of expelled agricultural workers in agricultural Ireland. At the same time, they pointed out that labour mobility is closely related with the capitalist production cycle. Vladimir Lenin added that workers who migrate from lower income regions to higher income regions have cascaded flowing features. This means that the floating size is positive in relation to economic development. Furthermore, they conducted a pros and cons analysis with regard to the relationship between labour mobility and economic development. Positive aspects included that they believed population mobility can promote the process of agricultural development, hence, the Agricultural Revolution. In this case, there was an expansion of business agriculture, leading to a surplus of agricultural workers flowing to cities, thus leading to a larger scale of business and an increase in the rate of productivity. Thus, it appears clear that the capitalist industry can result in total population migration, and population mobility can act as the "propeller" and "accelerator" for industrial development. Moreover, population mobility can promote urban development and change the pre-existing social structure. However, in contrast, the rapid agglomeration of the rural population can reduce production and impact negatively upon the living conditions of urban citizens. This is mainly due to excessive competition, lower salaries for workers and bad

living conditions, which can block economic development. Simultaneously, population mobility means that the rural areas lose a lot of their high-level workforce.

Specific to this theoretical analysis, Ravenstein's "law of migration" explains the rules of migration from different aspects, such as demography, economy, geography, family and so on (Ravenstein, 1885). While the neoclassical economic theory focuses on the economy (wages and migration costs) and employment conditions in countries, yet it is important to note here that both the origin and destination countries need to be considered in relation to this. At the same time, it generally conceives movement as an individual decision for income maximisation (Lewis, 1954; Todaro, 1969; Borjas, 1989). However, the new economics of labor migration theory treats the labour market as the main predictor for migration, as well as the capital market or the unemployment insurance market (Stark, 1991). Furthermore, it views migration as a household strategy used in order to minimise family income risks or to overcome the capital constraints on family production activities. Whilst the dual labour market theory, world systems theory and the world society theory all consider the economic approach to be integral at a macro-level. For the dual labour market theory, the economic variable employed is the industrial economy (Piore, 1979), which is similar to the neo-classical theory, both linking the industrial economies involved in terms of both origins and destinations. While for the world system theory, it usually considers the concept of economic globalisation and market penetration across national boundaries (Wallerstein, 2011); whereas the world society theory devotes more attention to the significance of cultural globalisation, yet economic imbalances are also included (Hoffmann-Nowotny, 1993; Thieme, 2006). Another theory that reminds us to think about migration determinants in relation to both origins and destinations is the push and pull theory (Lee, 1966) While this theory doesn't define specifically which factors can impact upon migration, instead Lee presented an open question. The most important aspect of this theory is the influences of the "push" factors and "pull" factors. Consequently, some researchers have put forward some specific models in response to this. The most famous ones of which are the decision-making models from Langenheder in 1968, who considered various factors that could predict migration decision (Langenheder, 2013). Moreover, Esser extended upon these models (Esser, 1980; Bell, Blake et al., 2002). The table below gives us a brief introduction to all of the aforementioned theories and their impact factors, as well as the basic ideology behind them.

Table 2 Summary of impact factors on labor mobility

YEARS	AUTHORS	THEORIES and MODELS	IMPACT FACTORS	IDEAS
1776	William		Economic aspect	The existence of comparative economic benefits

				produced labor flows from agricultural sector to industrial sectors.
1950s	Bague	"Push" and "pull" theory	Education level and population diversity etc.	There were both "push" and "pull" powers in one region, but this "push" power was stronger than the "pull" one in the exporting area and the contrary in the importing area.
1966	Lee			Lee developed this theory on an individual level looking at both the supply and demand side of migration.
1954	Lewis	Dualistic structure model	Differences in the supply and demand of labor between the rural and urban sector	The dualistic structure of a traditional (agricultural) and a modern (industrial) sector
1961	Ranis and Fei		Technology and products in agricultural sectors	Tabor migration was not only depended on gap in wages of different sectors, but also needed enough agricultural products for expansion of industrial sectors
1970/80s	Harris-Todaro	Harris-Todaro models	Gap in wages and probability of getting a job.	
1985	Cole and Sanders		Informal sectors	The informal sector attracted large amounts of rural labor with low human capital, so when the formal sectors improved, they would need more products from informal sectors, as a result of which the wages of informal sectors increased, finally formal sectors got some rural labors.
1992	Glomm		The relationship of residents' needs and incomes.	
2004	Lucas		Gaps between rural and urban areas, and the high salary in urban areas reflected the high technical level.	Rural labors with high human capital can flow to cities for accumulating higher human capital, as a result, migration occurs.
1979	Priore	Dual labor market theory	Strong structural labor demand in developed countries	Due to structural inflation, there are constant wage rises in the primary sector, the bad condition and lower pay in the secondary sector made unattractive to local citizens but migrant workers were more likely to work in this low-status jobs.
1982, 1986, 1991	Oded Stark	New Economics of Labor Migration (NELM)	Household and family decisions	The wellbeing of the whole family determines the migration of household members in order to maximize expected revenue and minimize risks under the unstable local market.
1974	Wallerstein	World systems theory	Structural approach and global economy	The development of global economy and expansion of world market made peripheral effects of developing countries and became subsidiary states which led to the colonialism and the capitalist expansion of neoclassical governments and multinationals.
1996	Carrington.et al		The cost of labor migration would decrease with the increase of migration scale.	Even though the gap in wages declined gradually caused by the expansion of migration, the labor migration could also exist.
1957	Simon Kuznets		Economic development and regional redistribution	On the one side, economic development promote population increase, and stimulate migration of population from densely populated areas to sparsely populated areas in order to explore resources so as to produce population floating; on the other side, social technical improvement can affect population distribution with industrialization and urbanization.

2.1 Theoritical reviews

2.1.1 Ravenstein's "law of migration"

Ravenstein initially introduced his "law of migration" in the 1880s, which was the interpretation of modern migration, based on empirical migration data. In his work, he generalised the population census data of England in 1881 and concluded that most migrants only tend to travel short distances to find work and normally flow to industrial and commercial centers. As a result, there is an absorption process and a discrete process for populations in cities – the population of periphery rural areas flows into cities and outer periphery workers normally migrate to the previous periphery to form a "layer by layer flow". There is also a similar cycle with the discrete process. In these processes, population mobility appears to be mainly affected by technical development. However, his idea is far from a complete theory of migration (Ravenstein, 1885).

As previously mentioned, through using census data of the native population of British and information regarding places of residence, along with vital statistics and immigration records, Ravenstein put forward his famous "law of migration". Greenwood (1997) put forward a useful summarization of Ravenstein's theory. It can be simplified as follows: "(1) the majority of migrants move only a short distance in any one migration. The normal activity distance of migrants is within 10-30 miles radius from their parish of birth, actually, only a quarter of all migrants move 20-30 miles from their parish of birth. (2) Migration proceeds step-by-step. Migrants may follow their ancestors on their journey from birth place to resting place. This could, for example, follow a line from a rural to small town to an industrial town and finally, a commercial city. (3) Each current of migration produces a counter current. This would help to answer why, for example, a young girl of 7 or 8 would be found in her home village in one census and then in a nearby town at the next age of 17 or 18 working as a servant. She might then return to the home parish to marry and then move onto to the bigger town with her husband but return to her home village to give birth to her offspring etc. (4) Females are more migratory than males within the county of their birth, but males more frequently venture beyond their county boundary. As mentioned in rule 3, female migrants prefer to move and work as domestic servants in close and nearby places, while males like to go further afield. (5) Most migrants are adults; families rarely migrate out of their county of birth. Law 5 may point you to that missing child (look also at boarding schools in neighbouring counties if the child is still of school age). If grown up then search further afield since as an adult, he or she may have

flown the nest but still be within contact distance to the home parish.[15] (6) Migrants moving long distances generally go by preference to the great centers of commerce or industry. (7) The natives of towns are less migratory than those of rural areas. (8) Large towns grow more by migration than birth rate. (9) Migration increases as industries and commerce develop and transport improves. (10) The major direction of migration is from agricultural to industrial or commercial centers. (11) The major cause of migration is economic."

Summarising these rules, we can say that Ravenstein considered demography, economy, geography, family etc. as the most important determinants of migration in the latter third of the 19th century when travel was most commonly made by foot or on horseback. After which, the rail network development prompted migrants to move a little further afield. As well as the new transportation systems emerging and the urge for adventurism during the 20th and 21st century, new theories were therefore migration called for.

2.1.2 Neo-classical economic theory

The neo-classical economic theory views wage difference between the receiving and sending areas as the main factor for migration. As mentioned by Ravenstein, each current of migration produces a counter current, thus migration could occur due to the expectations for higher earnings in host countries (Todaro, 1969). This theory argues that migration results from actual wage differentials across markets or countries that emerge from heterogeneous degrees of labour market tightness (Lewis, 1954; Hicks, 1963; Harris & Todaro, 1970). Bauer & Zimmermann (1999), Massey et al. (1993) and Borjas (2008) all identified the linear relationship between wage differences and migration (Massey, Arango et al., 1993; Bauer & Zimmermann, 1999; Borjas 2008). In fact, it is argued to be the expected wages, rather than the actual ones, that can predict migration with regard to full employment in the extended neo-classical economic theory (Bauer & Zimmermann, 1999; Massey et al., 1993).

The neo-classical economic theory treats return migration as the outcome of a failed migration experience, which did not yield the expected benefits of migration. In other words, from a neo-classical stance, return migrants are those who miscalculated the costs of migration and those who cannot earn their expected benefits or earnings. When migrants have failed experiences abroad or they cannot realise their human capital in the destination countries, return often occurs. Besides, the final purpose for migrants is normally not to maximise their

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[15]http://www.wiltshire-opc.org.uk/genealogy/index.php/research/useful-information/item/367-ravensteins-law-of-migration

salaries, but more importantly, to permanently settle in a place. From this perspective, return should be viewed as a failed migration experience (Cassarino, 2004). Consequently, based on the neo-classical economic theory, the wage differences explain the reasons as to why people move abroad and the variables that affect return migration are expected earning, employment and duration.

Practically, the neoclassical theory of migration has been sufficiently empirically tested, yet at the same time, it has several conceptual shortcomings. Firstly, it has been criticised as "mechanically reducing migration determinants" since it is argued that financial or economic factors are unique in terms of determining migration. For example, this theory is said to ignore market imperfections and provides little explanation of how remittances and skills are used in home countries. Besides, it has been claimed to result in the in homogenisation of migrants and migrant societies; painting them as ahistorical and static. What's more, the effect of the home and host states is also neglected, as well as the importance of politics and policies on migration. In fact, this theory merely views the latter as "distortion factors or additional migration costs" (Cassarino, 2004). While for returning, neo-classical economics cannot offer any reference to where migrants return to, nor the social, economic and political environment at home. Return experiences seem isolated from one another, thus "this paradigm tends in fact to isolate the decisions and strategies of the returnees from their social and political environment, without correlating them with contextual factors at home," (Cassarino, 2004).

Glomm (1992) set out another model in order to analyse why rural labourers tend to flow into urban areas, based on the relationship between residents' needs and incomes. Whilst Lucas talked about the same phenomenon, based on new statistics, claiming that there were gaps between the rural and urban areas, and also that the high salary in urban areas reflected upon the higher technical level of workers (Lucas, 2004). Rural labourers with high human capital can flow to cities so as to accumulate higher human capital, thus, migration occurs as a result. The final balance point lies in the same human capital between the rural and urban areas, which differs from Todaro's concept relating to the expected income of urban and rural areas. Cole & Sanders (1985) added in the influence of the informal sectors on worker migration so as to deepen Todaro's expected salary theory. Their theory documented how the informal sector tends to attract large numbers of rural labourers with low human capital, so when the formal sectors improve, more products from the informal sectors are required. As a result of which, the wages of the informal sectors increase and they gain more rural workers. This kind of migration can raise social productivity and enhance the welfare of the migrant and rural people. Moreover, Pissarides & Wadsworth (1989) used the data from the 1967-1977 and

1983-1984 Labour Force Surveys in order to compare the differences between manual workers and non-manual workers. They determined that the unemployed workers were more likely to migrate due to the low migration costs, since only some business subsidies were lost, which they could get back if they couldn't find jobs in the new regions.

Originating from neoclassical theory, the push and pull theory "continues to emphasize the economic context of the flow of workers," (Bauer & Zimmermann, 1999). It is argued that both push and pull factors can be used to predict population migration, so they can either "induce people to move to a new location or oblige them to leave old residences", and they can include economic, political, cultural, and environmental indexes. "Push factors are conditions that can drive people to leave their homes, they are forceful, and relate to the country from which a person migrates; while pull factors are exactly the opposite of push factors; they are factors that attract people to a certain location. Push-pull factors introduce relational aspects into thinking about migration and compose dyadic frames in which migration flows are studied empirically. There were both "push" and "pull" powers in one region, but this "push" power, which was influenced by shortage of natural resources, led to an increase of agricultural production costs, labour surpluses and low economic income was stronger than the "pull" factor in the exporting area and the contrary was identified in the importing area. Lee (1966) developed this theory at an individual level, looking at both the supply and demand sides of migration, thus proposing the idea that a group of factors can affect migration. He thought that mobility was affected by the following aspects: first, elements of migration destination; second, elements relating to origin places; third, elements that differ between the origin places and destinations; four, individual elements. They all contain positive (+), negative (-) and neutral (0) factors, therefore the contest and integration of these factors can lead to mobility. For example, the understanding of the level of importing and exporting for various regions may impact upon migration decisions, as well as the fact that greater diversity of people leads to more migration. As push and pull factors are largely a mirror-image of one another, the framework has been criticised for its inability to determine dominant factors (De Haas, 2008). Besides, its research and findings are also based on empirical observations, as well as lacking scientific inference and tests, thus it also has historical limitations (Sheng, 2005). Widespread dissatisfaction with the neoclassical economic explanations and the push-pull framework has therefore led to the emergence of new theoretical perspectives which seek to analyse "an interplay of individuals, motivations and contexts" better than the neo-classical framework is able to (Massey & Parrado, 1998).

2.1.3 New economics of labour migration theory

The main idea of the new economics of labour migration theory (NELM) began with Stark (1978), who saw international migration "in the context of household economic relationships, and by placing the household in the context of the imperfect credit and risk markets that characterise migrant-sending areas in the developing world," (Taylor, Arango et al., 1996). In his seminal book, Stark claimed that NELM "shifts the focus of migration theory from individual independence […] to mutual interdependence," (Stark 1991), thus extending the social context of international migration to the level of family or household (Stark, 1984; De Haas, 2010). That is to say, the family or household considerations play a more important role in non-family migration decision making than had been commonly assumed, which has been supported (at least empirically) by the phenomenon that there are always interactions between migrants and their families who stay behind in their country of origin. However, Katz & Stark (1986) evaluated this belief, claiming that it is normally the migrant's family that make the migration decision. They also claimed that, "Migration by a family member is then warranted when it facilitates reduction in total familial risk via diversification of earning sources" since "an exchange of commitments to share income provides co-insurance," (Stark & Bloom, 1985). As a result, it is the family members or households and migrants jointly that make the migration decision, so that "the decision becomes a household or family strategy to minimise risks, increase income and to overcome and ensure against the effects of a variety of market failures– the labour market, the credit market, or the insurance market," (Massey, Arango et al., 1993; Kurekova, 2011). Furthermore, Massey et al. (1993); Arango (2000) and De Haas (2007, 2010) also declared that, "migration strategy is undertaken not only to maximise income but also to minimize risks", therefore, the "family manages to supervise the risk via diversification of the family's incomes through migration" (Stark & Levhari, 1982). When alternatives for income diversification in a rural area are insufficient or do not exist, then "migration of a family member—is the clear strategy to follow," (Stark & Levhari, 1982). Households aim to control risks to their economic well-being by diversifying the allocation of their resources by operating in different labour markets. Hence, migration is seen "as a form of insurance, particularly in developing countries where the institutional mechanisms for managing risks, such as private insurance markets or governmental programmes, are absent," (Olejárová, 2007).

NELM theorists are adamant with regard to breaking away from the neo-classical image of the failed returnee. According to the new economics of migration theory, return migrants are those who are successful in achieving their goals or targets (i.e., higher income and/or the

accumulation of savings) in their hosting countries, instead of those who do not successfully maximise their expected earnings in the neo-classical economic theory. Return migration is viewed by Stark and his followers as well-prepared migration that "exerts a higher level of work effort in hosting countries than that exerted by native-born workers," (Stark, 1991) and migrants tend to save more money than native-born workers (Stark & Galor, 1990), yet also, they demonstrate a higher level of socialisation in the receiving countries and have a higher incentive to gain additional skills or on-the-job training," (Taylor, 1996). Thus, skills acquired abroad can be viewed as a possible predictor of returning migration. What's more, it can be assumed that "migrants go abroad for a limited period of time". The duration of a stay abroad however, is dependent on the need of the household in terms of insurance, purchasing power and savings. When they succeed in providing their household with the liquidity and income they expect to earn, return often occurs.

Remittances are "part and parcel of a strategy aimed at diversifying the resources of the household with a view to better compensating them for the risks linked to the absence of an efficient insurance markets in home countries".   Constant & Massey (2002) also claimed that, "remitters have higher rates of employment in receiving countries" through assessing the data relating to guest-workers in Germany from 1984 to 1997. In actual fact, remittances are perceived as "one of the substantial motives for migration" (de Haas, 2010). Moreover, they also constitute one of the explanatory factors involved with the decision to return, together with the migrant's attachment to their home country. According to the new economics of migration theory, a household's initial perceived relative deprivation within the reference group is another factor linked with families sending migrants to a foreign market (Stark & Taylor, 1989; Massey et al., 1993; Iontsev, 1999).

The new economics of migration theory "highlights the role of families and households, underlines the importance of remittances, and pays more attention to information and to the complex interdependence between migrants and the context in which they operate," (Arango, 2000). In essence, the wellbeing of the whole family determines the migration of household members in order to maximise the expected revenue and minimise risks from the unstable local market. Besides, the family needs household members to move out for the purposes of capital and technical insurance. Obtaining a comparatively higher income than the reference population so as to reduce the pressures of deprivation is another consideration with regard to migration.

Most significatnly, the new economics of migration has revitalised the debate regarding the

developmental effects of migration. Taylor considered these effects and argued: "A number of empirical studies from diverse regions support the new economics of labour migration (NELM) hypothesis that migration and remittances have positive indirect effects on incomes in migrant sending households, easing capital and risk constraints on local production," (Taylor, 1999). For instance, some workers move from rural to urban areas, however, despite having a higher income here, their economic status worsens and as a result, these workers may choose to remain in rural regions. In the 1980s, in cooperation with David Bloom, Eliakim Katz, David Levhari, Robert Lucas, Mark Rosenzweig, & J. Edward Taylor, Oded Stark (Stark ,1982, 1986, 1991) developed a theory that explicitly links the migration decision to the impacts of migration, with remittances being this link (Taylor & Fletcher, 2001). While a number of researchers have undertaken practical studies on the local markets and migration motivation, as well as considering the influence of the social economy, social networks and policy on migration income.

2.1.4 Social network theory

Network theory is a sociological approach toward migration, which emphasises the existence of social networks within a shared community (Taylor, 1986). According to Massey, migrant networks are, "sets of interpersonal ties that connect migrants, former migrants, and non-migrants in origin and destination areas through ties of kinship, friendship, and shared community of origin," (Massey et al., 1993). From this perspective, international migration used to be considered as, "an inherently social process that is organised through networks forged from everyday interpersonal connections that characterise all human groups," (Massey, 1987). Subsequently, a key insight provided by this theory is that the existence of such networks increases the propensity of migration due to the lower costs and risks associated with movement, as well as the rise in expected net returns with regard to migration, sparked by, "information providing, job and house searching and potential social integration," (Massey, 1987; Massey, 1990; Taylor, Arango et al., 1996; Massey & Parrado, 1998), Massey (1987) viewed migration networks as, "a valuable adaptive resource in a strange environment", which helps to "reduce the costs of migration, increase the likelihood of employment at the destination and reduce the likelihood of deportation," (Jennissen, 2007). Relatives, friends and other social ties in the destination are thought to lower migrant's costs in terms of a "first-time" migration (Massey et al. 1993), and furthermore, networks can "have a demonstration effect on migration, prompting non-migrants to seek employment abroad as they see the actions and successes of members in their network" (Arango, 2000).

In fact, the network theory "does not look at the determinants which initiate migration but rather at what perpetuates migration in time and space," (Massey et al., 1993). Thus, these networks are viewed as a form of "social capital" offered by "family and friendship connections built up among migrants with time," which "migrants can draw upon to begin a migrant career," (Massey et al., 1987). This helps us to explain why migration continues, even when wage differentials or recruitment policies cease to exist since, "the existence of a diaspora or networks is likely to influence the decisions of migrants when they choose their destinations," (Dustmann & Glitz, 2005). Social capital, which, in the words of James Coleman, "inheres in the structure of relations between actors and among actors" (Coleman, 1988) can thus be viewed as the resources provided by the returnees' families or households.

The network theory also play an important role in the geographical distribution of migration. It helps to explain the reasons why migration patterns are not evenly distributed across countries, but rather how they tend to form so-called 'migration regimes' (Faist, 2000). "More migrants move to a particular place because that is where the networks lead, and because that is where the social structure affords them the greatest opportunities for success. As more migrants arrive, the range of social connections is further extended, making subsequent migration to that place even more likely," (Massey et al., 1987). While Velazquez (2000) and Maritsa Poros (2001) believed that, to a certain extent, networks predict "which destination places are more likely to receive migrants from a specific origin", and link to "local labour markets in the process (determining the type of job that new migrants will take)."

Stressing the importance of the network theory for migration, Massey et al. (1993) thought that, "international migration is enormously attractive as a risk diversifying strategy by making migration a dependable and safe source of income.. Networks, thus, "shape migration outcomes, ranging from no migration, immigration, return migration or the continuation of migration flows," (Boyd, 1989). Hence, the social network theory views the returnee as "an actor who gathers the resources needed to secure and prepare his/her return to the homeland by mobilising resources stemming from the commonality of interests and available at the level of social and economic cross-border networks." It can also be argued that social structures increase the availability of resources and information, while securing the effective initiatives of actors, namely, return migrants. Whether they have a communal or an associative basis, the organisational characteristics of cross-border social and economic networks are responsive to the economic, social and political context in the receiving and sending countries (Cassarino, 2004).

In reality, migration network theory originated from sociology and anthropology (Castles & Miller, 2009), mainly focusing on the vital role of the personal relationships between migrants and non-migrants (Cassarino, 2004; De Haas, 2008), contributing to the explanation of the perpetuation of international movements.

2.1.5 Structural theory

Anthropologists, sociologists and social geographers have refined many empirical findings and theoretical insights from the structural approach of migration. Historical-structural theory shifts the importance of individual/family on migration decision-making to structural factors, such as, "the nature of modern industrial economies, which create a demand for particular categories of workers, political factors, such as the availability of visas or work permits for certain jobs, and social factors like access to social networks." While the dual labour market theory and world system theory are famous structural approaches which are also used for migration analysis. These theories offer macro-level explanations that focus on employment conditions at a national or global level, however, they have been criticised for their lack of attention to individuals and their decision-making processes.[16]

Just like the NELM, the structural approach to return migration highlights how crucial the financial and economic resources brought back to origin countries are in terms of the return decision and also to the reintegration of the migrant. Returnees' success or failure is analysed by correlating the "reality" of the home economy and society with the expectations of the returnee. For example, Francesco Cerase's seminal article on Italian returnees from the United States provides many emblematic cases of how complex the relationships between the returnee's expectations and the social and economic context (i.e., "reality") at home are. Cerase identifies four different types of returnees, emphasising their aspirations, expectations and needs: "Return of failure", "Return of conservatism", "Return of retirement" and "Return of innovation,"(Cassarino, 2004).

Dual labour market theory

Lewis (1954) initially proposed a theory of economic development featuring the dualistic structure of a traditional (agricultural) and a modern (industrial) sector, in which migration flows are attributed to the result of differences in the supply and demand of labour between

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[16] http://www.striking-women.org/module/migration/understanding-migration

the rural and urban sectors. In the initial phase of development, there is abundance of labour in the agricultural sector, where an institutional wage is set above the marginal product of labour. Industrialisation can be supported cheaply during this phase since the industrial sector faces an unlimited labour supply at a low, fixed and real wage. With continued industrialisation therefore, the economy reaches a Lewis turning point once the rural surplus labour supply is depleted. From this point, the industry faces an upward-sloping labour supply curve, which implies sharp increases in the real wages with further growth. Based on Lewis's theory, Ranis & Fei (1961) and Jorgenson (1961) analysed the impacts of the development of technology and products in the agricultural sector on labour migration. That is to say, labor migration was not only dependent on gap in wages among different sectors, yet also the necessity for sufficient agricultural products to support the expansion of the industrial sector. This dual structural theory from Lewis (1954) also explained the influence of labour mobility on economic development, thus he believed that labour mobility can promote the expansion of the modern sector and help respond to the recession within the traditional sector, in other words, labour mobility can enhance the rural economy and reduce the differences between the urban and rural incomes.

The theoretical hypothesis of the dual labour market theory (Priore, 1979) originates from the dual structure of the urban economy and its requirements in terms of labour. Thus, it is the individual that make the rational choice regarding migration decisions, and "international migration stems from the intrinsic labour demands of modern industrial societies," (Olejárová, 2007), where migration is considered to be the result of a temporary pull factor, namely the huge demand for structural labourers in the developed countries. Piore first mentioned this idea in his book, *Birds of Passage: Migrant Labor and Industrial Societies* in 1979, when he proposed that the "permanent demand for immigrant labour is inherent to the economic structure of developed countries." As a result, he divided the labour market into two sectors: the primary and secondary. The characteristics of the former are "relatively high wages, capital-intensive methods of production, fringe benefits, satisfactory working conditions, and employment security", mostly undertaken by native workers. While the latter is inhabited by migrants whereby "labor-intensive methods of production, minimal or nonexistent benefits, less desirable work conditions, higher possibility of laying-offs and periods of unemployment, more harsh or arbitrary supervision and work rules, as well as higher actuarial risks and job-related injuries" are the norm (Graham & Shakow, 1990). Due to structural inflation, there tend to be constant wage rises in the primary sector, whilst the bad conditions and lower pay in the secondary sector make it unattractive to local citizens. However, migrant workers are more

likely to work in low-status jobs, thus it's necessary to import lower wage workers such as this. Despite the higher wages, local staff tend to pay more attention to social status, yet migrants, who do not consider themselves to be part of the destination society, feel able to accept jobs in the secondary sector. The fluctuation in the economic cycle and the unstable, uncertain work conditions in the secondary sector again tends to lack interest for native workers. However, women and teenagers, who are not included in the traditional sources of labour in the secondary sector, have also joined the regular labour force. Thus, he believed that, "general labour shortages, the need to fill the bottom positions in the job hierarchy, and labour shortages in the secondary, low-wage level segment" of a dual labour market are the possible reasons for this phenomenon.

First of all, there is "the fear of the leverage that wage increases at the bottom would impose on their own internal wage structure that leads employers to seek out and encourage foreign migration," (Piore, 1979), which explains why employers are more likely to hire migrants who will agree to low salaries instead of natives during labour shortage periods. For migrants from low-income countries, low salaries in the destination country are generally higher when compared to the standards at home (Massey et al., 1993; Arango, 2000). Secondly, migrants, especially at the low levels, solve the issue of job hierarchies since they remain in their job despite their low social status (Piore, 1979). They can tolerate this as "they view themselves as a part of their home society rather than a member of the receiving society, and the labour abroad and remittances they earn bear significant prestige and status within their home community," (Massey et al., 1993). Thirdly, Arango (2000) believes that "in advanced economies, there is a permanent demand for foreign labour." According to the economic dualism theory, "it is difficult to attract natives to the second segment or secondary jobs because of the work conditions", therefore, in order to compensate for the scarcity of labour, employers attract migrants (Massey et al., 1993). The duality between labour and capital in developed economies thus "creates differences among workers that are related to the segmented labour market structure," (Piore, 1979; Massey et al., 1993).

This theory also argues that it is the demand for the migrant workers, instead of the supply, that produces migration (Piore, 1979). Based on this, the compensation of the primary sector labour market tends to grow along with an increase in working skills, experience and education; whereas in the secondary sector, compensation remains at a low level and there is little or not enough return for investment in skills, experience or education (Hagner, 2000). What's more, Hudson (2007) declared that "nonstandard jobs are more likely than traditional work arrangements to pay low wages and less likely to provide health insurance and pensions." He

also assumed that "nonstandard work and citizenship status now rival sex and race as important mechanisms for allocating workers into discrete segments of the labour market," (Hudson, 2007). Moreover, Jennissen (2004) confirmed the negative effect of the unemployment rate in terms of determining international migration by studying the major economic determinants of migration in Europe. This model is important since it explains some of the post-war migration trends in Europe and the United States, but the focus is too narrow, with only one pull factor being analysed and with no deeper analysis in relation to migrant decision making.

The world systems theory

The world systems theory (Wallerstein, 1974), takes a historical structural approach, and attempts to explain population migration from the perspective of the global economy. It extends upon the sociological approaches of migration, which "links the determinants of migration to structural change in world markets and views migration as a function of globalisation, the increased interdependence of economies and the emergence of new forms of production," (Massey, Arango et al., 1993; Skeldon, 1997; Silver, 2003). Furthermore, the development of the global economy and the expansion of world market has had peripheral effects upon developing countries and have since become subsidiary states, thus leading to colonialism and the capitalist expansion of the neoclassical governments and multinationals. Hence, this disruption with regard to traditional work structures has led to "new population segments into regional, as well as long distance migration," therefore, the origins of international migration can be explained via the dynamics of the capitalist world economy. Generally, capitalist countries endeavour to search for new raw materials, land, and new low-cost labour for capital accumulation, which has created a mobile population in peripheral, non-capitalist societies, i.e. "the flows from the center induce counter-flows from the periphery, such as labour migration." Moreover, cultural, transportation, communication links, or linguistic proximity between the countries of origin and the destination also promote migration. Consequently, dual migration is unavoidable: the capital of the developed countries has flowed to developing countries and controlled their land, resources, labourers and the market, which has also flowed in the opposite direction. Furthermore, capitalist expansion has had profound consequences in terms of migration issues, not only in relation to the capitalist mode of production, yet also with regard to the culture and stronger transportation, communication and military links penetrating peripheries. It is a migration theory not merely due to wage differences, but because of market competition and the global economy. In general, this theory

demonstrates the interconnection and relationship among capital and migration, denying that "individuals truly have free choice in making migration decisions." Instead, historical-structural approaches are thought to be "more deterministic forms to be presented as an outcome of broader structural processes," (de Haas, 2008). Besides, "migration is a natural outgrowth of the disruptions and dislocations that inevitably occur in capitalist development and can be observed historically, the theory also brings in global political and economic inequalities."

However, it is important to realise that the recent international migration studies have not paid enough attention to world systems and global development as in the earlier works due to the difficulty of deriving a set of testable hypothesis and descriptive characteristics (Bijak, 2006; Favell, 2008). Moreover, many individual motivations are neglected and the exact mechanisms of migration are also not clear. Recent examples of this theory consider globalisation in general and the transition of Central and Eastern Europe after the fall of Communism. Moreover, some researchers believe that the political setting is thus an important structural factor in terms of migration decisions.

The world systems theory and the world society approach focuses on forces operating at a global level. Furthermore, the world systems theory views migration as a natural consequence of economic globalisation, whereby companies now operate across national boundaries (Wallerstein, 1974). In later approaches to migration, alongside economic factors, cultural factors have also been considered very important. For example, people increasingly consume common cultural forms, such as music or films and share cultural values across the world, and therefore, this cultural globalisation leads people to perceive economic imbalances and they migrate as a consequence.

2.1.6 The institutional theory

William Richard Scott claimed that (1995), "there is no single and universally agreed definition of an 'institution' in the institutional school of thought." He also asserted that, "Institutions are social structures that have attained a high degree of resilience. They are composed of cultural-cognitive, normative, and regulative elements that, together with associated activities and resources, provide stability and meaning to social life," (Scott, 1995; Scott, 2001). Furthermore, he defined institutional theory as, "a widely accepted theoretical posture that emphasises rational myths, isomorphism, and legitimacy." While Kraft's Public Policy (2007) treats institutional theory as a "policy-making that emphasises the formal and legal aspects of government structures." Rejecting the rational-actor models in classical

economics, Powell and DiMaggio (1991) sought "cognitive and cultural explanations of social and organisational phenomena by considering the properties of supra-individual units of analysis that cannot be reduced to aggregations or direct consequences of individuals' attributes or motives."

Various institutions and organisations have been set up for international migration. Due to the considerable mismatch between the large number of people seeking employment opportunities in industrialised countries and the limited immigrant visas available in these countries (Massey et al., 1993), many profit-seeking, as well as not-for-profit organisations, have been established. However, profit-seeking organisations often "engage in illegal behaviors", for instance, facilitating the crossing of borders, counterfeiting legal and travel documents, arranging marriages between migrants and legal residents/citizens of the destination country, and providing credit facilities at high rates in exchange for fees (Massey et al., 1993). While most not-for-profit organisations "provide relief to the affected migrants by means of counseling, social services, legal advice, awareness on immigration laws etc."

Institutional theory places emphasis on capitalising the imbalance between the employers of labour-receiving countries and potential migrants of labour-sending countries, and it is especially important in today's context in order to create a more favorable and a strong policy framework for both labour-sending and receiving countries (Wickramasinghe & Wimalaratana, 2016).

2.1.7 The transnational theory

Since the late 1980s, there has been a lot of discussion and debate regarding the "dynamic and maintenance of regular migration linkages between sending and receiving countries and to interpret the back-and-forth movement of people crossing borders". Therefore, transnational terminology, initially used by international relation scholars, began to be adopted by migration scholars of different disciplines. However, "this terminological borrowing has been subject to various interpretations and understandings, which generated a great deal of sloppiness in its usage and analytical relevance in the field of migration", especially with the development of "new means of communication and technologies and the strengthening of the globalisation process". In fact, transnationalism constitutes an attempt to formulate a theoretical and conceptual framework aimed at gaining a better understanding of the strong social and economic links between migrants' host and origin countries, thus, new patterns in immigrants' lives across borders and migrants' ties with their places of origin began to be uncovered during

field research.

The earliest research can be dated back to the 1960s (Schuerkens, 2005), after which, Glick and his colleagues in the 1990s defined the migrants' new way of life as "transnationalism" (Schiller, Basch et al., 1992). They believed that "transnational migration is the process by which immigrants forge and sustain simultaneous multi-stranded social relations that link together their societies of origin and settlement," (Schiller, Basch et al., 1995). Moreover, they argued that, "the current linkages of migrants to their home societies are different than in the past", and they attributed this to the transformation in communication and transportation technologies (Schiller, Basch et al., 1995). Finally, transnationalism is presented as "a new field arising at a global level, primarily because of the intensification of relations between states," (Thieme, 2008).

According to Alejandro Portes, transnational activities are "implemented by regular and sustained social contacts overtime across national borders," (Portes, Guarnizo et al., 1999). They consider technological innovations and networks across space as two necessary conditions to make transnationalism possible: "technological progress and new capabilities in communication and transport technologies (planes, telephone, Internet, etc.) facilitate migrants' connections with their home society, making them faster, easier, cheaper and more accessible and frequent than in the past," (Schiller, Basch et al., 1995; Portes, Guarnizo et al., 1999; Pries, 2001). As a result, family and kin-based bonds have shifted to a great extent from a local to a global dimension (Al-Ali & Koser, 2002).

Moreover, this explains how influential such links can be on the identities of migrants. Transnational identities are the result of "the combination of migrants' origins with the identities they acquire in their host countries". This combination has thus led to the increasing development of "double identities" and subsequently, the emergence of conflicting identities. Migrants are viewed as "having the capacity to negotiate their places in society, whether in host or origin countries, with a view to becoming part of it," (Cassarino, 2004). Difficult socio-economic conditions in the migrants' countries of origin have led to migrants maintaining their lives across borders, some of them commuting between two countries, and others settling in a host country while still keeping a close connection with their home society—especially with family being left behind—through remittances, regular contacts and visits. In the end, "the host state, the sending state (sometimes viewed as an external homeland) and the minority group— migrants and/or refugee groups, or ethnic minorities" connect and interact with each to create the "transnational social spaces." While Pries (2001)

described them as having "a multipolar geographic orientation, rather than one limited exclusively to a single coherent geographic space."

With the development of globalisation over the last two decades, the "transnational social spaces" have been gradually developed into the transnational migration theory. Moreover, it provides a better understanding of "the migrant embedding, who stay connected and actively participated in both the home and host country's political, economic, social and cultural environments, including actors that are not states but that are influenced by the policies and institutional arrangements associated with states," (Schiller, 1999; Faist, 2000). Rather than explaining the causes of migration, transnational migration research clarifies the "relationships between migrants and the households or families they left behind, as well as migrants' places of origin and destination". It also describes "a new reality in the modus of migrating and integrating into host societies by proposing an emergence of dense networks across political borders created by migrants in search of economic and social advancement". However, their novelty has been criticised.

2.1.8 Other theories

Dale W. Jorgenson created his famous "Jorgenson Model" in his paper "Capital Theory and Investment Behavior" in the 1960s (Jorgenson, 1963). He believed that labour mobility was based on the surplus of agriculture instead of labourers, therefore the meaning of labour mobility lay in the change of consumption structures instead of in the increase of productivity. In the development of the economy, people have limited requirements for food but unlimited requirements for industrial products, so when food per capita productivity exceeds the threshold requirements of population increase, the further development of the agricultural sector is limited. Thus, the agricultural population moves to the industrial sector so as to meet the people's growing demand for industrial products.

While the new economic geography theory proposed that labourers would move to the manufacturing centers, influenced by home-market effects and price index effects. Whilst Simon Kuznets pointed out that labour flows have a close connection with economic development and regional redistribution (Kuznets, 1957). On the one hand, economic development promotes population increases, and stimulates the migration of population from densely populated areas to sparsely populated areas in order to explore resources so as to produce population floating. However, on the other hand, social technical improvement can

affect population distribution due to industrialisation and urbanisation. While Carrington deemed that the cost of labour migration would decrease with the increase of migration scale (Carrington, Detragiache et al., 1996), so that even if the gap in wages declines gradually due to the expansion of migration, labour migration can also exist.

2.2 Empirical reviews

Based on the summary analysis of all the migration theories, in this section, a conclusion can be reached with regard to the numerous migration research studies that have been undertaken. In fact, migration has been analysed from many different perspectives: migration patterns, migration mechanisms and migration influences; with each of these areas being described using different levels and with different tools. However, we should realise that, "most disciplinary assessments evaluate migration research as lacking theoretical advancement: while the empirical work is abundant, it is often either disconnected from the theories or used to confirm rather than to test, question or refine the existing theoretical propositions," (Kurekova, 2011). Therefore, having a general idea about all the theories and their relationships is useful for one to gain an understanding of population migration. Since the relationship and connection between industrial relocation and labour migration is the key consideration for this thesis, the researcher will examine the the relationship among these two aspects in a separate part from this empirical review analysis.

2.2.1 Reviews of migration regularity and patterns

Population migration is one of the most important aspects for human development. As a key issue related to migration studies, migration pattern discussion is useful in understanding the national, spatial and economic development. Yet, research on population migration patterns have been proved useful with regard to understanding migration law and contributing to the creation of population and economic policies so as to guide the concept of population distribution. Several theories have been developed in order to explain migration patterns. Based on research of Ravenstein, E.S. Lee explained migration regularity in more detail: "The size of migration changed with the differences between origins and destinations and also migration structures and characteristics (for example, different ages, genders and occupations and so on). The larger the differences are, the more population will migrate." Additionally, the "Large size of mobility is accompanied with return migration, that means one region which has

a large amount of out-migration can be compensated by in-migrants from other regions."[17] As previously mentioned, the neo-classical economic theory and the new economics of labour migration theory, as well as the dual labour market theory and other migration theories, in some sense, have also discussed migration patterns.

Moreover, various empirical studies have been proposed by Chinese scholars with regard to migration scales, directions, individual characteristics of migrants, all according to the real situation in China. Before Chinese reform and the opening-up policy, interprovincial migration studies demonstrated that the western and central regions lost their population due to interprovincial migration, whereas provinces gained the greatest population due to being located in the coastal region (Zhang, 1990; Fan, 1996; Shen, 2011), and thus, this concentration was gradually enhanced (Yu, 2001). For example, Guixin Wang analysed the fourth census' data and through analysing the information relating to 1% of the population sample data in 1995, it was demonstrated that the population net immigration areas were dominanted by the eastern part of China, while the center and western parts of China had the greatest net out-migrated population in the 1980s (Wang, 1996). Liang & White (1996) believed that Beijing, Shanghai and Tianjin were continually the main destinations for interprovincial mobility, and they were located in the coastal line of China, while provinces and regions with a high level of out-migration were usually in the central and western parts. Moreover, Cai (2005) used the immigrant rate and GDP per capita in each province to undertake empirical research and proved that the population would flow to areas with high levels of economic development. However, from the 1990s, some regions within the central and western regions of China began to attract more migrants due to the continuous eastern migration flows. Furthermore, Wang & Ye (2004) highlighted the changes in China's interprovincial migration model from a gradient eastern-ward one-way migration to a stronger eastern-ward and weaker western-ward two-way migration after China' s economic reform in 2000. Subsequently, many scholars reached similar conclusions (Cai & Wang, 2003; Ding & Liu, 2005; Chan, 2008).

2.2.2 Reviews of migration mechanism

As the theories already discussed help to explain the population or labour migration from the perspective of a variety of fields, related research has developed a broad range of theoretical approaches and concepts in order to explain migration processes, thus, the determinants that can be used to predict migration can be very distinctive. In fact, various research studies have

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[17] http://www.china.com.cn/chinese/zhuanti/shfz/1019025.htm

proposed how migration began and the social, cultural, economic or political consequences on the destination. It is common for migration processes in these theories to be viewed as a one-way or bilateral movement caused by isolated or multiple factors. The most typical example is from Iontsev (1999), who classified international migration into the following approaches: economic, demographic, migration, sociological, political, systemic, geographical, ecological, historical, ethnographic, psychological, biological, genetic, philosophical, juridical, typological, and methodological (Iontsev, 1999; Sagynbekova, 2016). Further, Kritz & Zlotnik (1992) thought that international migration doesn't just focus on one single theory, it is connected with the historical, cultural, colonial and technological linkages of the destination countries, and they distinguished it into different social, political, demographic and economic contexts (Jennissen, 2004). Whilst B .Chandra, Ipseeta & Anirban (2014) published an article named "Determinants of Migration- A review of literature" in order to broaden understanding with regard to the various determinants which lead to the migration of the work force from rural areas to urban areas. In this article, they summarised various articles that talked about factors that could determine migration, and reached the conclusion that, "the various factors that induce/compel migration were economic reasons, better education, health care facilities and entertainment, better employment opportunities, an expected hike in income, the existence of surplus work force in rural areas, the nature of employment, which is sometimes temporary or seasonal, reducing the risk of income loss, individual migration because of less land holding, and family migration because of marriage and less land holding, pursuing higher education, to get social protection, women migrating for increased employment opportunities and social conditions, migration because of geographic proximity, for the improved standard of living, children migrating to search for a job, etc."

Under the background of China's development, the determinants that can influence population migration can differ. For example, Li Lihong (2000) announced that there are many factors that can impact upon population migration in China, but the distance between the origin and destination, economic factors and demographic variables are known to play a major role, which is in line with the market orientation of China's reform. Moreover, Li Qiang (2003) analysed the determinants influencing the mobility of migrant labors in China with the "push and pull" theory, finding that Chinese labour migration didn't follow the normal "push and pull" regularity due to the special household registration system in China, which therefore made the theory useless. Additionally, Wang & Pan (2012) used the census data of 2010 to analyse the spatial distribution of Chinese migration and found that population size was the main reason for intra-regional migration, yet also determined that interregional migration could be

predicted by the economic development of the in-migrated region and the population size of the out-migrated region, as well as the spatial distance, etc.

2.2.3 Reviews of the relationship between industrial relocation and labour mobility

There are currently a huge number of theoretical models or perspectives that have been offered which employ various concepts, assumptions, frames and levels of analysis in migration determinant research (Arango, 2000), as well as in books and other publications. They relate to almost all the aspects of the migration process, which include aspects such as society, economy, regional space and personal attributes and so on. Furthermore, it has become a common belief that migrants have a distinct selectivity in their personal characteristics, for instance, the young, well-educated men are more likely to migrate than others; married people present more interest in moving than those who are unmarried. However, research has often grown out of "isolation and are separated by disciplinary boundaries (Arango, 2000; Castles, 2008a) because the majority of these researches are developed from specific empirical observations", while modern migration literature (Massey et al., 1993; Portes, 1999; Todaro & Smith, 2006; Lucia, 2011) also considers them to be complementary, rather than mutually exclusive. [18]

There is no doubt that industrial relocation will lead to a change in labour structure, and as a result, bring about more labour mobility. The mechanism between labour migration and enterprise mobility is a bidirectional dynamic process. Thus, migration can affect the location choice of employment, meanwhile, the distribution of enterprises can also influence upon the preferences for labour migration. Here, we try to understand three questions: how the labour demand and labour mobility changed with the relocation of enterprises; what the mechanism between labour supply and demand was during this period and how labourers had an impact upon the migration decisions; and how labour mobility matched with industrial relocation. This section therefore, attempts to employ the common migration theories in order to analyse the above questions and provide rational and logical explanations.

The earliest theory concerning the relationship between the spatial distribution of enterprises and labour mobility utilised the idea of Krugman's "core-periphery" model, with its main points being as follows: manufacturing initial advantages can lead to a circulation of cumulative

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[18] Conceptual review and empirical testing in the context of EU east to west flows

causation and path dependence that could enhance these advantages, so that the labourers kept flowing to the manufacturing agglomeration areas until all the non-agricultural population gathered together. At the end, an economic model that considered the manufacturing agglomeration areas as "core" and took the surrounding areas as "periphery" could be constructed, meanwhile the "path-dependence" and "space locking" effects would work. Dumias studied the changes relating to the manufacturing centralisation of America through analyzing various industrial data, which identified that labour migration can give rise to industrial agglomeration (Dumais, Ellison et al,. 1997). Moreover, based on the data on migration from America to Canada and their trade, Head & Ries (2001) confirmed that home market effects, the factors' market approaching effects of factors and products worked together so as to influence the distribution of industrial space, during this process, the labour migration played a significant role. Moreover, Fujita & Henderson (2003) established that there was a high correlation between labour migration and manufacturing agglomeration, the inflow and concentration of regional labourers can improve the concentration degree of the manufacturing enterprises, and this motivation can last a long time. Furthermore, R.J Ao analysed the interaction relationship among manufacturing agglomeration and the labour migration of China, based on data from 1995 and 2001, confirming that economic growth can benefit a lot from the development of manufacturing enterprises, which helped to realize the rise of China (Ao, 2005). Whilst Forslid & Ottaviano (2003) built the Footloose Entrepreneur Model, according to the changes relating to the spatial distribution of industries. This model broadened the labourers to "human capital", which was more fluid and could lead to the spatial transference of productions and consumptions. Additionally, owing to the circulation of cumulative causation caused by forward and backward linkage, "core-periphery" theory can be identified in industrial space. Wei & Wang (2005) investigated and discussed the changing laws of industrial agglomeration and the spatial distribution of labour in Shanghai, the results of which demonstrated that the general distribution of industries and labour forces presented a gradual decrease pattern from the central area to the outer suburbs, thus Krugman's "core-periphery" theory can be tested.

On the basis of the "core-periphery" theory and homogenous labour forces in manufacturing sectors and agricultural department, the patterns above all suggest that home market effects and labour migration led to industrial diffusion and concentration. However, the labour migration was restricted by zone boundaries on a large scale, affected by quality and consumption preferences, thus, the labour forces were heterogeneous. Some experts brought in heterogeneous labourers and thought that trade costs and labour skills together resulted in

industrial agglomeration and inter-regional trade, which can be identified by the heterogeneous labour model and the self-selection model.

The heterogeneous labour model updated the assumptions of the "core-periphery" theory: bringing in the heterogeneous labourers, the theory thus explained that technology labourers tended to work in industrial sectors, while the unskilled labourers normally took jobs in agricultural departments. Moreover, it was argued that labourers can move freely within the same region and department but not inter-regionally; therefore enterprises can experience a free flow from region to region and sector to sector. Consequently, the mechanism of industrial agglomeration was described as the mutual choice between enterprises and the skilled labour force, as well as their circulation of cumulative causation. The core of the theory lies in the aspiration of enterprises to aggregate in the region that has gathered a large number of labourers, so as to hire skilled people more easily. This theory also encompasses Marshall's "labour-share" effect.

Marshall considered industrial agglomeration to be rooted in the combined action of labour-share, thus saving on transport (trade) costs and knowledge spillovers. Moreover, the labour-share was defined as follows: a large amount of enterprises in one industry gathered in one place, hence, they are able to form a labour market that all the skilled workers can jointly access. The market offers stable technology and offers enormous production advantages so that the workers can easily find a job. This kind of share effect reveals the reasons for enterprise migration and labour mobility from the perspective of choice, in order to explain the common phenomenon of regional specialisation and how economic agglomeration can occur in daily life. Abdel-Rahman and Fujita explained agglomeration from the viewpoint of labourers, which Diamond and Simon also supported; claiming that many manufacturers can increase employment opportunities when labourers get into trouble when searching for jobs, and therefore, these manufacturers can always find the necessary skilled workers since there are plenty of labourers are aggregated and waiting to find a job. Furthermore, W.W Zhang intended to study the relationship between labour migration and industrial spatial structure by using Forslid and Ottaciano's Footloose entrepreneur model, Krugman's "labour-share" model and the industry-diffusion model, under the framework of New Economic Geography. The findings were that the concentration of human capital was one of the most significant elements relating to industrial agglomeration, while it was claimed that the unbalanced distribution of human capital may bring about a large gap in terms of regional incomes.

Common workers and human capital with different productivity levels were introduced into the

self-selection model, and this model paid more attention to the migration of highly skilled individuals and the knowledge spillover effect for the sake of emphasising the dynamic relationship among the location choice of manufacturers, as well as the skills matching of labourers and economic welfare.

In his book "The evolution of the International Economic Order", William Arthur Lewis analysed the factors of enterprise relocation and labour costs (Lewis, 2015), which he considered to be the direct reason for enterprise relocation. While, Robert Crandall, in his seminal book "Manufacturing on the Move", examined the regional shift of industries in the United States from 1960 to 1993 and found that rising labour costs and union density drove the manufacturing industries (automobiles, steel, machine tools) away from the Rust Belt (the central, western and northeast regions) toward the south and west (Crandall, 1993).

Nevertheless, all the models above don't present a dominant explanation, and are only able to imitate due to the help of computer simulation technology. For instance, Ottaviano's linear model (including the pro-competitive effect and transportation costs) claimed that the final situation may be the unilateral trade of interregional products (Ottaviano & Thisse, 2004). Thus, enterprises in large areas can export their products to surrounding areas (with few competitors) in order to make a profit, while the small areas can't. Additionally, introducing in the linear utility function and linear transportation costs, the linear footloose entrepreneur model underlined the dispersancy between urban living costs and inter-urban commuting costs, which helped with understanding changes in city size and spatial structure, and to analyse some social issues, such as population and traffic jams, etc. In 2001, Tabuehia and Thisse expanded upon the labor force heterogeneity theory by importing consumer preferences. This model still emphasised the centripetal force of backward and forward linkage and the circulation of cumulative causation, yet also discussed more sources of dispersancy and showed that consumer preferences, market competition and the congestion effect and so on, were all able to disperse the industries' location agglomeration.

Through introducing different assumptions, starting with Krugman's "core-periphery" theory, the theories above have been used to interpret the interactional relationship between enterprise migration and labour mobility, yet most of the models are not analysable, and moreover, their theoretical hypothesis and empirical research could still be improved. With the development of Chinese society and the economy, alongside the promotion of institutional reform, a gradual improvement in the socialistic market economy system can be observed since 1949, especially after 1978. As a result, the mechanism between China's manufacturing

enterprise migration and labour mobility has become increasingly complicated, and none of the theories above can adequately explain and replace this mechanism, thus multi-angled analysis is needed. In fact, influenced by China's social economic system and policies, the reality of China has some unconformities with the formal theoretical models. Take the household registration system and the differentiation of welfare policy for instance, they have limited the free flow of labourers. Since 2004, China has begun to experience periods of labour shortages in the Pearl River Delta and Yangtze River Delta regions due to employers experiencing difficulties in recruiting migrant labourers (Huang, 2004). Besides, regional differences in economic policies have also had a huge impact on industrial migration. Furthermore, the matching process of workplaces and labourers in China has been restricted by some unique non-market factors. As a consequence, this dissertation intends to explore the mechanism of workplaces and different kinds of labourers since the 1990s, so as to build a theoretical model relating to manufacturing enterprise migration and labour mobility, based on the political and economic framework of China. The hope is that China's economic phenomenon can be genuinely interpreted. This matching mechanism can accurately analyse the evolution of manufacturing enterprise migration and labour mobility at different stages, and is the foundation of labour migration and the employment problem, whilst also acknowledging the positive effects of labour migration on employment levels.

Until now, few papers have been published that have analysed this mechanism in China. An Wu (2004) considered a "Reverse flow" of labourers and industries in China, and believed the huge contrast in labour costs was the most important reason. The western part of China has lower overall costs and higher relative ones, which results in plenty of out-migrants and difficulties with undertaking industrial relocation.

While the labour mobility from the central region and the west to the east of China can enhance the comparative labour advantages of the coastal part (Chen 2007), and at the same time, weaken the attractiveness of central and western China to the labour-intensive industries. This also provides an alternative formation, to some extent, for the relocation of coastal enterprises, especially labour-intensive industries. Moreover, Gang Li & Zhian Ren (2008) introduced the relationship between labour-intensive enterprise relocation of eastern China and importing areas for labour mobility and emphasised that by moving from the east to the central and western regions, enterprise relocation cannot only bring about inner-land employment opportunities, yet also reduce the coastal flowing speed. Whilst Cai, Wang & Qu (2009) argued that due to the existence of large regional differences in terms of productivity and labour costs, China can continue to preserve its comparative advantage in labour-intensive

industries for a long time by relocating industries from coastal to interior regions. Furthermore, Fanen Wang (2009) believed that due to the central and west-to-east mobility of agricultural surplus labourers, the regional distribution of labourers in China has changed, which has led to a reverse in the comparative labour advantages in the east, weakened by the undertaking ability of the labour-intensive industries, and it has also blocked the relocation of labour-intensive industries. However, Shewu Shan & Zhiyong Liu (2010) had some doubts regarding the opinion that labour mobility has blocked the relocation of labour-intensive industries in the east of China. Thus, he analysed the labour costs for 27 industries in China from 1993 to 2006 and determined that free movement of labourers cannot continue due to labour cost advantages in the east. Moreover, Meicr G.M. (1989) and Pin Zhou (2007) argued that industrial relocation can directly impact on labour mobility, and as a result, labour mobility is based on enterprise relocation. While high-skilled labourers will flow to technology-based companies, and ordinary workers will flow to the labour-intensive industries.

In practice, the governments of Guangdong Province proposed the "bi-transfer" strategy in order to deal with the unbalanced regional economic development. Li Liu discussed that on the basis of the "bi-transfer" strategy, it is a special correlative that industries has brought about the law of systematic between the Pearl River Delta and the underdeveloped region of Guangzhou, and also brought about the law of systematic evolution of the bi-region industrial structure. Therefore, it provides benefits to dwindling regional disparity and helps promote economic harmonious development of the Guangdong region. Jiqiang Wang (2010) researched this problem, and indicated that the "bi-transfer" strategy of Guangzhou was occupied by both the market and the government, helping to promote economic development, the employment of surplus labourers and encouraging industrial upgrading in the Pearl River Delta region.

Studies regarding labour mobility in China have mainly taken place after the 1980s, and largely consisted of empirical research instead of theoretical creation. In this process, the impact elements for labour migration have been studied, including age, gender, marriage, social capital, the percentage of rural population divided by the rural population in the whole country, the national proportion of hired TVE and the household registration system, as well as informal institutions, for example, relationships. In China, another important factor influencing migration is politics. However, after the 1990s, more and more research studies aggregated in salary, consumers' situation and the behaviours of migrants, and mainly used field surveys and statistical analysis methods. Moreover, Yanyun Yang, Chenxi Huang & Guixin Wang etc. all believed that young people are more likely to migrate. Whilst Yushan Zhang, Maolin Zhang thought that there were more female migrants within short distance mobility, and more male

migrants within interprovincial mobility. Xincheng Fan, Lijun Wu (2007) considered the gap in income between the rural and urban areas, the employment rate and the job creation rate in the modern sector to be the three biggest factors influencing labour mobility. Besides, some researchers used the game theory to analyse the influences of government, whereby they were participants and their benefits were evaluations received from residences, which means the ballots in their hands. Residences have a huge influence on government, thus government tends to pay more attention to the benefits of local residences, so as to avoid in-flow of labourers in case they cause damage to the benefits of local residences. Furthermore, Jiesheng An deduced five categories of migration laws from Chinese history (An, 2004): political dominance, the density of the population and carrying capacity, impelling of disaster and famine, migration of ethnic groups and migration and characteristics of culture.

As introduced by the international theory, it is the normal regularity for labour mobility, based on economic benefits, purchasing for maximum economic interest is the basic target for mobility. Moreover, Lihong Li (2000) concluded there were 10 elements related with labour mobility and believed that distance, economy and population played a major role. Whilst Guixin Wang (1996) analysed the attracting and pushing functions alongside regional economic income and economic scale in his article, "relationship between population migration and regional economic development of China", and found that economic scale can push out-migration and attract in-migrants, while economic income can affect the direction and distribution of labour mobility. Cai Fang, Yang Du & Meiyan Wang (2003) published a book named "The Political Economy of labour mobility", discussing how labour migration was not only determined by the income gap between importing and exporting areas, but also attributed to the change of the migration status in these regions.

Chapter 3 Population migration analysis

3.1 Introduction

Prior to the economic reforms of the late 1970s, China's interregional migration reflected upon the planned socialist economy philosophy (Lin, 1999). The government believed that big cities would face problems with housing, employment, and infrastructure etc., and therefore they believed they should regulate city sizes. One of the main reasons for this was that the rural to urban migration was strictly controlled for the sake of social stability and in order to protect the benefits for urban residents (Goldstein, 1990a). Since the late 1950s, the Household Registration System (HRS) has been one of the most important population policies with regard to migration restrictions (Jiao & Jim, 2002).

However, since the reforms and the opening-up policy of China, coastal areas have been attracting huge numbers of workers and population from the central and western regions, particularly due to its geographical and political advantages. Moreover, huge economic growth and the implementation of the population policy has meant that China's birth and death rates have reduced to a relatively lower and stable level, which is comparable to that of other East Asian nations (Feeney, 1994; Nolan & Sender, 1994). While the implementations of the "western development policy" and the "Rise of central China" during this period has also encouraged the further development of China's central and western economy, as well as help being provided for the updating of industrial structures and shorting the disparities between companies. Thus, this has reduced the ratio of interprovincial migration flows and lots of migrant workers started to move back from the eastern region to the central and western regions – this is referred to as the famous "countercurrent migrant workers" (Yun Guo, 2013). Additionally, enterprise relocation in China has also impacted upon important structural shifts in terms of interregional migration patterns. Policies relating to "Promoting enterprise migration from east to west" claimed that the growing activity and freedom of the migrant workers has gradually altered the regional development pattern of inter-provincial migration, which means that the original "central and west to coastal transition" has been replaced by a "two-way transfer" mode that is enhancing the migrant reflux. What's more, the relax of the Chinese household registration system ("Hukou") since the 1990s has led to a higher concentration of rural migrants in urban areas and also them gathering in well-developed places from less-developed regions. Shanping Yan (1998) pointed out in his article that most of

the migrants originally come from rural areas, yet they normally move to the cities or towns. However, the upgrading and corporate relocation to the coastal areas, as well as the rapid socioeconomic development in some big cities in the central and western regions, can all contribute to this population reflux. The concept of a "labour shortage" is not a special phenomenon in eastern China right now. Accordingly, internal migration has become an increasingly significant element in the redistribution of the population and with regard to the background of industrial relocation in China.

Furthermore, the publication of the Population Census Survey every five years has prompted researchers to investigate spatial migration patterns. For instance, Cindy Fan(1996) examined interprovincial migration by describing its spatial patterns and estimating models based on the gravity approach and determined that the overall pattern is that the central and western regions have lost some of their population due to interprovincial migration, whereas provinces that have increased their population are generally located in the coastal region, Fang Cai put forward the same trend for migration (Cai & Wang, 2003). Jiaosheng He & Jim Pooler (2002) applied the coefficient of variation indices so as to examine the regional concentration of China's interprovincial migration flows and confirmed that each province had its own migration flow field and the difference lay mainly in the degree of regional concentration. Moreover, Guixin Wang (2000) used the migration preference index to examine the interregional migration patterns and tendencies in China, and suggested that the "asymmetric bilateral migration pattern" has occurred ---- when migrants tended to cluster in the east, there were more and more strengthening migration attractive centers. He asserted that Beijing, Shanghai, Guangdong and Xinjiang were four of the most attractive centers. In Chen's population migration research, spatial interaction model, markov chain and linear programming were integrated to find new method for studying the migration of Hebei (Chen, 2009). Furthermore, Kelin Hu and Xinqi Zheng developed an interprovincial labour migration model, with the help of ARCGIS, in order to compare the migration attraction of different Chinese provinces and established that there was a huge gap between them (Hu & Zheng, 2013). Tony Fielding (2010), in his working paper "Inter-regional migration in a transition economy", used the 'Migration velocities' so as to reveal the strong spatial clustering of 'neo/peripheral Fordist' capital accumulation in the Shanghai-Guangdong coastal axis, and uncovered evidence regarding the trends, and the compositions of, the inter-provincial flows in relation to the emergence of the 'new spatial division of labour' in China (replacing regional sectoral specialisation), as well as the trends in migration flows reflecting on the weakening control over migration exercised by the central state).

3.1.1 Historical evolution of migration and industrial relocation

There is a long history that population migration and industrial movement interact with each other. Since employment is the main purpose for population migration, it is closely related with enterprises. However, that is not to say that industrial relocation is the unique reason for migration, since other reasons, such as salary or family, are normally significant. In order to better understand how the population migrates under the background of industrial relocation, as well as the relationship among them, in this section, there will be a summary of several of the most important migration trends since the foundation of China, and simultaneously, the context of industrial development and relocation.

—— **Administrative migration period (1949-1978)**

After the founding of new China and before the reforms and opening up policy, the highly centralised planned economic system in China treated industries and enterprises as workshops that should turn over their profits to the state, accept the allocated investment, and expand in limited places. Thus, they didn't have independent investment and business authorities, and moreover, there was no autonomous enterprise relocation. During this period, the characteristics for population migration were as follows: from the early liberation of China to 1958, a large amount of the population flowed from rural to urban areas, from peripheries to centers in particular; yet 1958, due to being controlled by the strict household registration system, rural residents were forbidden to move to urban regions. Therefore, we saw less migration; then, influenced by the Third Front Movement and the Cultural Revolution, population movement was almost stagnant for a time.

Large-scale urban and industrial construction after the foundation of new China (after 1949) resulted in some peasants going to cities in order to work. For example, the construction of cotton mills in the north of China attracted various farmers and women to the area, and at the same time, a large proportion of population moved to provide support to the heavy industrial development occurring in the northeast. As many universities were located in the capital city, Beijing became one of the most attractive centres for students, celebrities and services. Additionally, some went to the south in order to join the army or volunteer, while others went to supportthe construction of Xinjiang and so on. Even though the population migration during this period was still intervened by the legacy of the planned economy, in general, they were positive and natural flows.

Since 1958, the Chinese population have begun to lose freedom with regard to migration as part of a gradual process. During the Three Years of the Great Chinese Famine (1959-1961), the population migration was limited to urban idle populations being decentralised to rural areas, the streamlining of organisations and institutions, or forced migration to the edges (undeveloped places) of the "rightists" or "the problematic people". There was almost no industrial relocation. The Third Front Movement in the 1960s mainly led to administrative enterprise relocation and a considerable number of new factories and industries moving from coastal regions to the so called "big Third Front" or "small Third Front" (the former located principally in Sichuan, Guizhou, Yunnan etc., the latter lying in south of Anhui province). The main concentration for development and defense construction during this period was put on the "big Third Front". For instance, in 1964, the Chinese government decided to relocate the unique "factory" and related industries to the "Third Front" (Bo, 1993). In particular, large industrial firms were located according to the following three principles: geographical proximity to mountains, dispersion and concealment. While the coastal region couldn't develop industries, therefore populations were forbidden to move to the coast. Together with the strict household registration system, it was almost impossible for the population to migrate easily.

However, the Cultural Revolution began in 1966, which triggered large-scaled population migration. On the one hand, the government continued to streamline and sent some of its population from Shanghai to Xinjiang; while on the other hand, the Up to the Mountains and Down to the Countryside Movement sent approximately 17 million young people from the medium-sized cities to the rural areas of Heilongjiang, Yunnan, Inner Mongolia etc. According to the census of 1971, from 1964, there were 380 inland-migrated factories with 145 thousand workers and 38 thousands of equipment (Wang, 1986; Wei & Bai, 2009). While, before 1949, as a consequence of historic events and economic choices, many Chinese manufacturing firms were located in coastal regions.

However, from 1953 to 1978, the location of Chinese industrial firms was not determined by economic concerns. Instead, concern about destruction from potential military conflicts led to the strategic location of industrial firms in inland China.

—— Reform and the opening-up period (1978-1990)

After the reforms and the opening up policy, in the 1980s, provinces tried their best to attract the floating populations for demographic dividend, and the large-scale surplus labour forces transferred from rural to urban regions. While labour-intensive industries were developed and

began to cluster in eastern coastal China during this time, which attracted a huge percentage of the rural population from the mainland. Intra-province migration and the distinctive migration rate between provinces were the principle migration features [19].

China was in a restorative stage of urbanisation in the 1980s, with the youth and decentralised cadres began to return to the cities which led to a migration wave from the rural to urban areas. At the same time, the Chinese government decided to implement specific policies for thee Guangdong and Fujian provinces, opened the coastal economic zone, port cities and economic areas, set up the Taiwanese investment zone in Fujian, and developed Pudong New Area in Shanghai so as to form a coastal strip from south to north. Large numbers of the enterprises were from overseas, and at this time, they were intensively concentrated in the coastal regions, especially the Pearl River Delta. The population represented more activities for migration, for instance, China had about 6.26 million net provincial in-migrants and 1.07 million net out-migrants between 1979-1981.

When the government had to relax the controls on population migration after 1984, peasants were able to settle down in small towns. Further, the rapid development of Township and Village Enterprises promoted the transformation of the rural surplus workforce to towns and cities. Meanwhile, the progressive opening up from the south to north led to northward investment movement, even with some interior enterprises beginning to relocate to coastal areas. Thus, coastal cities or part of the coastal rural areas were very attractive for these rural surplus labourers, which meant that Guangdong became the top destination for migrant workers. Simultaneously, there was population migration from the western and central areas, as well as from the northeast. What´s more, the political relocations of Third Front enterprises that were moved from the inland to the coastal areas also contributed to these migration trends (Wei & Bai, 2009). During this period, Beijing, Shanghai, Tianjin, Guangdong etc. demonstrated their importance in terms attracting migrants, and these migrants were mainly from Sichuan, Zhejiang, Heilongjiang and other provinces in the middle eastern region of China.

From 1978 to 2000, with the establishment of the market mechanism and the agglomeration of FDI in China, as well as the accelerated integration of the global economic system and various kinds of industries emerging, this led to large scale migration and the increased flow of workers from the central and western regions to the coast. As a result, the eastern coastal areas quickly became China's "core" area with regard to the manufacturing enterprises, while

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[19] http://business.sohu.com/20160918/n468586030.shtml

relatively, the western region, lost a good deal of labourers and became a peripheral region.

—— Stable development period (1990-2000)

Deng Xiaoping's speech in southern China in 1992 led to a surge in terms of market economic reform, which resulted in population migration witnessing rapid development. Compared with those the 1980s, this migration represented new characteristics: both Hukou migration and floating migration all rose rapidly. Whilst, with the development of the electronic and automotive industries and growing foreign direct investments, labour migration flows demonstrated a close link to significant disparities in terms of wages among the urban and rural areas, as well as between all regions in China (Chan, 1994; Cai, 2000; Fan, 2005). "Moving for business" thus replaced "job transfer" and "moving with family members" became the main reason behind migration.

However, during this time, interregional element flows and industrial investments also rose rapidly, while foreign investment in China was still concentrated in the coastal regions. The concentration of population migration in the east was strengthened, therefore the proportion of migration in the eastern region continued to increase, while the central and western regions had high net out-migration. The central regions continued to lose its population at a higher rate than the west. As a result, taking the important provinces in the central and west as the origins and the economically developed large central cities and the eastern developed provinces as the destination was the main feature for migration, which resulted in the three migration regions in the coast: Guangdong province (the Pearl River Delta), Shanghai (the Yangtze River Delta) and Beijing (Jing-Jin-Ji metropolitan). However, accompanied with the combination of funds, talent and industries in the east, enterprises on the coast, especially in Zhejiang etc., started to expand to other places. Additionally, administrative enterprise relocation was also active (Wei & Bai, 2009). In 1995, the "westward shift of eastern ingot" policy moved cotton yarn production from Shanghai to Xinjiang, thus, together with its unique geographic location and the national policies (such as the west development policy), another "smaller" migration center in the west—Xinjiang Province—attracted large numbers of workers from inland China (mainly from the west of China and Henan etc.)[20].

—— Rapid development period (after 2000)

Population migration appeared sharp growth during the 21st century. Nevertheless, government policies, such as the western development policy, the rise of central China plan and the Northeast area revitalization plan couldn't alter the dominance of the east in attracting

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[20] http://business.sohu.com/20160918/n468586030.shtml

migrants. Whilst, frequent intra-regional migration also existed, which accounted for more than 70% of overall migration. The central and west continued to be the main out-migrated regions, with all the provinces in the central area having a net out-migration of 87%, with most of them moving to the east. Like the coastal region, some provinces in the west also had their attractions in terms of enticing in-migrants, such as Ningxia, Qinghai, Tibet and Xinjiang etc.

The "millions of businesses go to the west" project in 2006 and the "promoting the west development" policy of 2007 encouraged the central and western regions to undertake coastal industrial transfer and trade transfer, so as to promote the westward movement of coastal enterprises, as well as economic and technological zones (Wei & Bai, 2009). Simultaneously, due to the market-oriented economic reforms, the new technology and knowledge-based economy developed rapidly, as well their being increased land prices, regional wage differences and deterioration of the environment in the eastern region, the adjustment of the industrial structure on a world scale was speeding up. Thus, the eastern coastal areas accelerated their industrial upgrade and diffusion, raising the labour capital, with some enterprises originally located in the coastal regions beginning to relocate to the central or western regions of China in order to take advantage of cheap land, better resrouces and workers. Due to the updating of the transportation system and the transfer of the industrial gravity center, the migration centers changed. Hence, Beijing, Shanghai, Zhejiang, Guangdong, Tianjin, Fujian and Jiangsu became the new in-migration centers, while the attraction of Beijing, Zhejiang and Guangdong were decreasing. In the big cities, with the increasing extension of city centers, the speed of urban industries moving out of city centers was growing.

With the transfer of manufacturing enterprises from the eastern region to the central and western regions, some workers who registered themselves in the central and western regions actually worked in the east, thus presenting a "backflow" tendency. When they flew back, these people would not only find similar jobs but also save on some of the fees they spent on transportation and daily life. Consequently, the central, and even the western areas, where most manufacturing industries had gathered, became the new "core" area. When large amounts of low-level, resource-oriented enterprises emigrated from the eastern coastal areas, the east focused on high-new-tech industries and advanced services instead, which consequently led to a gradual decrease in the number of labourers. These kinds of workers, who originally came from the central and western areas tended to be low-level and cheap but suitable for manufacturing jobs. Hence, it can suggested that the central and western areas were not the "core" areas anymore but the "periphery" regions.

3.1.2 Regional migration pattern

Migration's overall pattern can be precisely explained at the economic regional level (Fig. 3)[21]. Zhang in 1995 and Yang in 1994 and 2002 and other researchers have summarized the interregional (in /out / net) migration of different economic regions in different periods. They pointed out that the central and west of China were net out-migrated regions while the east was the net in-migrated region based on the census and sample survey of 1987, 1990 and 1995. The population migration in China represents a continually increasing tendency. People who have left their hometown more than 6 months reached 261.39 million in 2010, while 221.43 million of this number were classed as migrants[22]. This number equals 34 times the number of migrants at the beginning of the opening-up policy, and increased by 81.03% compared with the fifth population census in 2000, with the migrants grew by 116.995 million persons. The sample survey of 2005 showed that China had 147.35 million floating population with 30.4% of them were interprovincial migrants, which were 5.37 million more than those in 2000[23]. Until 2015 People who have left their hometown more than 6 months have reached to 292.47 million, compared with the sixth national census these migrants increased by 31.08 million with the increase rate of 11.89%.

Table 3 compares the number of interprovincial migrants during these four periods, which increased from 33.98 million to 82.58 million. There were 50.41 million interprovincial migrants during 2000 to 2005, the increase rate was 48.34% compared with the previous period; and during 2005 to 2010 China had 54.99 million interprovincial migrants with the increasing rate of 9.1%. Then this total number achieved 82.58 billion for 2010-2015, the increase rate reached to 50.16%. The second characteristic of the overall migration is that gradually there has been persons moving to the east of China. The number of in-migrants to the east have been proved to be of the highest proportions and have witnessed a continuous increase. For example, migrants moving within the east but between provinces increased from 4.229 million during 1995-2000 to 13.64 million during 2010-2015; while those from central to east grew from 13.567 million to 27.54 million, and furthermore, 8.169 million to 17 million from west to east.

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[21] The "Eastern, Central and Western" regional disparities based on economic specialization and comparative advantages provide a convenient regionalisation scheme to describe the level and regional changes (C. Fan, 2005). First published by "the Seventh Five Year Plan" of the Fourth Session of the Sixth Chinese National Congress21 in 1986, the western part added Chongqing (it was defined as a municipality by the Fifth Session of the Eighth Chinese National Congress in 1997), as well as Inner Mongolia and Guangxi (because of their equilibrium of the GDP per capita with the average level of the western region). Thus, the eastern part contains 11 province-level divisions, which are Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan; the central part contains Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei and Hunan, totally 8 divisions; while the western part contains 12 divisions—Sichuan, Chongqing, Guizhou, Yunnan, Xizang, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Guangxi, and Inner Mongolia.

[22] Those numbers come from the sixth National Population Census of China, 2010.

[23] Those numbers come from the 1% population sample survey in 2005.

However, the central and west of China keep losing some of their population due to the issue of interprovincial migration, since the coastal areas are attracting huge numbers of labourers and a population boost from the central and western areas, chiefly based on their geographical and political advantages. Among the 33.98 million migrants for the 1995-2000 period, 25.96 million chose the eastern region as their destination (not including intra-province migration), which accounted for 76.4% of overall migration; and the total eastern-bound migration reached 40.89 million in 2000-2005, 43.58 million for 2005-2010 and 58.19 million for 2010-2015, with proportions of 81.13%, 79.24% and 70.47% respectively. While the central and west had a number of 27.69 million of out-migration during 1995-2000 and 58.74 million during 2010-2015 compared with 8.02 million and 24.39 million of in-migration.

Figure 3 Three economic regions in China

Furthermore, the implementations of the ¨western development policy¨, the "Rise of Central China" and relaxation of the Chinese household registration system decreased not only the regional disparities yet also led to huge numbers of "counter-current migrant workers" (Yun, 2013). The original "inland (central and western areas of China) to coastal transition" has further been replaced by a "two-way transfer" system, which has enhanced the migrant return flows. Thus, if the growth of total migration and migration from east to west are compared, the return tendency can be seen to occur. From 1995 to 2015, total migrants increased 2.43 times

in general (from 33.98 million to 82.58 million), migration from east to central and east to west grew by 4.81 and 5.11 times, which is much higher than the general growth expected, indicating a more rapid speed of population moving back to the central and western areas from the coastal region.

Table 3 Population migration between regions of China (1995-2010)

ORIGIN	DESTINATION	1995-2000	2000-2005	2005-2010	2010-2015
Eastern	Eastern	4229242	6842900	7855110	13642200
Eastern	Central	1110211	2310900	2182660	5341400
Eastern	Western	949768	1955900	1895750	4855000
Central	Eastern	13566632	21133300	22522260	27543700
Central	Central	1074484	1032000	1462910	3134200
Central	Western	1313242	1267600	1960960	3503800
Western	Eastern	8168737	12916000	13201760	17005000
Western	Central	895326	731200	994950	2232900
Western	Western	2673547	2216300	2917550	5320100
Total		33981189	50406100	54993910	82578300
Increase rate			48.34%	9.1%	50,16%

Note: Data comes from Population Census 2000 and 2010, and Sample Survey 2005 and 2015. Unit is person.

3.2 Bidirectional migration Pattern in China

3.2.1 Introduction

Population migration is one of the most important aspects for human development. Due to the economic transition and the release of migration control, large-scale interprovincial migration has played an increasing role in China's socio-economic development (Harry, 1994; Fan, 2005; Li et al., 2014). As key issue of migration studies, migration pattern discussion is useful to understand the national spatial and economic development. Researches on population migration patterns have been proved useful to understand the migration law and contribute for making population and economic policies to guide the population distribution. Effected by regional and population development policies and economic gaps, inter-regional migrations of different periods show different patterns (Johnson, 2003). Before Chinese reform and opening-up policy, interprovincial migration studies demonstrated that west and central regions lost population through interprovincial migration whereas provinces that gained most population were located in the coastal region (Zhang, 1990; Fan, 1996; Shen, 2011), and this concentration was enhanced gradually (Yu, 2001). However, Wang & Ye (2004) pointed out the changes in China's interprovincial migration model from gradient eastern-ward one-way

migration to stronger eastern-ward and weaker western-ward two-way migration since China's economic reform in 2000; then many scholars got similar conclusions (Cai & Wang 2003; Ding & Liu 2005; Chan 2008). The above papers have given detailed analysis on interprovincial migration patterns, but emergence of "Eastern enterprises move westward", "Return of migrant workers" and "shortage of migrant workers" brought new characteristics and regularities for migration pattern. As a result, new methods and models are called for.

Many existing studies have examined the principal methods for migration pattern analysis. For example, the composite-indexes (Liu et al., 2010) , BTM (Bi-component Trend Mapping technique) (Li et al., 2014) try to depict multiple forms of trend variation simultaneously on one map to effectively illustrate the dynamics of spatial patterns of China's interprovincial migration. Migration Preference Index (Wang 2000; Li 2008) is able to connect both the in-migration and out-migration and can at the same time avoid influences on time and statistical survey differences. Same situation occurred in migration velocities analysis, spatial interaction model, Markov chain and linear programming (Chen, 2009). Tony Fielding (2010) calculate the 'Migration velocities' for all inter-provincial flows to reveal the spatial structures, and propose a 'new spatial division of labor' in China.

Gravity model uses population of origin, population of destination and distance between origin and destination to explain the migration flows (Clark, 1986), it is one of the most practical methods for migration pattern study. Following the rules that gravitational attraction between two masses are used to explain the connection and interaction between two places, gravity model is widely used in many empirical studies and also there are numerous modified versions even though obtaining an explicit definition for distance is difficult (Li & Liu, 2010). There exist researchers who adds single or double constraints to either improve the accuracy of the models or try to find out the more significant determinants of migration flows except for the distance decaying (Isard, 1998; Fan, 1996).

Interaction value, in some sense, reverses the equation of gravity model, and at the same time, replace the distance by migration flows between origin and destination. This study falls in line with the work of gravity model that adopts flows between origins and destinations. In addition to considering the connections between regions, it takes care of the frequency and interaction of regions in the whole system (Roca and Moix, 2005). As early as 1970s the British Department of Employment developed the Employment Areas or Travel to Work Areas with the method called "link value" by Smart (1974) for determining their spatial extension. Later, in 1984, this method was partially modified thanks mainly to the contribution of Coombes et al.

(1986), which came to form an essential point of reference in the area of employment policies. This has led to its "official" exportation to the other countries. For instance, Sforzi in 1991 adopted this method for delimiting urban systems in Italy (Sforzi, 1991). Besides, this even led to orienting European policy by the European Union through the European Commission's statistical office (Eurostat, 1992). Coombes in 2005 had used this method for the self-containment of delimiting local labor market. Rethinking of the delimitation of interaction value and enlightened by Smart, Coombes & Sforzi, Roca et al. broke the tradition of working on local labor markets but concerned the delimitation of urban system based on the application of Interaction Value (Roca & Moix, 2005; Roca et al., 2009). Then this application was successfully applied to Portugal (de Deus et al. 2012), Chicago and Los Angeles (Roca et al., 2011). Same method has proved useful for analyzing "functional spaces", Burns (2008) used functional distance to analyze the air passenger flows for European metropolitan system.

In order to analyze the evolution of the migration pattern, this article separates the interaction value formula into two parts to add the floating directions for migrant analysis in china. This does not only take the relationship between migrants, but also measure the migration direction as well as their moving activities. As a result, it would be better to use interaction values for the interprovincial migration pattern study.

The objective of this section is trying to evaluate the new characteristics of the migration pattern in China between 1995 and 2010 with the interaction value model. Some descriptions of interaction value method and data sources applied would be explained firstly. This is followed by the migration system analysis and estimation of interprovincial migration based on interaction values. Finally, it summarizes the findings and the theoretical and methodological implications.

3.2.2 Methodology

According to Castells (1996), contemporary society is constructed around space of flows, such flows are "the expression of processes dominating our economic, political and symbolic life". Either workers, air passengers, or population migrants in the labor market or urban system are able to ascertain the nature of the relations between regions. In order to explain the migration pattern in China, interprovincial migration will be analyzed (intra-provincial migration are not included). For this reason we choose the interaction value model from Sforzi for the interpretation.

$$IV_{i,j} = \frac{f_{ij}^2}{O_i * I_j} + \frac{f_{ji}^2}{O_j * I_i} \tag{1}$$

Where:

IV_{ij} is the interaction value between the zones i and j;

f_{ij} and f_{ji} are the existing migration population from i to j and from j to i (such as journey-to-work flows);

O_i, O_j are the total out-migrant population in region i and j;

I_i, I_j are all the in-migrants in region i and j.

As Roca and Moix (2005) state in their article: "the objective of applying the interaction value methodology to the spatial reality is to seek to arrive at an integral methodology of territorial delimitation free from all administrative limitations". Thus it is possible to construct an iterative model based exclusively upon the interaction value for the delimitation of the territorial systems at provincial level, in order to unify the individual local services and scale economy. At the beginning, each province can be viewed as an individual area with the maximum interaction value. Then each province (or municipality) can form a "proto-system" with those provinces (or municipalities) that keep the greatest interaction values with it, if these provinces (or municipalities) are contiguous or form a contiguous proto-system. However, if a province (municipality) has a maximum relation with an external municipality, the proto-system is not consolidated, but rather it waits for the conformation of the set of proto-systems of the whole study area. That is to say, if one province A has the maximum interaction value with another province B (municipality) on which does not border, it is necessary to check whether both of the provinces have bilateral maximum value. If it is only unilateral, province B is not belong to the proto-system. Once this first iteration has taken place, the non-consolidated proto-systems join up with those that have the maximum interaction value. Same situation occurred based on the third greatest interaction value and so on. Here we use the migration matrix between provinces for analysis, so we call it "migration system".

Actually, interaction value formula contains two parts: interaction value from region i to j (IV_{ij}), and interaction value from j to i (IV_{ji}). If we compare IV_{ij} and IV_{ji} separately, we can got interaction value of population migration with directions[24]. In this way, interaction value of in-migration and out-migration of each province can be calculated, which we can call "one-way

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[24] Here the variables have the same meaning as formula above, just separate it into two parts for the directions.

interaction value". The larger this interaction value, the more interacted of two areas and more in-migrants from original area to the destination. Adopting interaction value equation, in this case the migrant population flows between provinces (f_{ij}) were counted; O and I represented all out- or in- migrated people in the related province.

$$IV_{ij} = \frac{f_{ij}^2}{O_i * I_j} \tag{2}$$

$$IV_{ji} = \frac{f_{ji}^2}{O_j * I_i} \tag{3}$$

Interaction value measures the relationship existing between two areas or spatial entities regardless of the intervening distance (Burns M., 2008). For this reason, there is truth in Coombes & Openshaw's (1982) assertion that the interaction value is representative of an index for weighting the strengths of the respective commuting flows. Clearly it is the sum of the products of the ratios existing between the flow 'i,j' (and the transitive 'j,i') and the masses of origin and destination (as well as the transitive masses).

Standard Deviation (SD) and Mean (M) of the interaction values were calculated in this article, then sum two of these values will be used (SDM=SD + M). Even though mean value can help us to delete large amounts of the lines on the maps with small interaction values, adding a standard deviation contributes to exclude those lines locating in the confidence interval so as to leave the most representative ones. However, SDM is different in four periods (during 1995-2015), so an average of the three SDMs is necessary for the final value (0.0123). As a result, 0.0123 can be considered as the threshold for selecting the lines displaying on the maps.

Interaction value measures the relationship existing between two areas or spatial entities regardless of the intervening distance (Malcolm C. Burns, 2008). For this reason there is truth in Coombes & Openshaw's (1982) assertion that the interaction value is representative of an index for weighting the strengths of the respective commuting flows. Clearly it is the sum of the products of the ratios existing between the flow 'i,j' (and the transitive 'j,i') and the masses of origin and destination ($O_{i,j}$ and $I_{i,j}$) (and the transitive masses). However assuming that f_{ij}^2 is a measure of the force of gravitational attraction of j upon i, then the interaction value could be rewritten in terms of the concept of functional (as opposed to physical) distance (FD).[25]

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[25] We can notice that fij and fji locate at the bottom of the equation, so that migration flows cannot be 0, as a result, FD

$$FD = \sqrt{\frac{(O_i * I_j) + (O_j * I_i)}{f_{ij}^2 + f_{ji}^2}} \qquad (4)$$

According to the analysis of functional distance, we can get approximate functional center (the province which has closest distance to the center) in the new two-dimensional space. A transfer of the location of functional center from the coastal region to Central and west in China indicates the migration mobility from east to west. Also the gradually shortening distance of each province to the center stands for their close connections and linkage with each other. Based on the calculation of Functional Distance, in this section we use Multidimensional Scaling (MDS) mathematical technique to discover the dimensional nature (Malcolm, 2008) of the interactions among Chinese provinces, ALSCAL program from SPSS is the normal method.

3.2.3 Data sources

Population migration is defined as the movement by people from one place to another with the intentions of settling temporarily or permanently in the new location. But China's hukou [26] administration system generated population migration as only hukou migration (migrants with residential changes). Since the mid-1980s, economic reforms and the relaxation of migration controls have brought sharp increase in "renkou liudong" (population movements or "floating" population), implying a "temporary" move to a destination where the person is not supposed to, and is legally not entitled to, stay permanently (Liang, 2001; Cai & Wang, 2003; Fan 2005). However, researchers and statistical agencies used information on hukou and non-hukou migrants on a largely de facto basis through various sample surveys and population census (Li, 2001; Chan, 2008), this general concept of population migration will be used.

With the development of economic reform and globalization, the adjustment of industrial structure, rapid growth of labor supply and lack of non-agricultural jobs together lead to new characteristics of migration, especially after the 1990s. Besides, during this time, the government has released the household registration system in China, in some places there were no big differences with urban Hukou or rural one which bring about various regional migration. As a result, studying the migration pattern after the 1990s conduce us to know the new features of recent China which is significant for regional equilibrium. As a result, data

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from one province to the same province will not be calculated.

[26] Hukou is a record in the system of household registration required by law in China and Taiwan. The system itself is more properly called "huji", and has origins in ancient China.

sources in this article concerning interprovincial migration come from Population Census of 2000 and 2010 and 1% population survey in 2005 and 2015 undertaken by the State Statistical Bureau of China. The documents collected data of inter- and intra-provincial migration during 5-year period with those aged five years old and over. Normally they had left their place of origin at least six months and had been in the new place for five years or less. A 31*31 interprovincial migration data matrix can be derived for the calculation, but Hong Kong, Macao and Taiwan are not included because of the statistical shortage.

3.2.4 Evolution of Migration Pattern: Evidence in China

Migration systems analysis in China

Figures 4, 5, 6 and 7 show the delimitations of migration systems of different periods in China. The 31 provinces of China can be reduced to form 5 migration systems during 1995-2010: northeast China, Bohai Economic Rim, Yangtze River Delta, Pearl River Delta and the northeast China. Basically, it follows the general migration pattern in China: Beijing, Shanghai and Guangdong are three of the most important attractive centers for migration, the northeast and northwest are also relatively developed. With their peripheries they formed the migration pattern in the 2000s.

However many differences existed among these four periods. The first and most important is that China was divided into 7 migration systems for 2010-2015: northeast China, Bohai Economic Rim, Yangtze River Delta, Pearl River Delta (this is just part of the Pearl River Delta migration area during 1995-2000), northwest China, Chengyu area and Zhejiang migration area. Compared with migration areas in 1995-2000, Pearl River Delta migration area was divided into three parts for 2010-2015: Pearl River Delta and southwest migration area which contains Chongqing, Sichuan and Tibet and part of Zhejiang migration system (Tibet belonged to Pearl River Delta for 2000-2005 and 2005-2010). This separation verified the decreasing power of Pearl River Delta for attracting the west inland, and at the same time, showed the significance and independence of the southwest, and the importance of Chengyu metropolitan in the southwest of China cannot be ignored. In 1997 the Chinese government set Chongqing as the fourth municipality which laid the foundations for the development of the southwest; while northwest China relies too much on their natural resources and cheap labors, coupled with its bad environment, it is rational that northwest migration system will be separated because of the far away location to the Pearl River Delta and different cultures.

Another important changes occurred in Yangtze River Delat. For the period of 1995-2000, Shanghai, Jiangsu and Anhui constituted the Yangtze River Delta migration system, but with the development of industries and enterprises of this region as well as the northward movement of labors and population, Zhejiang and Guizhou joined this system. There is no doubt that Zhejiang would become one of the most important province of Yangtze River Delta because of its geographical location, but Guizhou was a big surprise. This maybe because Guizhou is always a labor exporting province which has supplied large amounts of labor forces to the coast of China before 2000, especially the Pearl River Delta. However, the high living costs, low competitive salaries and bad welfare treatments in the Pearl River Delta finally led to some kind of "labor shortage", instead the rapid development of the Yangtze River Delta offers opportunities for these labors with better treatments and working environment. It is possible that the convenient public transportation as well as the close relationships and investments from the Yangtze River Delta that make Guizhou stand out. The release of Guizhou from Pearl River Delta to Yangtze River Delta after 2000 determined the northward movement of migrant attractiveness and the decreasing significance of Pearl River Delta in migration. Then Zhejiang met a fast development with the labor support of Guizhou and other provinces, finally for 2010-2015 combining Tibet, Zhejiang migration system became independent. Shandong moved from one migration system to another one also during these periods. Instead of Bohai Economic Rim, Shandong had close interaction with northeast China before 2010. Although located to the southwest of Beijing, Shandong has a long history of communicating and connecting with northeast China, the Northeast Area Revitalization Plan enhanced this connection around 2000s. However, taking advantages of its location, the great development of Jing-Jin-Ji economic Rim promoted Shandong to join this system step by step. What's more, Shanxi and Shaanxi also fluctuated between the northwest system and northeast one.

Figure 4 Migration systems of China in 1995-2000
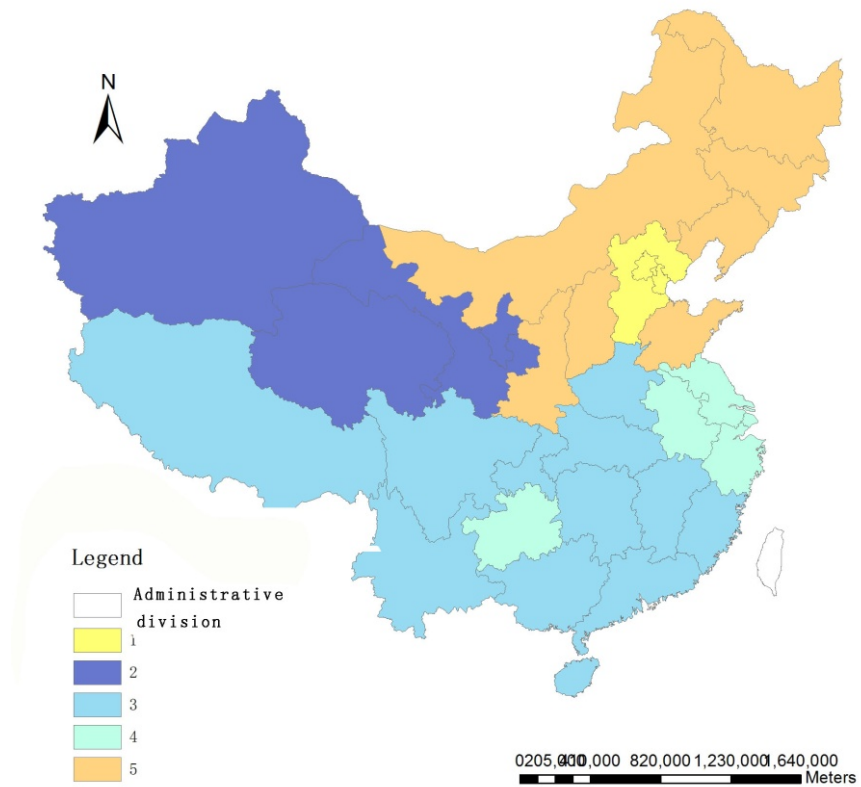
Figure 5 Migration systems of China in 2000-2005
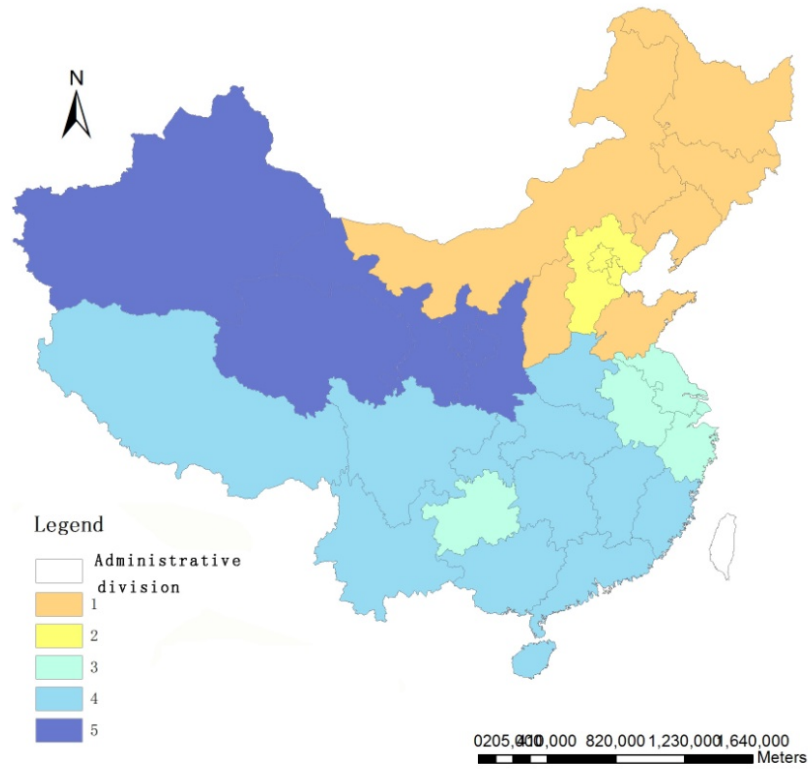
Figure 6 Migration systems of China in 2005-2010

Figure 7 Migration systems of China in 2010-2015
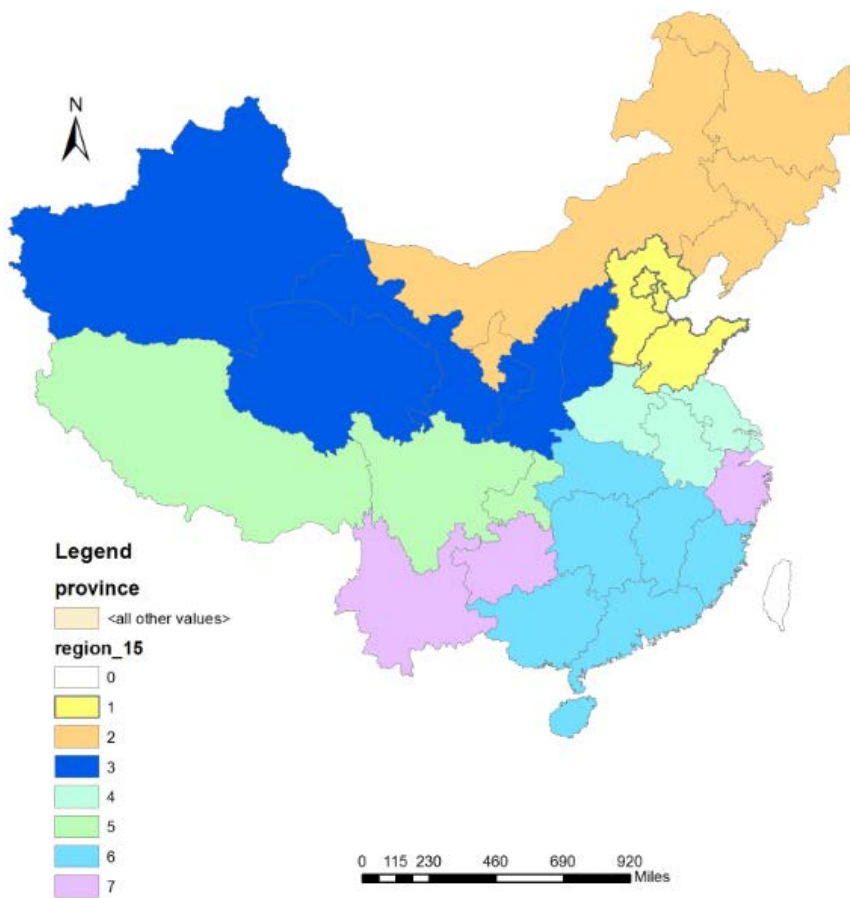
Interaction Value comparison

By mapping the interaction value of migrants, figures 8, 9, 10 and 11 seek to identify more specifically the gainers and losers of migration at the provincial level. I try to illustrate the clear visual complexity of the 961 interaction values of migration between 31 provinces (as mentioned in data sources, Hong Kong, Macao and Taiwan are not included), with priority being given to the magnitude of the flows, in the sense of the greatest flows being proportioned greater visibility. Here only lines with interaction values more than 0.0123[27] will be selected in order to compare the evolution differences from 1995 to 2015.

It is quite obvious that the most linked interaction value gathered principally in the coastal region indicating the strong concentration of population migration in the eastern area. Pearl River Delta, Yangtze River Delta and Beijing-Tianjin-Hebei metropolitan always gather the most and highest interaction value, which highlighted the dominance of the eastern region. More than 25 of the lines with interaction value more than 0.0123 for 1995-2000 related with population mobility from inland provinces to eastern regions. During the period of 2000-2005, 23 lines showed directions from central and west to east, 4 with directions from east to east, while 7 from east to central and west and 7 within inland among the 41 lines. While in 2005-2010, there were only 19 lines with direction from central and west to east in the total 37 lines which had interaction value more than 0.0123, and this number reduced to 15 for 2010-2015. Even though the "central and west to east" migration trend doesn't change, there exists a declining mobility.

Some coastal provinces lost their attractiveness to the central and western provinces gradually, mainly manifested in the decreasing of lines from central and west to east China. Moreover, various lines presented on the maps also witnessed interaction value declining. Interaction value from Sichuan to Guangdong decreased from 0.074 to 0.021 during 1995-2015; Anhui to Shanghai from 0.071 to 0.042; Henan to Guangdong from 0.025 to 0.019 for 1995-2010 and then less than 0.0123 during 2010-2015; Jiangxi to Fujian from 0.046 to 0.0196; Jiangxi to Guangdong from 0.049 to 0.028, as well as Inner Mongolia to Liaoning (0.02 to 0.017 for 1995-2010 and then less than 0.0123 for the next period), Heilongjiang to Shandong (from

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0.042 to 0.025 then less than 0.0123), Jiangxi to Zhejiang (from 0.048 to 0.024) and Hubei to Guangdong (from 0.055 to 0.039) etc.

Figure 8 One way interaction Value >=0.013 during 1995-2000

Figure 9 One way interaction Value >=0.013 during 2000-2005

Double flow of interaction value for 2005-2010 (>0.0123)

Legend

- 省会城市
- 省级行政区

Lines
iv2010

- .0123 - .04
- .04 - .06
- .06 - .09
- .09 - .11
- .11 - .15
- .15 - .2

0187,5075,000 750,000 1,125,0001,500,000
Meters

Figure 10 One way interaction Value >=0.013 during 2005-2010

Double flow of interaction value for 2010-2015 (>0.0123)

Legend

- 省会城市
- 省级行政区

Lines
iv2015

- .0123 - .04
- .04 - .06
- .06 - .09
- .09 - .11
- .11 - .15
- .15 - .2

0187,5075,000 750,000 1,125,0001,500,000
Meters

Figure 11 One way interaction Value >=0.013 during 2005-2010

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From the four figures we can see that there are some attractive centers, but their importance and attraction showed a northward mobility. Pearl River Delta progressively lost its thriving in migration attraction, but Yangtze River Delta began to take shape.

Guangdong played the most important role in integrating with other provinces. The underlying reason for this is not only with the fact that Guangdong is the third biggest cities in China, but also the largest province in terms of receiving foreign investment in China since the late 1970s (Kueh, 1992) which created large amounts of employment opportunities and economic growth for attracting migrants from other places (as the first topmost migration province in China, Guangdong has a total of 31 million floating population in 2012). The strongest connectivity lies between Guangdong and Hunan with interaction value of 0.1695 during 1995-2000, followed by Guangxi (0.1229), Sichuan (0.0737) and Hubei (0.0554). Even though the prime position of Guangdong doesn't change, interaction value from Hunan to Guangdong decreased by 0.025 during 2000-2005, but interaction value from Guangxi to Guangdong reached to 0.135 which is a little bit higher than that in 1995-2000. Also Hubei (0.0568), Sichuan (0.0458), Henan (0.0363), Jiangxi (0.031), Chongqing (0.0147) and Guizhou (0.0 153) are great contributors for high interaction value of Guangdong. Except for the dominance for attracting migration from interior provinces, Guangxi (0.1406) and Hunan (0.1347) had the highest interaction value with Guangdong and were proved to be the top two connections within China. But compared with those during 2000-2005, Guangdong lost Chongqing and Guizhou in 2005-2010 with interaction value lower than 0.013. Besides, interaction value from Sichuan to Guangdong decreased from 0.0737 in 1995-2000 to 0.0458 in 2000-2005 to 0.0339 in 2005-2010 indicating a clear weakening interaction from southwest of China to Pearl River Delta. Following this tendency, Guangdong continued to lose attractions for its peripheries except Guangxi, the interaction value from Guangxi to Guangdong increased by 0.017 for 2010-2015 compared with the previous period.

As we all know, the large official development and economic activities in Yangtze River Delta can lead to the concentration of labors and population. In the case of Shanghai, the highest Interaction Value (0.082 for 1995-2000) comes from Jiangsu Province and this is marginally ahead of the interaction value originating from Anhui (0.0713 in 1995-2000). Also Jiangsu (0.0934 with Anhui) and Zhejiang (0.0477 with Jiangxi, 0.0366 with Anhui and 0.0139 with Guizhou) have in-migrating interaction value more than 0.0123. During 2000 to 2005, Yangtze River Delta enhanced migration from Henan to Jiangsu and from Anhui to Zhejiang, with interaction value grew from 0.0031 to 0.0137 and from 0.0366 to 0.0439 separately. But Zhejiang lost its attraction of migration from Sichuan province with their interaction value

connection lowered than 0.0123 in 2000-2005. At the same time, Zhejiang was not one of the important contributors for Shanghai with their interaction value less than 0.0123. Actually, Yangtze River Delta couldn't escape from this reflux trend during 2005-2010. Although Guizhou and Henan added their contributions on Zhejiang, interaction value from Anhui to Jiangsu, Anhui to Shanghai and Sichuan to Zhejiang all witnessed decreasing connectivity, with interaction value from 0.112 to 0088, from 0.0637 to 0.0584 and from 0.0193 to 0.0146 separately. For the period of 2010-2015, this tendency continued. The contribution of Henan and Sichuan to Zhejiang all declined below 0.0123, and simultaneously, Zhejiang lost some attractions to Jiangxi, with the interaction value reducing to 0.024 compared with the 0.034 for the 2005-2010. Nevertheless, this is not a coincidence: these values from Jiangsu and Anhui to Shanghai and from Anhui to Jiangsu all decreased, except the connection between Henan and Jiangsu with their interaction value increased by 0.01.

The Bohai Economic Rim mainly contains Beijing, Tianjin, Hebei, Shandong and Liaoning Province. Beijing is the capital, political and economic center of China, its largest migration interaction value of 0.0845 in 1995-2000 comes from Hebei which is 6.5 times higher than connectivity with Shandong which is the second largest connection in this period. That maybe because of the relocation and mobility of enterprises and the strict migration control policies of Beijing. Moreover, Tianjin attracted more and more population from Shandong and Hebei, their interaction value grew by 0.0234 and 0.0136 in 5 years. Maps showed that connections from Shandong and Hebei to Beijing increased by 0.004 and 0.01. However, interaction value from Heilongjiang, Jilin and Inner Mongolia to Liaoning (0.0699 to 0.0672, 0.0434 to 0.032, 0.0224 to 0.0177), from Heilongjiang to Shandong (0.0377 to 0.0251) and from Shandong to Tianjin (0.0365 to 0.0176) all experienced obvious declining during 2005-2010 compared with the last period. If we take a look at the period of 2010-2015, the interaction values among Hebei, Tianjin and Beijing were all increasing which represented the enhancing concentration of Jing-Jin-Ji metropolitan in attracting migrants. Another thing that corresponded with the migration system analysis above is that there were more and more migrants from Shandong would like to go to Tianjin, and that´s the exact reason that instead of the northeast migration system, Shandong finally went to the Jing-Jin-Ji metropolitan system. Those circumstances, where this general pattern is interrupted, can be attributed to the large development projects undertaken by the central government.

Except the three principle metropolitans, there were also some weak migration sub-centers. The most obvious concentration happened in Chengyu metropolitan (Sichuan and Chongqing). It was usually a great supply region for other coastal areas but a weak attractive center for

migration. Interaction value from Sichuan to Chongqing grew from 0.022 for 1995-2000 to 0.026 for 2005-2010 and then to 0.47 until 2015. At the same time, the attraction of Sichuan to Chongqing was enhanced from less than 0.0123 for 2000-2005 to 0.022 for 2010-2015. Northeast of Liaoning and northwest of Xinjiang can also be considered as weak sub-centers. Heilongjiang, Inner Mongolia and Jilin all presented high level of Interaction Value with Liaoning for the four periods, with interaction value all above 0.067 from Heilongjiang to Liaoning even though declined to 0.036 for 2010-2015; above 0.036 from Jilin to Liaoning but only 0.026 for the last period; and fluctuated from 0.018 to 0.02 from Inner Mongolia to Liaoning from 1995 to 2010 but less than 0.0123 later. For Xinjiang, early in 2000, it had Sichuan, Gansu and Henan as contributors with interaction value more than 0.0123, while decreased to only Gansu in 2000-2005 and 2005-2010 with interaction value declined half of that in 1995-2000, yet the connection between Xinjiang and Gansu were enhancing with the growth of interaction between them for 2010-2015.

At last, nearby transfer in the inland regions was accelerated. For the interactions between provinces in the central and western parts of China, greatest changes occurred in Xinjiang, Inner Mongolia, Sichuan and Anhui. As explained above, compared with 1995-2000, even though Xinjiang continued to lose migrants from Gansu, Sichuan and Henan in the next 10 years, the western part gained migration from Gansu to Ningxia with interaction value more than 0.0123 during 2005-2010, and the interaction between Xinjiang and Gansu increased for 2010-2015. Inner Mongolia met the most drastic change in interaction value lines. During 200-2005, interaction value from Shaanxi, Shanxi to Inner Mongolia and Inner Mongolia to Hebei all exceeded 0.0123, while these values were all below the threshold (0.0123) in other three periods. Since 1995, Sichuan has been proved to be one of the migrate center in the west of China. Except the declining of flows from Sichuan to Guangzhou and Zhejiang, fewer persons from Yunnan like to move to Sichuan while the disappeared lines from Sichuan to Chongqing during 1995-2005 had interaction value more than 0.0123 again for 2005-2015. Similar changes also occurred between Henan and Nanjing, Hebei and Heilongjiang etc.

Functional Distance comparison

In this part, the ALSCAL from SPSS will be used for the analyzing. Values of Stress and RSQ showed the fitness of all the points. The larger is the RSQ, the better is the fitness. Usually Stress equals to 0.2 and RSQ values more than 0.6 are acceptable. Here Stress in 2000 and 2010 is about 0.19 with RSQ reaching more than 0.8, which means the fitness in 2000 and 2010

all are available for ALSCAL analysis.

In general, the hierarchical differences of the inter-provincial population migration are not very clear. According to the distribution of the points of the two periods, large part of the points clustered in the center of the Coordinate, but their locations changed between 4 quadrants. The normal way for explaining the ALSCAL spatial model is finding out the proper diagonal, it's easy to illustrate their differences above/below this line (Kruskal & Wish, 1978). Divided by the horizontal axis, the provinces were separated into two types in 2000: the in-migrated region locating in the above section of the graph which was presented by Guangdong, Jiangsu, Zhejiang etc.; the out-migrated region below the horizontal axis with Henan, Sichuan and Chongqing. If we make diagonal from the center for the graph of 2010, we can see that it shows similar distribution in functional space. Large amounts of these provinces (Jiangsu, Zhejiang, Guangdong and Shanghai) gather in the same side of the lines, indicating their similar characteristics in attracting migrants. While provinces near the center point show their closer connection with points of other side as well as their huge attractiveness, which helps for accelerating the nearby transfer in the central and west. Besides, compared with figure 12 and 13, the gradually concentrating points in 2010 demonstrate the enhanced connection between central and west and east as well as community inside central and west.
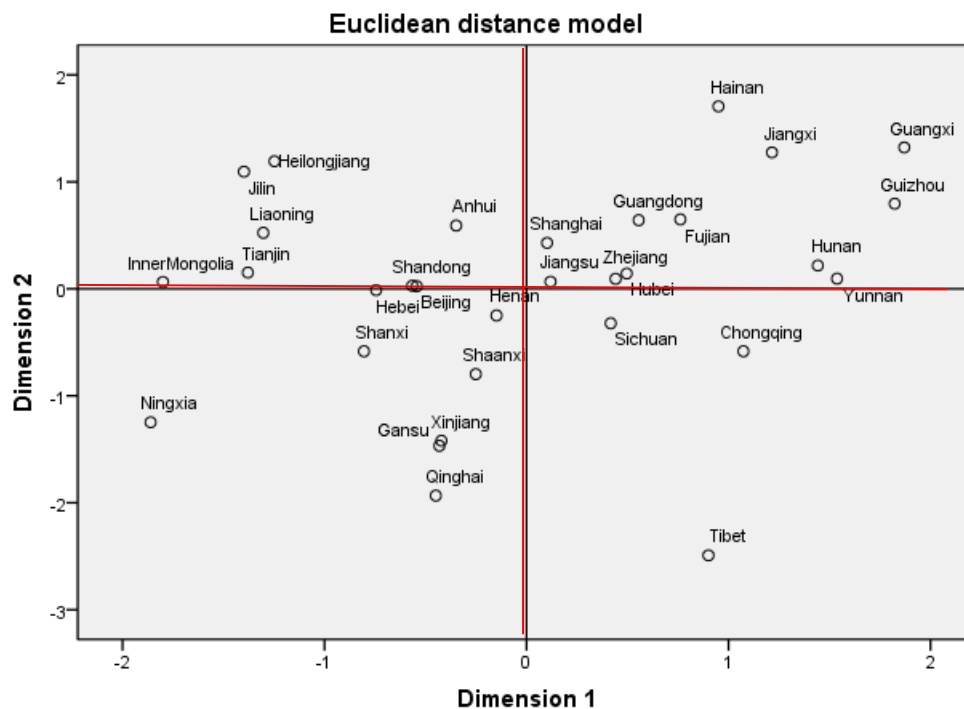
Figure 12 MDS (ALSCAL) analysis of FD in 2000
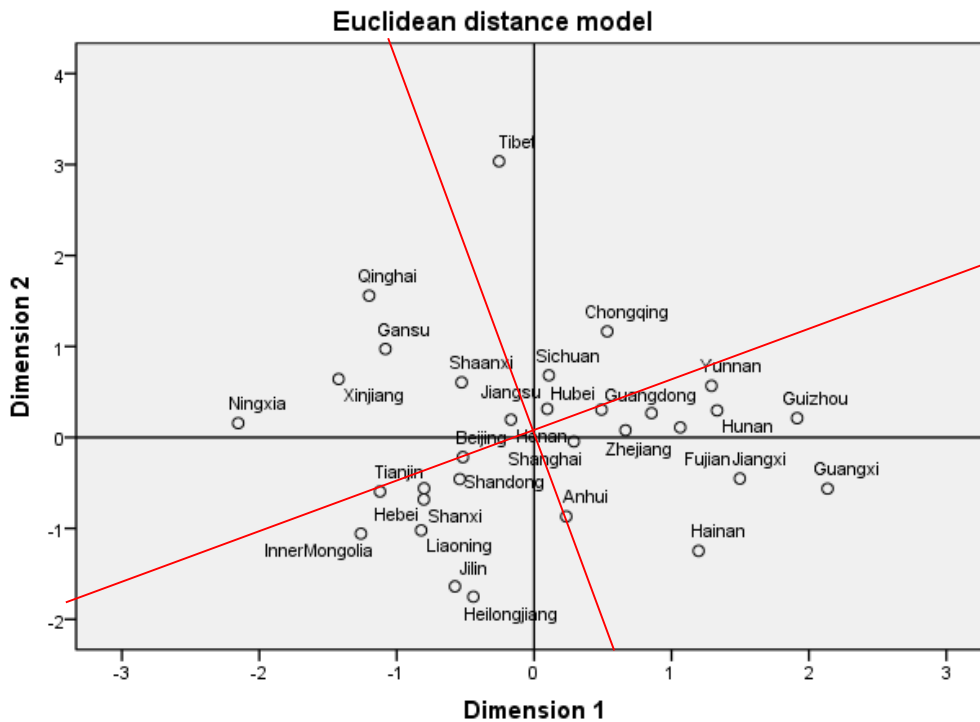
Figure 13 MDS (ALSCAL) analysis of FD in 2010

The Euclidean Distance from each point to the center was calculated and their ranks are well exhibited in the table below. The functional center changes its location coordinating with population migration. Jiangsu and Henan are the top two provinces closest to the center of the "space of population migration" in China. Henan, exceeding Jiangsu (which was usually considered the migration center) in 2010, accounted for the first place, indicating a gradual transition of functional center from eastern to central region since 2000.

Distance of each point to the functional center interprets frequency of community and activeness of the interregional migrants. The closer these points are, the more active are the provinces. From 2000 to 2010, the total distances of the eastern provinces extended from 9.48 to 9.81 and the central region from 9.21 to 9.26, and from 20.09 to 20.15 in the west. That is to say, all these three economic regions increased their distances to the center, but the east grew more than the central and west representing the decreasing attractiveness of interprovincial migration of the east. However, the fact is not only this. When we compare the distance changes on the provincial level, it is not difficult to find that in the east more than half of the provinces (7 provinces among 11, containing Guangdong, Fujian, Jiangsu, Zhejiang, Beijing, Hebei and Hainan) which "locate" closer to the center extended their distances to the center, demonstrating the declining activities of population migration happened in these provinces. What's more, Henan, Hunan, Jilin and Jiangxi in the central China shortened their distances to the center meaning the more frequent communication in the central and a flux tendency of

these persons. For the western part, only Chongqing, Sichuan, Tibet and Xinjiang witnessed distance extending among all the 12 provinces which displayed migration communication and flux trend.

Table 4 Comparison of distances to the center and their ranks

	2000		2010	
	Distance	Rank	Distance	Rank
Anhui	0.686	9	0.900	11
Beijing	0.544	7	0.562	4
Fujian	1.001	14	1.069	14
Gansu	1.529	20	1.455	20
Guangdong	0.849	12	0.895	10
Guangxi	2.290	30	2.209	30
Guizhou	1.989	28	1.926	27
Hainan	1.952	26	1.729	24
Hebei	0.745	10	0.978	12
Henan	0.290	2	0.258	1
Heilongjiang	1.726	22	1.807	26
Hubei	0.516	5	0.577	5
Hunan	1.459	18	1.364	18
Jilin	1.777	24	1.737	25
Jiangsu	0.136	1	0.327	3
Jiangxi	1.762	23	1.564	22
Liaoning	1.405	17	1.311	17
Inner Mongolia	1.802	25	1.646	23
Ningxia	2.240	29	2.159	29
Qinghai	1.985	27	1.968	28
Shandong	0.567	8	0.709	8
Shanxi	0.994	13	1.053	13
Shaanxi	0.836	11	0.802	9
Shanghai	0.442	3	0.293	2
Sichuan	0.527	6	0.691	7
Tianjin	1.388	16	1.270	15
Tibet	2.649	31	3.046	31
Xinjiang	1.481	19	1.561	21
Yunnan	1.540	21	1.410	19
Zhejiang	0.451	4	0.670	6
Chongqing	1.222	15	1.281	16

3.2.5 Conclusion

Enterprise relocation from the coast to central and west has become one kind of truth in recent China. Central government also published some relative policies and strategies to promote this mobility and obtained some success in shortening regional differences between western and eastern areas to realize the Regional Equilibrium Development. Comparing east, central and

west of China, coastal area has attracted large amounts of labors and population from the center and west based on its geographical and political advantages. However, in the process of human migration, the dominant stream is often accompanied by reserve flow or a counter stream (Lee, 1996). These "countercurrent migrant workers" between provinces have formed new characteristics for China's migration pattern (the stronger eastern-ward and weaker western-ward bidirectional migration pattern). The original "inland to coastal transition" will be replaced by a "two-way transfer" mode. This section demonstrates one of the purpose of my thesis that there exist a "stronger eastern-ward and weaker western-ward bidirectional migration pattern" in China.

The Sforzi's interaction value model was used to calculate the migration system for explaining the new characteristics of migration pattern in China. The greatest changes happened in the Yangtze River Delta and Pearl River Delta. First of all, Zhejiang and Guizhou moved from the Pearl River Delta to the Yangtze River Delta confirmed the northward movement of the migration centers, then Zhejiang and Guizhou together with Tibet separated from the Yangtze River Delta and became an independent system; secondly, the separation of the Chengyu metropolitan migration system and Pearl River Delta represents the the declining significance of Pearl River Delta attraction as well as the development of western regions.

These observations can also be proved by the modified interaction value model, with which we calculated the interaction value between provinces and compared the lines with interaction value more than 0.0123 on ARCGIS maps of three periods from 1995 to 2015. It is easy to get that lines with higher interaction value located principally between highly developed coastal regions (Guangdong, Shanghai, Jiangsu and Beijing) and principle provinces in the inland China (Sichuan, Henan and Anhui). A great stronger eastern-ward migration was demonstrated, but there exists a declining trend. Decreasing numbers and narrowing lines with interaction value from inland provinces to coastal provinces presented the lost attractiveness of the east of China. Pearl River Delta, Yangtze River Delta and Jing-Jin-Ji metropolitan are three of the most important migration attractive centers. The maps showed a northward mobility trend of the importance and attraction of the centers: Yangtze River Delta began to take place of Pearl River Delta to be most important and attractive center for migration. At the end, except for the polycentric pattern of Chinese population mobility since 2000, nearby transfer in the inland regions was accelerated.

Transfer of the functional center from coastal province to central province showed the western-ward migration pattern. Comparing the results of MDS (ALSCAL) analysis of each

period, the compression of these points in the 4 quadrants indicates their frequent communication and reflux trend. Also the extended distances in some important eastern provinces as well as shortened distances in the central regions enhanced this returning tendency.

3.3 Interprovincial migration and distribution forecast

3.3.1 Introduction

Over the past 50 years, population migration has emerged as a major force throughout the world (Massey, Arango et al., 1993), while migration distribution in China has been synchronised and developed according to the changes in migration policies and industrial relocations. It is the result of socio-economic development, and at the same time, the reason for population distribution. Research on population migration cannot only describe the certain geographical characteristics of the population, yet also help to analyse the evolution process of population agglomeration and dispersion, which will provide a scientific basis and reference for regional development planning and rational population flows. However, different natural resources, regional development and population policies can all cause spatial structural differences in terms of migration distribution.

Despite there not being many papers that mention migration distribution, research on population distribution have focused on long-term development, including distribution characteristics, spatial and temporal changes and influences, as well as future forecasts etc. (Hu, 1935; Midanik & Clark, 1994; Spoorenberg & Schwekendiek, 2012; Franklin, 2014). Hu´s "Aihui-Tengchong" line in 1935 was proved to be the first concept for describing China´s population distribution pattern—the population was gathering in the southeast but few were present in the northwest (Hu, 1935). However, simple population distribution research on evolution and current patterns is not sufficient in explaining the problems caused by a large population flows. A higher level of management from the government is fundamental in terms of social justice in employment, education, housing and services and infrastructures etc. (Chen, 2012). Besides, its unprecedented spatial reconstruction has a huge influence on regional sustainable development. As a result, predicting the migration distribution correctly and

understanding its evolution and distribution pattern will play a significant role in China´s stability and harmonious development (Yu et al., 2010).

The linear regression model, logistic model, gravity model, cohort-component model (C-C model) etc. have all been used for population forecasts (Isserman, 1984), as well as to evaluate increased tendencies and estimating distribution changes. For instance, the linear regression is easy to realize and calculate but can't adequately predict population in the medium and long term. Mathematical trend extrapolation relies on the patterns of historic population data so as to predict what will happen in the future (Keyfitz and Caswell 2005). This method assumes that the future growth of a population will follow a similar pattern to the past. The accuracy of population forecasting, therefore, is subject to the choice of the baseline and underlying assumption (Sres, Nakićenović et al., 2000). The C-C model divides the population into age groups, and takes the effects of human fertility, mortality and natural growth into consideration, thus provides a relatively accurate prediction of population (Stauffer, 2002). The key for this method is parameterising the model in order to reflect upon the social and geographical characteristics of the population. The C-C model has been adopted by the United Nations (UN) to routinely forecast the future country-level population in the world (Deng, Liu et al., 2015). Above all, estimating significant factors and exogenous variables, such as socio-economic development tendencies, institutions and policies are two of the most significant elements for the prediction, but there is no doubt that they greatly increase the forecasting difficulty and reduce the credibility of the results. In addition, the above methods fail to take into consideration the increasing importance of the floating population in China, as instead of the natural growth, migration has become the most significant factor in terms of population growth (Deng, Liu et al., 2015).

Understanding migration distribution and regularity cannot only control the population tendency, yet it is also useful for comparing the evolution and changes in migrants for different regions, which contributes to China's strategic population development and population policy. Taking province as the research unit, this section uses the constrained gravity model, with data from the population census of 1995, 2000 and 2010, to predict the distribution, as well as the growth and decline of the provincial migrants. Hence, it is quite helpful in guiding population flows and rational distribution.

This section can be organised as follows. After the introduction, some basic information regarding the distribution of the interprovincial migration in China will be discussed. In the main part, the background for the gravity models will be presented, especially with regard to

the constrained gravity model. While, the census data will be used for calculating their coefficients and subsequently, making an attempt to do the forecast. In the last part, the whole section will be concluded and some comments regarding the future tendencies will be provided.

3.3.2 Migration forecast: gravity model

Newton first published the "law of gravity" in 1687, which states that any two bodies in the universe attract one another with a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between them. The gravity model is well known and is one of the most frequently applied tools in the research topic of spatial interaction (Sen & Smith, 1995; Mikkonen & Luoma, 1999). The popularity of its various forms can be explained by the following: spatial interaction is an especially multi-faceted and important phenomenon in relation to regional economies. Thus, the gravity models appear to offer a useful way in which to describe and analyse this phenomena, and many branches of science are interested in such topics, not least the area-based branches, such as regional science or studies, human and economic geography. Transportation planning and consumer behaviour, for example, are very common application areas for gravity models (Mikkonen & Luoma, 1999). For example, international trade (Ohlin, 1967) and trip distribution (de Grange, Troncoso et al. 2009) commonly use gravity models for analysis. The gravity model of migration started with Zipf´s research (1946), where he set forth the theoretical reasons for anticipating that the inter-community movement of goods (by value) and of persons between any two communities will be inversely proportionate to the distance (Zipf, 1946). While, Wilson and Alonso introduced balancing factors and formulated spatial interaction models based on the maximum entropy model (Wilson, 1967; Alonso, De Jong et al., 1978; Shen, 2012), with this model controlling the consistency in the observed and predicted sum of flows. Moreover, Fotheringham extended the model through the incorporation of a competing destination variables in order to remove the effect of spatial structure (Fotheringham, 1983; Shen, 2012).

However, Luoma & Palomäki (1983) developed a special case of the classical theory of the gravity model ----the concept of the "threshold gravity model" in order to interpret and separate the influence of a centre, a distance, and the reaction of an individual. Furthermore, Smith (1985) used the "Threshold-Frequency Theorem" in order to show a simple satisficing model of discretionary travel behaviour. Moreover, research from Luoma et al. (1993) helped to enhance the interpretation. Nevertheless, it is important to note that the parameters of

gravity models are not constant; in other words, they vary over time. Hence, this is rather inconvenient with regard to applications in planning (Mikkonen & Luoma, 1999).

The following is the general gravity formula. The number of migrants *Fij* that move between regions *I* and *j* is proportional to the total migration in the origin and destination places, and diminishes with the distance between them (Krueckeberg & Silvers, 1974).

$$F_{ij} = O_i * \frac{\frac{D_j^a}{M_{ij}^b}}{\sum_{k=1}^{n} \frac{D_k^a}{M_{ik}^b}} \tag{1}$$

Where：

Fij *is the population flows between region i and j;*

Oi *and* *Dj* *are the total migrants in the origin and destination places;*

Mij *is the distance between region i and j. Occasionally, it is interpreted as the probability rate of individuals travelling from i to j, or an effective coupling between the two locations.*

a *is the adjustable attractive parameter for the destination;*

b *is the spatial friction parameter.*

3.3.3 Empirical analysis

3.3.3.1 Value of a and b

Instead of the residential changing individuals [28], population migration used in research and articles in China is usually considered to be a floating population, which means a "temporary" move to a destination where the person is not supposed to, and is legally not entitled to stay permanently (Liang, 2001; Cai and Wang, 2003; Fan, 2005; Qiao & Huang, 2013). As a result, the above gravity model will be created for simulating the interprovincial migration movement of China during 1995-2010. Calibration will be performed with a matrix of origin-destination migration statistics, derived from Chinese population census of 2000 and 2010, as well as the 1% of the population survey in 2005, which contains both residential migration and temporary migrants. Due to the data shortage, here, migrations from and to Hong Kong, Macao and Taiwan, will not be included. Flows between provinces i and j (Fij) correspond to the sum of

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[28] China's hukou administration system generated population migration as hukou migration ("qianyi")

flows in a time span of 5 years.

The purpose of the calibration is quite simple: it is set to "solver" two parameters, which allow the model to simulate population flows that are approximate to the real numbers. The two basic parameters to be estimated are: alpha (a) and beta (b). Alpha measures the attraction intensity of the destinations and beta measures the impedance imposed by the spatial friction. The distributions of estimates of parameters (a and b) can be observed in the figures below (Marmolejo et al., 2012).

Here, we simply use the "solver" function in excel for the "a" and "b" calculation. According to Newton´s law of gravity, we assume the initial value to be a=1 and b=2, which means we can obtain the most adjustable values. Since "a" stands for the attraction possibility of each region, and each destination has their own attractiveness, based on their socio-economic development, we set 1 as the value for each province or city of China. Figure 14 shows the attraction parameters of each province in each period. By looking at standard errors of parameters for the three periods, it is clear that all the differences of parameters over time can hardly be only statistical errors (Mikkonen & Luoma, 1999). Moreover, the changes in attractiveness for the destinations can be displayed clearly on the map (Figure 15, 16, 17 and 18).
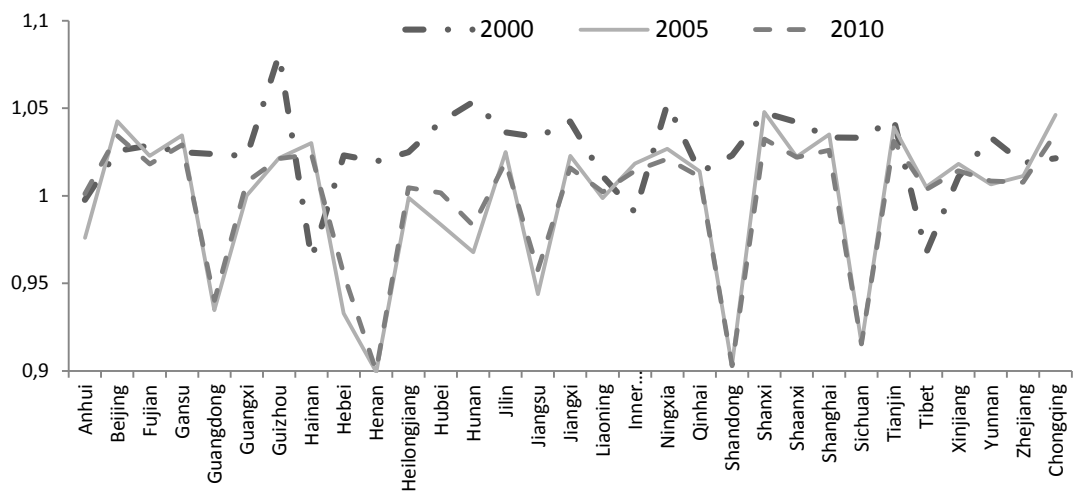
Figure 14 Regional fluctuation of alfa
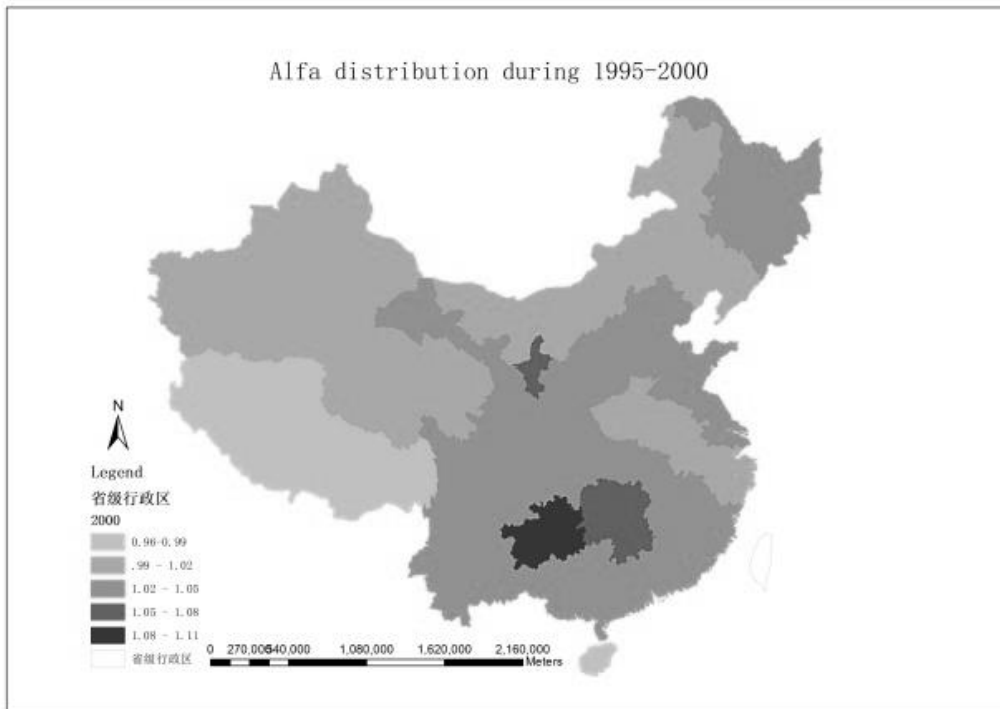
Figure 15 Alfa distribution during 1995-2000
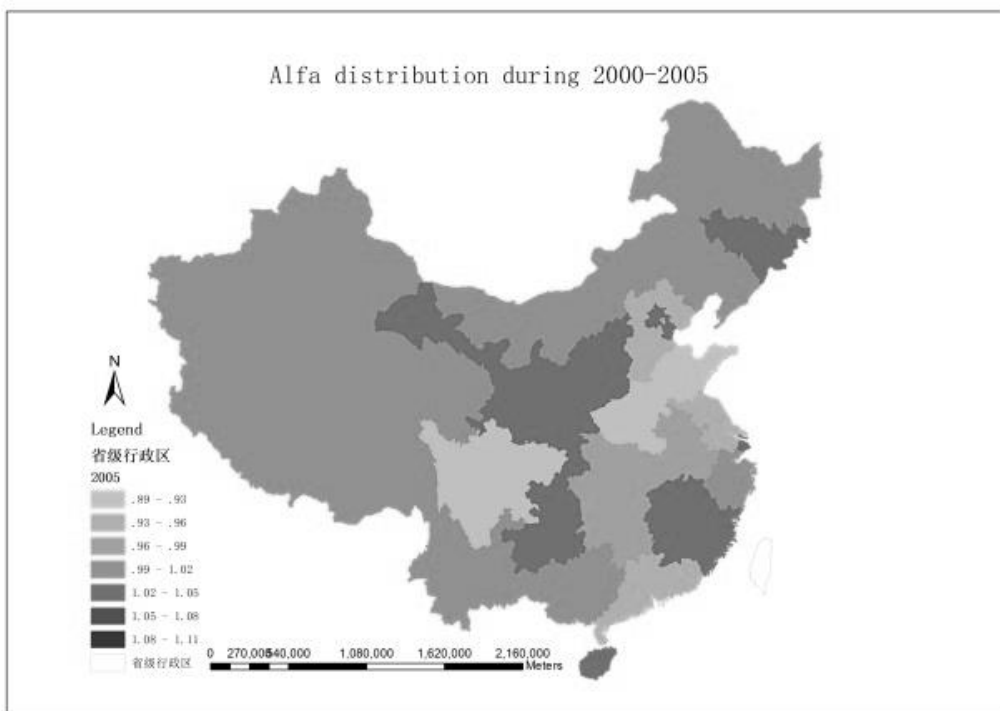
Figure 16 Alfa distribution during 2000-2005
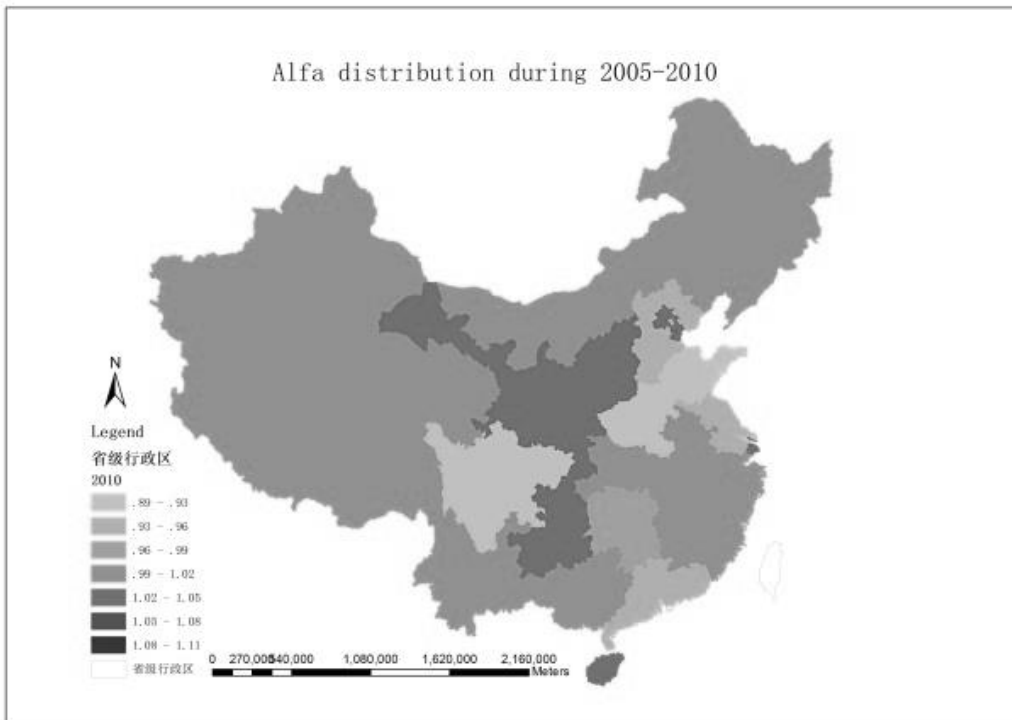
Figure 17 Alfa distribution during 2005-2010
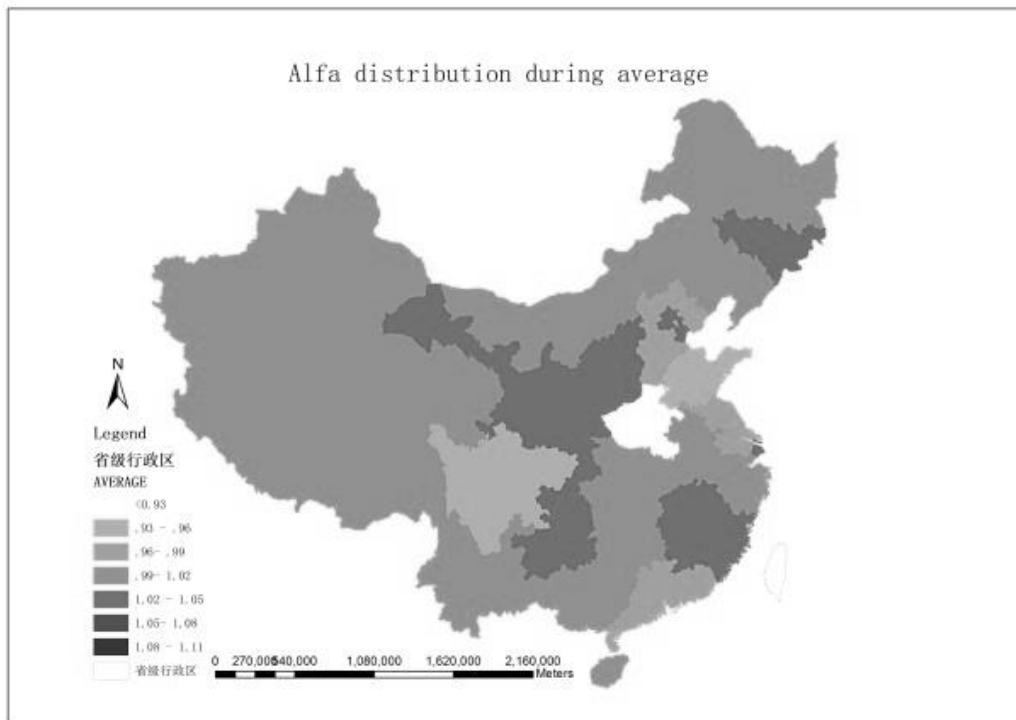
Figure 18 Average alfa value distribution

It can be observed from figures above that the attraction parameter α in the eastern region have decreased during 2005-2010, compared with it during 1995-2000; while western and

central China witnessed some growth during the same period. As one of the three most agglomerated places in the coastal region, Beijing continued to attract more population, with α increasing from 1.025683 in 2000 to 1.0426 in 2005, and there was a slight decline in 2010 (with α being 1.034384). Yet, the α for Shanghai and Guangdong decreased over ten years, especially for Guangdong, whose attraction parameter was 0.9402 in 2010, which was 0.08 lower than that of 2000. While, this number was even lower in 2005. Moreover, the same declining trends occurred in Tianjin, Fujian, Jiangsu, Shandong and Zhejiang etc. However, we can see growth of Alfa in Anhui, Inner Mongolia of the central area, as well as Chongqing, Gansu, Tibet and Xinjiang of the western region, which all displays the increasing attraction of the central and western areas. Although some provinces in the central and western China began to attract migrants, their citizens moving to the coastal regions in order to live and work is always the main trend.

The attraction parameters that could present the changing tendency of migration has been shown during 2000-2005, and those values during 2005-2010 confirmed this trend, thus it is available to use these values of the last period to predict the migration distribution over the next 20 to 30 years, even though there were some small changes. It is quite clear from table 5 that, compared with 2000, this friction increased slightly in 2005 (from 1.93 during 1995-2000 to 2.1 during 2000-2005). Nevertheless, compared with 2005, this value reduced by 0.016 during 2005-2010. This is very interesting as the growth of this index from 1995 to 2005 means that distance played an increasingly important, but negative, role in the gravity model for attracting migrants. That is to say, when people intend to migrate, they take distance into consideration, thus they may not move a long distance. As this value increased, the negative significance of distance increased.

However, the situation was opposite from 2000 to 2010. The decreasing number represents that distance was not as important as it was before. This may be due to the rapid development of the transportation modes and the internet, which consequently shorted travelling times and made it easier to get from one place to another. People didn´t need to think much when they had to travel faraway, and moreover, they could go back home within a day. It was anticipated that distance would continue to lose its importance in affecting people´s migration, since the transportation in China will become even more convenient and technology will develop further. As a result, it´s better to use the coefficient of the last period for the future prediction.

Table 5 Changes of beta coefficient

b	2000	2005	2010	AVERAGE
	1.93355	2.100017	2.084	2.039135

3.3.4 Migration projection analysis

In this section, the attraction and distance friction parameters from above will be used, alongside the total population of each province in 2010, for the forecast. This calculation assumes that all the population has the same possibility of moving to other provinces or municipalities, and each region can offer the same number of work vacancies for the individuals who move. Yet, the attraction of the destination place depends on parameter a, and b, which can affect their movement, based on the distance matrix. The graph below presents the future distribution of migration.

According to the projection, migration patterns in China will experience great changes during 2025-2030, especially in the well-developed provinces of each economic zone[29]. In the east, Shanghai, Beijing and Tianjin will be the three provinces with an increasing number of migrants, and they will see rapid growth. While for the rest of the coastal provinces, they will all lose population through migration. As shown in the figure below, in the next 20 years, the central region will dominant in terms of migration, with more than half of its provinces attracting increasingly more migrants. Take Shanxi, for example, compared with the 35740000 migrants, there is a prediction of 247928404 migrants from 2025 to 2030, thus it appears to be the province with the most migration growth. The province with the second biggest growth in migrants in central China between 2025-2030 will be Jiangxi, which will gain 92919552 migrants more than during 2005-2010. What´s more, the well-developed provinces or municipalities, such as Chongqing, Guizhou and Shaanxi in the western regions, will also experience great migration increases, though provinces such as Sichuan, Xinjiang, Yunnan and Guangxi will lose some of their population.

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[29] The "Eastern, Central and Western" regional disparities are based on economic specialisation and comparative advantages providing a convenient regionalisation scheme to describe the level and regional changes (C. Fan, 2005). The eastern part contains 11 province-level divisions, which are Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan; the central part contains Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei and Hunan, totally 8 divisions; while the western region contains 12 divisions—Sichuan, Chongqing, Guizhou, Yunnan, Xizang, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Guangxi, and Inner Mongolia.
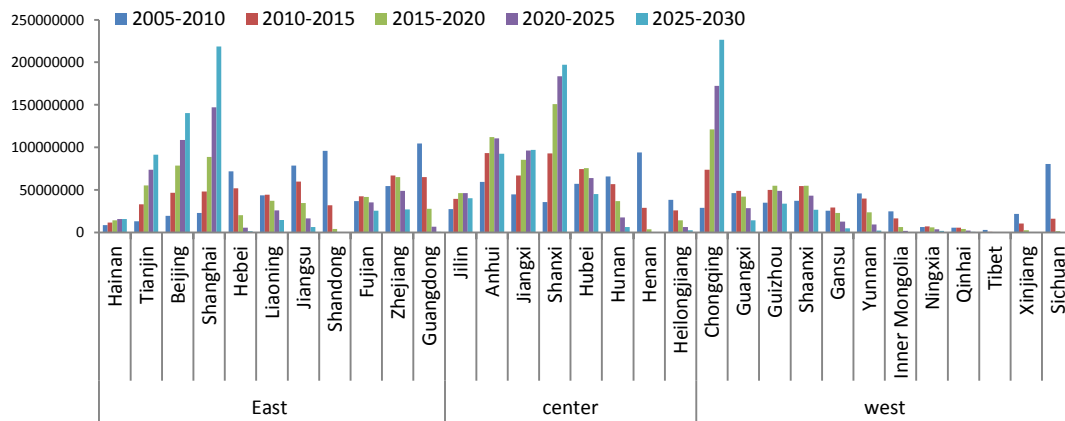
Figure 19 Regional migration prediction
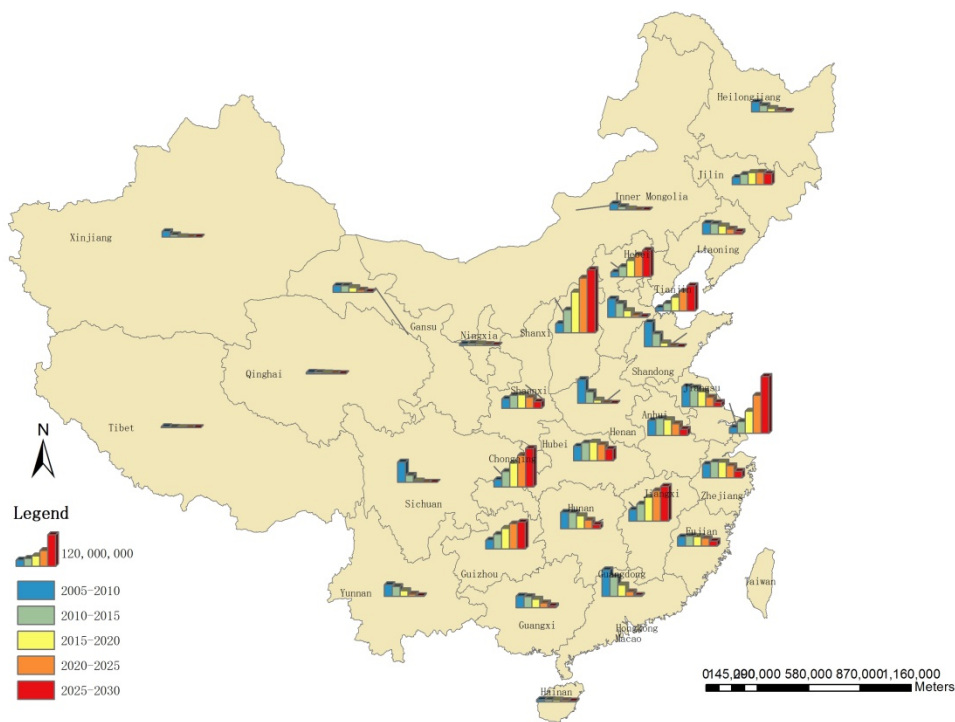
Figure 20 Regional migration prediction on map

Table 6 shows the changes in the proportion of migrants in each province from 2010 to 2030, based on the forecasting done here. During 2010 to 2015, the provinces with a migration proportion of more than 5% will be Shanxi, Guangdong, Jiangsu, Hubei, Jiangxi and Anhui, with the maximum proportion of 6.71% and the minimum proportion of 5.02%. Followed by provinces in the central and western regions, such as Hebei, Hunan, Chongqing and Guizhou with around 4% of migration population, except Zhejiang province. For the next period, people

will continue to move to Shanxi, with its proportion reaching to 12% at the end of 2020. Migrants in Jiangxi, Chongqing, Hubei and Guizhou will all grow, especially Chongqing, whose proportion will increase to 7.17%, compared with 4.59% in the previous period. While between 2025 and 2030, the migration pattern will be reasonably obvious as most of the migrants will be concentrated in four provinces (or municipalities): Shanxi, Shanghai, Jiangxi and Chongqing, each which will account for more than 16% of all the migrants in China. That´s very interesting since these four provinces (or municipalities) may well represent four of the most developed poles in China, which means by 2030, Yangtze River Delta, Jing-Jin-Ji metropolitan, Chengyu metropolitan and the Central Plains of China will become the new attractive centres, instead of the Pearl River Delta, as it is currently. There are lots of reasons that can lead to this attractive centre transfer, for example, the implementation of industrial relocation and balanced development policies.

Table 6 Migration forecast from 2010 to 2030

PROVINCE	2010-2015	2015-2020	2020-2025	2025-2030
Anhui	5,02%	4,70%	3,53%	1,99%
Beijing	3,03%	4,86%	6,42%	7,72%
Fujian	2,98%	2,85%	2,35%	1,59%
Gansu	1,92%	1,38%	0,67%	0,20%
Guangdong	5,80%	3,45%	1,46%	0,35%
Guangxi	3,23%	2,47%	1,44%	0,55%
Guizhou	4,30%	6,05%	7,39%	7,88%
Hainan	0,65%	0,58%	0,45%	0,29%
Hebei	4,08%	1,98%	0,65%	0,18%
Henan	3,44%	0,95%	0,15%	0,02%
Heilongjiang	1,89%	1,01%	0,46%	0,18%
Hubei	5,25%	5,46%	4,78%	3,46%
Hunan	4,79%	3,88%	2,52%	1,25%
Jilin	3,01%	3,67%	3,81%	3,43%
Jiangsu	5,61%	4,47%	2,84%	1,32%
Jiangxi	5,04%	6,99%	8,90%	10,31%
Liaoning	3,10%	2,46%	1,57%	0,76%
Inner Mongolia	0,91%	0,29%	0,06%	0,01%
Ningxia	0,56%	0,52%	0,37%	0,19%
Qinghai	0,38%	0,26%	0,12%	0,03%
Shandong	3,80%	1,10%	0,15%	0,01%
Shanxi	6,71%	12,00%	16,08%	18,59%
Shaanxi	3,80%	3,98%	3,20%	1,96%
Shanghai	3,48%	6,52%	11,08%	16,61%
Sichuan	2,07%	0,38%	0,05%	0,00%
Tianjin	2,28%	4,09%	5,81%	7,44%

Tibet	0,03%	0,00%	0,00%	0,00%
Xinjiang	0,71%	0,15%	0,01%	0,00%
Yunnan	2,84%	1,68%	0,63%	0,14%
Zhejiang	4,72%	4,63%	3,58%	1,96%
Chongqing	4,59%	7,17%	9,47%	11,56%

3.3.5 Discussion and conclusion

The purpose of this section is to try to predict the future migration patterns in China by using the constrained gravity model in order to gain an understanding of the migration trends under the background of industrial relocation. Besides, the constrained gravity model is one of the most important ways in which to make a forecast, based on the previous evolution and distances between regions, thus, it is popularly used in many kinds of studies.

According to the analysis above, the general migration tendency for the next 20 years will follow the normal trend – flow from the central and western regions to the east of China. Moreover, there would be a northward movement of the attractive centers, for instance, Yangtze River Delta even Jing-Jin-Ji metropolitan will become two of the most important in-migrating regions. At the same time, some of the well-developed regions, such as the Central Plains in the central region and Chengyu metropolitan in the western region, will also become increasingly significant, while Guangdong will gradually lose its population and will not maintain its status in terms of attracting migrants.

Despite the above results demonstrating the future tendencies for population migration in China, it is important to declare what was used to formulate the hypothesis when making predictions, which included: (1) the migration parameters of a and b coming from the coefficients of 2005-2010, which means there is no change in terms of the attractiveness and distance friction of each province in the future. Although some of the tendencies for migration were shown during 2005-2010, the rapid socio-economic development and introduced population policies, as well as the progress of transportation modes and other equipment, will change these indexes correspondingly. (2) It was assumed that the total population in 2010 will be available for migrating, and all the provinces can offer enough vacancies for all those migrants. Besides, the total number of migrants won't change. This is impossible in real life as experience demonstrates that the population aged between 20 and 45 are more interested in migrating, while those who are younger or older don´t want to move. What´s more, the

capability of offering employment positions for each province is dependent on its economic development and potential. For example, the well-developed in-migrated provinces can normally offer more positions for both the local citizens and migrants, while the net-out-migrated provinces don´t have as many positions as their total population. Finally, the number of migrants will change with time. Even though these two hypothesis can limit the accuracy of the prediction, the results based on the constrained gravity model are fundamentally correct, thus, they effectively show the future distribution trend of population migration, which is meaningful and significant in terms of formulating population development policies and directing the rational layout of enterprises.

Chapter 4 Industrial Relocation and Population Migration

4.1 Introduction

In September of 2010, the State Council published "Guidance of The State Council on industrial relocation of central and west in China" to give some opinions for promoting enterprise relocating from east to west: industrial relocation is one effective way for optimizing the spatial distribution and forming rational industrial division, is inevitable requirement for promoting industrial reconstruction and accelerating the shift of economic development. In fact, the speed of this relocation from east to west increased gradually with the adjustment of domestic and international industrial division. Relying on its abundant resources, low element costs and potential market, the midwest can receive this relocation. It does not only help accelerate new industrialization and urbanization, promote coordinated regional development, but also helps to push the transformation and upgrading of coastal areas and optimize the national industrial division. Simultaneously, Chinese Premier Keqiang Li in June of 2014 emphasized its importance -- Industrial relocation is a means to promote China's economic upgrading.

The location of firms and the geographical distribution of industry have significance for economic efficiency (Wen, 2004). Economic geographers have increasingly realized that the literature on the restructuring of industrial districts has paid little attention to the relocation of firms and delocalized groups (Wei, Li et al., 2007). At the same time, the evolution of enterprise relocation can reflect one kind of cultural transformation and institutional transformation, and it's also "reposition" of social science. More importantly, the existing theories regarding industrial relocation also tend to focus on the relocation of Multinational Enterprises (MNEs) at the global scale (Wei et al., 2007). Actually, experts and researchers have contributed many efforts to analyze the theories of enterprise relocation of different periods as well as their characteristics and mechanisms behind. The most significant theories are "neo-classical location theory", "Product life-cycle theory", the ''flying geese model'' and the "marginal

industry expansion theory" and "Industrial gradient transfer theory " as well as the "regional industrial relocation theory"(Vernon, 1966; Kojima, 1978; Hart-Landsberg & Burkett, 1998; Liao & Chan, 2011). Prior to 1960s, marked by Isard (1956) and Beckman (1968), neo-classical location theory mainly paid attention on optimal location choice and impacts of corporate relocation influenced by external location factors. The theory believed that because of the fluxion of the costs in businesses and incomes, actually, the enterprises were hardly located in the profit maximization location. Therefore, migratory preference always existed. The famous "flying geese" from Japanese economist Akamatsu (1962) explained that there is a catching-up process of industrialization in late-comer economies and it has been obviously identified in Asia over the past decades: from Europe and United States to Japan to "Asian Four Little Dragons" to mainland China, India and Vietnam (Chang, 2008; Heley, 1999; Kojima, 2000; Kumagai, 2008; Ozawa, 1993). However, this relocation can also occur among regions, Robert Crandall discussed this industrial relocation in United States in his book Manufacturing on the move (1993) from 1960 to 1993 and found that rising labor costs and union density drove manufacturing industries away from the Rust Belt toward the South and West. Cai also stated that industrial relocatin can be occurred between different nations but also between different regions of the same country (Cai, 2009). There is a large gap and difference between China's economic development and resource endowment, therefore, the flying geese model of the industrial structure can be extended among the various regions in China (Feng et al., 2010).

Actually, industrial relocation is quite related with labor mobility. Yunwei Zhu (2013) talked about the mechanism between industrial relocation and labor mobility in his dissertation by analyzing the relocation of the footwear industry of Wenzhou city and found that there existed "Bi-transfer" strategy between labor and enterprise migration. Thus it would be very interesting to see the influences of industrial relocation on labor mobility. On the other side, arranging the labor mobility under the industrial relocation is useful for reducing the regional difference and equilibrium development, provides both theoretical and empirical basis for the formulation of regional policies.

The rest of the section is organized as follows. In the next section, we discuss the evolution of Chinese industries and enterprises theoretically and summarize the literature on industrial relocation and related method of industrial potential. This is followed by detailed discussions on the historical development of the industrial relocation in China with the data of Industrial census of China (1997-2009). The thesis further compares the relationship between industrial relocation and migration during this period. The concluding remarks emphasize on the changes and differences of industrial relocation in different time and the socio-economic equilibrium

development of China.

4.2 Industrial relocation in China

4.2.1 Industrial relocation in China

As the gaps of economic development and incomes among the eastern, central and western regions are widening, which can directly affect China's social equity and social stability, the 17th National Congress of the Communist Party of China declared that some effective measures should be taken to promote the coordinated development of regional economy and gradually narrow the economic disparities between the east and west. Therefore, some researchers announced that interregional industrial relocation should be one the most important ways for coordinating regional development (Afriyie, 2009), especially when the industries are facing reconstruction, optimization and upgrading, the abundant resources, low land price and labor salaries would exacerbate this relocation.

Over the last two decades several studies have provided some insight into the interregional industrial relocation in China. Evidence from Mei Wen study of relocation and agglomeration of Chinese industries has indicated that China's manufacturing industries were highly geographically concentrated in several coastal regions in 1995, and they have become more geographically concentrated following the economic reform (Wen, 2004).

The study of Feng and Liu et al. has shown that only part of the industries relocated relatively among the eastern, central and western regions, the phenomenon of absolute industrial transfer has not yet occurred, thus the interregional industrial transfer is not significant (Feng et al., 2010). At the same time, some cross-regional industrial relocation happened, for instance, many industries relocated to the western region directly by crossing the central part. It was revealed by the 27 industries of the three economic regions as well as the sectional data of 1993, 2000 and 2006 (the data come from the China Statistical Yearbook and Chinese Industrial Statistics Yearbook) that both the number and scale of industrial relocation from east to west are not big, but increasing their strengths over time. Furthermore, industries with absolute scale advantages are easier to relocate and they are normally resource-orientated and resource-intensive industries, parts of the technology-intensive industries begin to transfer to the central and west before the labor-intensive industries. However, the industrial movement in China doesn´t follow the rules of "from the east to central then to the west" strictly. Even though from 1993 to 2000, there were more industries moving from the east to central than

the west, eastern industries were more likely to relocate to the west than the central for 2000-2006 (Table 7).

Table 7 Eastern industrial relocation destination and scale

Eastern industrial relocation for 1993-2000			Eastern industrial relocation for 2000-2006		
Industry	Destination	Portion	Industry	Destination	Portion
Beverage manufacturing	West	0,10%	Petroleum coke	West	1,50%
Ferrous metal mining	Central	0,70%	Special equipment manufacturing	West	2,90%
Non-ferrous Metals	Central	5,40%	Petroleum industry	West	2,40%
	Central	5%		Central	4,90%
Nonmetallic mining	West	1,05%	Nonmetallic mining	West	1,05%
	Central	2,40%	Beverage manufacturing	Central	0,20%
Petroleum coke	West	3,08%		West	5,50%
Pharmaceutical manufacturing	Central	0,10%	Pharmaceutical manufacturing	Central	0,10%
	West	3,40%		West	0,10%
				Central	2,90%
			Non-ferrous Metals	West	11,70%
			Electricity and heat supply	Central	2,90%
				West	6,10%
				Central	4,20%
			Food manufacturing	West	5,83%
				Central	0,20%
			Coal mining	West	5%
Total	6		Total	10	

Note: Table comes from the paper of "An Analysis of the Trend, Characteristics and Forming Reasons of the Industrial Transfer in the Eastern, Mid and Western Areas of China"

By measuring the relocation scale of 20 two-digitmanufacturing industries in the period from 2001 to 2014 in China, Guan and Cao (2016) found that China´s manufacturing industry has largely shifted from coastalregions to the central regions of China, it has undertaken the largest number of industries and was the largest area to undertake industries. Both the agglomerationtransfer and diffusion transfer of manufacturing industry coexisted, the number and scale of industries were expanding and peaked in the period from 2007 to 2010, the transfer scale has been slightly reduced in the new era. Same as the result talked above, portion of technology-intensive industries transferred prior to the labor-intensive industries and portion of coastal regional industries directly relocated to western region while passing the central area.

Actually, Luo, Miao & Li summarized China´s industrial relocation from the aspects of concept, methodology and empirical analysis (Luo et al., 2014), and got the conclusion that generally large-scale industrial relocation was not obvious in China, there were only limited and relative industrial transfer among the east, central and west, and they were mostly resource-oriented indsutries that move from east to the central and west. At the same time, relatively large scale industrial transfer has happened among provinces in eastern China.

4.2.2 Industrial potential and evolution

Formula of industrial potential

The earliest research of market (Reilly, 1931) potential is from Reilly in 1931, he applied it to separate the market areas of two cities that were commercially between themselves. He called this model the law of retail gravitation. It aims to identify the quantitative characteristics (number, size and location) of a number of shopping centers in the context. Same as in the 1960s, it offers the possibility to generate growth in urban sub-centers.

Given that it is a model of retail, the residences´ purchasing power is crucial. In an economic entity, it is expected that the total sales is equivalent to the total share of the household budget allocated to this kind of consumption; of course, purchases made on the outside of the entity are offset by purchases made in the Body of the external families.

Given that consumers bear the cost of Travel (Transport and time) from their Residence to the Mall, there is a widespread tendency to minimize these costs. On the other hand, it is the size of the mall that attracts consumers. The greater the size is, the greater product variety and therefore greater convenience for consumers.

A region consists of residential areas from i to n, and commercial areas from I to J in which spending on consumer goods Retail varies depending on the purchasing power of residents, as well as varies the size of the shopping centers that offer such property. We can know the amount of spending that a consumer will spend R J through the following Equation.

$$S_{ij} = C_i \frac{\frac{F_j}{d_{ij}^a}}{\frac{F_i}{d_{ij}^a} = \frac{F_j}{d_{ij}^a} + ... + \frac{F_n}{d_{in}^a}} = C_i \frac{\frac{F_j}{d_{ij}^a}}{\sum_{k=1}^{n} \frac{F_k}{d_{ik}^a}} \qquad [1]$$

Where:

Sij= Detail costs in center j of the resident population in region i

Ci= Total expenditure for consumption of this type of property for the population i

Fj= Size of the detail activity detail in j

Dij= Distance between i and j

a= Adjusted exponent of the distance, normally it is 2

Formula [1] can be transformed to calculate total costs of all consumers of all areas in a given area or Mall j, the formula is as follows:

$$S_j = \sum_{i=1}^{n} C_i \frac{\dfrac{F_j}{d_{ij}^a}}{\displaystyle\sum_{k=1}^{n} \dfrac{F_k}{d_{ik}^a}}$$ [2]

Spatial patterns of industrial distribution

Before 1949, many industries and firms were concentrated in the coastal region of China because of the historic events and economic choices. Actually, it is the foreign enterprises invested by the western aggressors as well as the official businesses run by the domestic Westernizations that advanced the development of China's modern industry in the middle of 1800s. They were mainly concentrated in Shanghai, Guangdong, Tianjin and other coastal cities as well as some special inland cities like Wuhan. After 1945, however, parts of the industries like cotton, chemical, steel and so on gradually relocated to the southwest and northwest of China (for example, Chongqing, Kunming, Xian and Lanzhou etc.), which have been proved to be the initial foundations of urban industrial development and helped to reserve partially the fragile modern industry.

When the People's Republic of China was established in 1949, Chinese industry was highly geographically concentrated in the northeast and central and west, with industries and enterprises relocating from the east to central and west. At the beginning, more than half of the industries were concentrated in the coastal region as a consequence of Japanese occupation of the Eastern Liaoning Peninsula and the effect of leasing territories to foreigners in Shanghai. Liaoning Province was the main center for heavy industries, while Shanghai, Tianjin and Qingdao were mainly responsible for light industries such as textiles and repair of machinery etc. However, economic factors were not predictors for Chinese industrial location during 1953 to 1978. The first 5-year plan put forward a balanced regional development policy

and tried to build new industrial projects in inland China. Later, influenced by the three strategic principles guiding the location of industrial firms, together with duplication of production among provinces for self-sufficiency, Chinese industries and enterprises were gradually relocated to the central and west. In fact, large industries were located according to the following three principles before 1978: geographical proximity to mountains, dispersion and concealment (Liao & Chan, 2011).

After the reform and opening policy, the industrial distribution witnessed the transformation from the Planned economy to a Market economy. Taking advantages from the government policies and locations for opening-up, the eastern part of China became the new place for industrial development with an eastward movement. Then, in a very short time, the coastal region become the most important place for industrial development and contain the largest amount of enterprises. However, accompany with the rapid development of the eastern region are rising costs of labor and land as well as environmental pollutions, which results in higher costs of traditional manufacturing enterprises in the east and its lower economic benefits of agglomeration and location. As a result, there exists industrial bilateral relocation. On the one hand, firms and industries continued to concentrate in the east; on the other hand, resource-oriented and heavy polluting enterprises began to move to the central and west.

To assess the characteristics of geographical industrial relocation, province is adopted as research unit and industrial potential indexes are calculated for industrial distribution analysis. Then, at the same time, we will trace the evolution of this index. The follow figures show the distribution of industrial potential from 1998 to 2009, the darker the color of each province, the larger the industrial potential.

In general, industries and enterprises are mainly concentrated in the coastal region of China. The top 5 provinces with high industrial potential in 1998 are Shanghai, Tianjin, Beijing, Jiangsu and Zhejiang, which all belong to the eastern economic region. Even though their ranks are fluctuated in some years, but the main trend doesn´t change. This value in Shanghai are always the largest during all the period, and it was dramatically larger than the rest provinces. At the same time, these values increased gradually. It is until 2008 that Anhui exceeded Beijing and became the fifth province that had the largest industrial potential in the central economic region. Besides, from the figures we can see the same tendency. The darker color each province has, the higher industrial potential it has. And it is easier to get that provinces with higher industrial potentials are gathering in the coastal line of China among the whole periods.

The industries present a northward and westward movement tendency. According to the

evolution of industrial potentials during 1998 to 2009, the industrial westward movements are quite obvious. In 2000, Zhejiang, Jiangsu and Anhui had industrial potentials more than 100 and Beijing and Tianjin more than 200; while except Beijing and Tianjin, industrial potentials in Zhejiang and Jiangsu were also more than 200 in 2002 compared with those in 2000, the ones with industrial potentials more than 100 are Hebei and Shandong; then Anhui added to the line in 2005 as well as Shanxi, Fujian and Henan, and this value in Tianjin was more than 400; after were Hubei, Jiangxi and Guangdong, and Zhejiang and Jiangsu were more than 400; in 2009 Jilin and Chongqing were added on the map and Anhui increased to more than 400.

Following the general development tendency, there are also some development centers, two of the most important ones are Yangtze River Delta and Bohai Economic Rim. As early as in 1998, Shanghai had industrial potential more than 1000, and Shanghai has been proved to be the most import city in Yangtze River Delta, around which those provinces also had relatively high potential value, and this value increased with the time. Followed by the Beijing and Tianjin, gradually they formed the Bohai Economic Rim. But generally provinces with high industrial potential concentrated in the coastal line of China.
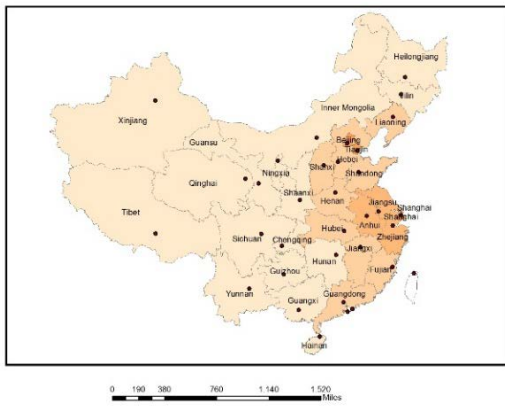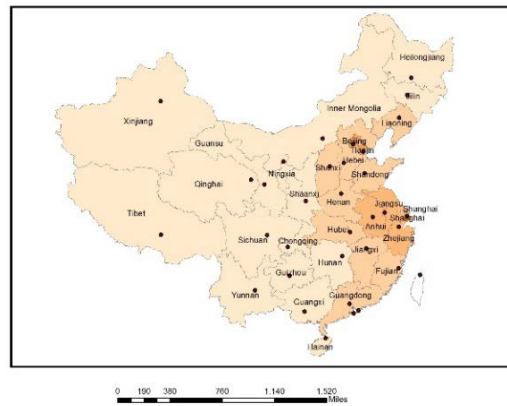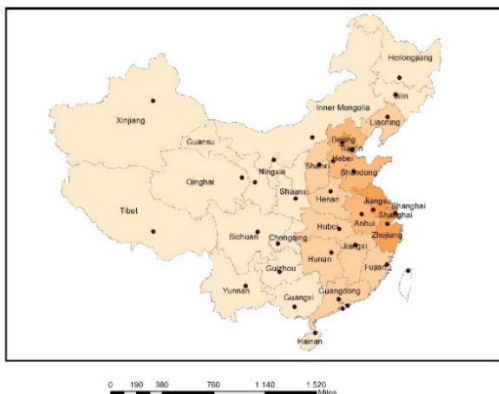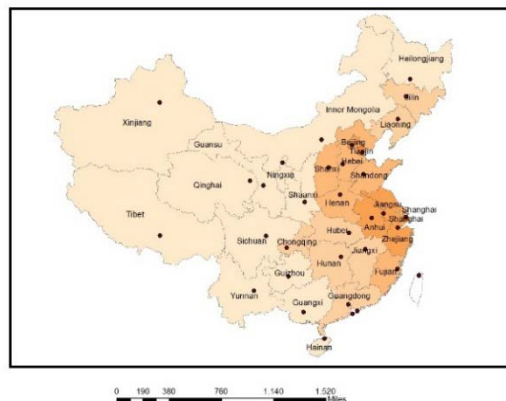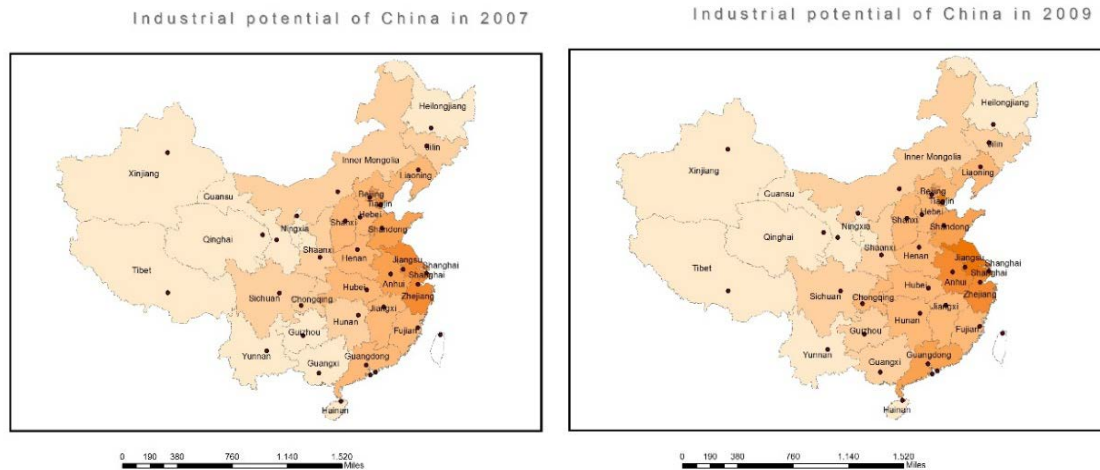
Figure 21 Industrial evolution in China

4.3 Industrial relocation and population migration

In order to understand the migration under the background of industrial relocation, it is necessary for us to know the relationship between industrial relocation and population migration. I am going to use the extended gravity approach for my analysis in this section.

4.3.1 Extended gravity model

Derived from Newton's law of gravity, gravity model in urban geography cited the concepts of 'bodies' and 'masses' in the statement of Newton's law and replaced them by 'locations' and 'importance' respectively where importance can be measured in terms of population numbers, gross domestic product, or other appropriate variables (Greenwood, 2005). The gravity model of migration is therefore based upon the idea that as the importance of one or both of the location increases, there will also be an increase in movement between them. The farther apart the two locations are, however, the movement between them will be less.

The key to the gravity model is the relationship between migration and distance, as well as between migration and origin and destination population size (Makower, Marschak et al., 1938). They decleared in 1938 that "quite a close relationship was found between discrepancies in unemployment rates and migration of labour where allowance was made for the size of the insured population and the distance over which migrants had to travel". Then Stewart found that the distance to his students´ home towns seemed to behave like the Newtonian law of gravitation (Stewart, 1947). The basic gravity law of spatial interation can be

expressed as:

$$M_{ij} = \frac{GP_i^{b1}P_j^{b2}}{D_{ij}^a}$$ [1]

Where:

Mij is the gravitational or demographic force;

G is the constant;

Pi and Pj are separately the population of origin i and population of destination j;

Dij=distance between i and j.

According to Newton's law of gravity, the values of b1 and b2 are equal to 1.0 and the value of a equals to 2.0, which states that demographic force is directly related to the origin and destination population sizes and inversely related to the square of the distance between them. But in formula [1], these three values can be estimated freely and the traditional model can be tested.

During the 1960s, the main thrust of migration research took on a decidedly more formal tone that has continued to the present. Most of the research was not formal in a theoretical sense but rather intuitively generated hypotheses were at first tested formally in an econometric sense with aggregate data, typically (but not always) with place-to-place migration data. These aggregate models of migration frequently were specified in the context of modified gravity models. The models are of the gravity type, in that migration is hypothesized to be directly related to the size of relevant origin and destination populations and to be inversely related to distance. As a result, we can express the model in the log form (formula [2]), b1 and b2 are the population parameters, meaning that an b1 and b2 units of increase of the log of the origin or destination population would result in one unit increase in log of migration from i to j, while a unit of increase of log distance between i and j would lead to one unit decrease of log migration. Thus the gravity model can be rewritten as:

$$lnM_{ij} = k + (-a)lnD_{ij} + b_1lnP_i + b_2lnP_j + e_{ij}$$ [2]

Then the model can be modified in the sense that the variables of the basic gravity model are given behavioral content and additional variables that are expected to influence the decision to migrate are included in the estimated relationship (Greenwood, 2005). The modified gravity

models that became common in the migration literature beginning in the 1960s add several additional variables to those of the basic gravity model. Thus, we commonly find studies of place-to-place migration that take the following form:

$$lnM_{ij} = lnb_0 + b_1 lnD_{ij} + b_2 lnP_i + b_3 lnP_j + \sum_{n=1}^{m} b_{in} lnX_{in} + \sum_{n=1}^{m} b_{jn} lnx_{jn} + e_{ij} \qquad [3]$$

As showed above, Mij, Dij are the migration and distance between i and j; Pi and Pj are the population of the origin and destination separately; Xin and Xjn are the additional variables in the origin and destination needed. In this section I am going to see the relationship between population migration and industrial relocation, so the Xin and Xjn should be the variables that could represent industrial relocation----the provincial input/output.

4.3.2 Results analysis

In this section I estimated the interprovincial migration of China for three periods: 2000-2005, 2005-2010 and 2010-2015 using the 870 migration flows (the reason for 870 flows is because there are no data of regional input-output for Tibet, in order to uniform all the variables, I only use 30 provinces or municipalities of China for my analysis). The population in 2002, 2007 and 2012 are utilized as population in the origins and destinations, on the one side these three years are near the middle of the respective periods, on the other side they are the only three years that Chinese government published information related with regional input-output. Same like population of origin and destination, the data of regional input-output in the same years are evaluated as my variables of "Origin input/output" and "Destination input/output". The distance is evaluated by the Cartesian distance, which means I used the straight distances between capital cities. Actually, it is better to use the transportation distance (like the railroad or airplane or bus), but Cindy Fan had demonstrated that the differences of the two results were minimal, so I just used the straight distance in this section (Fan, 2005).

The following three tables illustrate the relationship of population migration and industrial relocation of three periods from 2000 to 2015. For the three periods, all the first three coefficients are significant, and as we expected in the methodology the coefficient of distance is negative. Comparing the coefficients of these variables, distance is the most important variable for the period of 2000-2005, that is to say people care more about the distance when they intend to migrate than other factors in this time. The variable with the second biggest coefficient is original population, and then the destination population. Chan et al. and Shen in

1999 all demonstrated similar results that original population was a more powerful predictor than destination population for migration (Shen, 1999). It's not rare to see the municipalities or other developed cities that have less population but attract large amounts of migrants, for instance, Beijing, Shanghai, Chongqing and Shenzhen etc. Model A for the period of 2005-2010 and 2010-2015 show the same tendency that the distance friction, such as cost of travelling and the uncertainty about distant destinations, is their big concerns when move to other provinces. What is very interesting is that this coefficient declined gradually with the time went, indicating that the significance for distance friction to predict population migration is not as important as before. With the development of transportation and technics, the transports are much cheaper and faster, it is not the first important thing that people care when they want to move. What's more, the widening gap in regional development promotes people's long distance migration (Liang & Ma, 2004). Another clear phenomenon for model A is that the importance of original population and destination population also declined, even though the former is always more significant than the latter for the three periods. In addition of thinking long-distance travel, the size of the province where people leave as well as the size of their destination are also important when they decide migrate. Normally the province with larger population has more potential to export or import migrants. Nevertheless, this trend is decreasing due to the releasing population policies and fast development of technics and equipment. The population policies give more freedom for moving while the latter free the rural surplus labors (especially the young persons), regardless of big cities or small cities.

The basic and main purpose for population migration is chasing the economic gap, the direct factor that can affect this uneven regional development is finding a job, where industrial relocation can present the possibility of offering job positons of each region. As a result, I tried to use the provincial input/output as the index for interpreting industrial relocation in China, and model B gives the detail information about the relationship of interprovincial migration and regional input/output. The migrants are supposed to move from the high input/output province to the province with low input/output, their coefficients are expected to be negative and positive respectively. Besides, we can see that among all the three periods, the R squares all increased when I added the provincial input/output, implying that model B is able to explain the population migration better.

During 2000-2005, destination input/output replaced the distance friction to be the first important factor in predicting population migration and its effects are positive as I expected. While the original input/output is not significant at all, suggesting that during this period where migrants come from cannot interfere people's willingness of migrating, the "push" power from

the origin is quite weak. In model B another thing that we need to pay attention is that the coefficient of destination population became negative, which was positive in model A during the same period. It is interesting because when I controlled regional input/output, there are more destination people, there are less population flows between origin and destination. This finding is consistent with the reality that the migration destinations are normally well-developed cities in the coast, even though they attracted many migrants, their population still cannot be compared with large-size provinces. However, some changes occurred for 2005-2010. The coefficient of original input/output is significant and negative as supposed above, even though it's small, it does indicate that the push factor is becoming more and more important in determining interregional migration. The destination input/output is still significant and positive, it stands for the second most important position in predicting migration in my model, while original population became the most important factor in model B during this period. It's a big change, compared the previous period the "push" forces have increased in importance, yet the "pull" forces are declining with coefficients of destination population and destination input/output smaller than before. The coefficient of original population for 2010-2015 is as important as it was for 2005-2010, it was the second most important predictor for population migration. But, in general, all the coefficients of the five variables were decreasing, and the original input/output was negative but only significant at the level of 0.05. The biggest change happened in the variable of destination population, it was significant and positive for 2010-2015 which was quite different with other two periods. This result was corresponding with the developing of sub-centers in the central and west which could attract more and more migrants.

Table 8 Modeling population migration and industrial relocation during 2000-2005

	2000-2005					
	MODEL A			MODEL B		
	Coef.	Std. Err.	t	Coef.	Std. Err.	t
Original population	0,9564	0,0546	17,52***	0,8820	0,0745	11,83***
Destination population	0,5487	0,0589	9,31***	-0,7334	0,0630	-11,63***
Distance	-1,1448	0,0676	-16,93***	-1,0613	0,0572	-18,56***
Origin input/output				0,0926	0,0619	1,5
Destination input/output				1,3422	0,0571	23,52***
_cons	8,3955	1,2291	6,83***	-7,7900	1,4258	-5,46***
R square		0,4476			0,6585	

***means that significance level equals to 0.01 or less
** means that it is significant at the level of 0.05

Table 9 Modeling population migration and industrial relocation during 2005-2010

	2005-2010					
	MODEL A			MODEL B		
	Coef.	Std. Err.	t	Coef.	Std. Err.	t
Original population	0,9047	0,0438	20,68***	1,1605	0,0598	19,41***
Destination population	0,4547	0,0487	9,34***	-0,6096	0,0503	-12,12***
Distance	-1,0303	0,0569	-18,1***	-0,9508	0,0467	-20,34***
Origin input/output				-0,2486	0,0478	-5,2***
Destination input/output				1,0775	0,0441	24,46***
_cons	10,6686	1,0459	10,2***	0,4276	1,1658	0,37
R square		0,5046			0,7052	

***means that significance level equals to 0.01 or less
** means that it is significant at the level of 0.05

Table 10 Modeling population migration and industrial relocation during 2010-2015

	2010-2015					
	MODEL A			MODEL B		
	Coef.	Std. Err.	t	Coef.	Std. Err.	t
Original population	0,8738	0,0458	19,08***	0,9565	0,0555	17,25***
Destination population	0,6082	0,0456	13,33***	0,3867	0,0609	6,35***
Distance	-0,9946	0,0530	-18,78***	-0,9761	0,0525	-18,6***
Origin input/output				-0,0869	0,0395	-2,2**
Destination input/output				0,2412	0,0459	5,26***
_cons	7,4629	0,9899	7,54***	5,2990	1,3328	3,98***
R square		0,5375			0,5589	

***means that significance level equals to 0.01 or less
** means that it is significant at the level of 0.05

4.4 Summary and conclusion

Using the extended gravity model, this section compares the significant factors that could

affect population migration in China during 2000 to 2015 with the census data of 2005, 2010 and 2015. The results suggest that gravity factors such as population and distance friction are very important in affecting interregional migration; the industrial relocation –here I used the regional input/output as the predictor—also reflect the roles it plays in influence migration, which helps to confirm the hypothesis quite well.

The influence of industrial relocation on population migration has been well explained by my model. Distance friction is one of the most important determinants, which witnesses declining with the development of technics and transportation. Original population also plays a significant role in predicting population migration, the "push" forces also contain original input/output which is negative during the last period but not significant at the beginning. Both the population and input/output in the destination are significant in determining mobility, while opposite as original input/output, the population in the destination was negative for the 2000-2005 but finally was positive. As a result, over time, the significance of industrial relocation has increased, although its importance is not stable; besides, the push factors where migrants leave, in general, are weaker than the pull factors in the destination.

Chapter 5 Labor mobility under the background of industrial relocation

5.1 Determinants of return migration in China

5.1.1 Introduction

Migration can be defined as the movement of a population from one geographical area to another. In fact, mobility has always been one of the fundamental characteristics of the human species. Even though immigration is a key issue for academic population research, return migration has recently played increasing roles in the migration literature (Cassarino, 2004; Rodríguez & Egea, 2006). Influenced by Chinese regional development policies ("western development policy", "Rise of the central China", "Reviving Northeastern Old Industrial Base" etc.) and industrial relocation or semi-relocation from the east to west, return migration studies are not limited in their contribution on economic development in the original regions, more and more studies have examined the determinants of return migration and evaluated their significances and influences. These factors contain personal attributes, social network, economic situation, job satisfaction etc. However, as the motives underlying different types of industrial regions are likely to vary, a distinction would be made between in-migrated area and out-migrated region. In-migrated industrial areas refer to some coastal developed provinces which need to update their industries and enterprises because of the high labor costs as well as resources and environmental problems, whereas out-migrated areas mainly contain the less developed regions in the central and west of China where there used to be lots of out-migration and now introduce some replaced industries from eastern area. As a result, which are the most significant variables that can predict migrant´s intention of going back to his place of household registration? Are there some differences of determinants between in-migrated and out-migrated regions? How

about the central and west of China?

According to neoclassical migration theory (NE) , migration is considered as individual´s income or utility-maximizing behavior by relocating to other places where they can be more productive (Harris & Todaro, 1970; Todaro & Maruszko, 1987; Douglas, Joaquin et al., 1998) or where they can expect the highest returns on their human capital investments (Bauer & Zimmermann, 1998). Actually, the neoclassical migration theory supposes that migrants have access to full information on opportunities abroad prior to migration, and expect to be integrated successfully and be more productive than in their original regions, so they don´t have motivations to go back. However, what if they cannot find a job in the destination area or they cannot earn their expected salaries, or they have high salaries but bad social network in their resident or working places or other reasons? These can all produce returning intention. Thus, as explained by the NE, return migration is mainly interpreted as a result of failure to find a place in receiving societies. In fact, the economic and social ties at the origin would have positive effects on returning, while these ties at the destination are negative.

The "push and pull theory" firstly originated from D. J . Bagne in the 1950s can help us to understand the determinant differences in the in-migrated and out-migrated region. He believed that there were both "push" and "pull" powers in one region on population migration , but this "push" power which was influenced by shortage of natural resources, the increase of agricultural production costs, labor surpluses and low economic income was stronger than the "pull" power in the exporting area and the contrary in the importing area. However, Lee (1966) developed this theory on an individual level looking at both the supply and demand side of migration, he held the opinion that a grouping of factors can affect migration. He thought that mobility was affected from the following aspects: first, elements of migration destination; second, elements about original places; third, elements between original places and destination; four, individual elements. They all contain positive (+), negative (-) and neutral (0) factors, and contest and integration of these factors lead to mobility. For example, the understanding level of importing and exporting regions influences migration decisions, greater diversity of people leads to more migration.

Same theory that can explain the difference of in-migrated and out-migrated regions is dual labor market theory. This theory divides the economy into two parts, called the "primary" and "secondary" sectors (or the formal and informal sectors), it focuses on forces operating at much higher levels of aggregation and links migration to the structural requirements of modern industrial economies (Massey, Arango et al., 1993). In whole, it is not concerned with individual decisions to migrate but focuses on what pulls them, as a collective group, to migrate. It argues that international migration starts from the labor demands of modern civilization. In this way, determinants of return migration will differ in the in-migrated region and out-migrated region as well as in the central and west of China.

The main purpose of this section is to find out the possible predictors of return migration intention. There are two points in which our study differs from others. First of all, we use data of the China labor force dynamic survey in 2012, which contains all the relevant characteristics of labor migration of the whole China. Secondly, we compare the factors in the out-migrated and in-migrated regions and attempt to see the determinant differences between regions. Previous researches on determinants analysis suffer from a number of limitations. These include focusing on the contributions of return migration to the socio-economic development, relying on the previous variables, and only concentrate in one region. As a result, little information was used for analyzing the potential factors for return intention so comprehensive, normally they choose some of the special aspects or some certain region that they are interested in. Solving these problems, this work expects to detect the potential significant variables for respondents´ return intention in a comprehensive view, and at the same time, compare the difference in the in- and out-migrated areas.

After the introduction, this section can be divided into 4 parts for the determinant analysis. Part 2 discusses related literature and provides some basic facts on the interregional migration, this is followed by the description of research unit and data resources as well as the methodology of ordinal logistic regression model; the empirical analysis focus on the influence and importance of each factor on migration return intentions, which emphasizes the difference in in- and out-migrated regions as well as the central and west; I conclude by

summarizing the findings to see the main factors of their return intention and the difference in those regions.

5.1.2 Literature reviews and hypothesis

Income-orientated return migration has been identified by many economists, geographers and social researchers. However, people normally have complex and frequently non-economic reasons for moving or staying in a given region (Pendakur & Young, 2013). Personal attributes, satisfaction, cultural attachments to place, stage in the life-course and skills can all enhance or restrict possibilities for mobility (Waldorf, 1995; Ommer, 2007).

From the aspect of personal attributes, gender plays different roles in return migration intention. Even though De Jong et al. finds that gender difference is not significant in predicting the internal migration intentions in rural Philippines (Dejong, Root et al., 1986). However, more empirical evidences have been proved that gender has influences on migration intention, for instance, Seller and Dunning all proved that women are less assimilated than men because of their lower level of economic success (Seller, 1975; Dunning, 1989).

Hypothesis 1: Gender is one of the significant variables for determining return intention in China, and women are more like to return than men.

The effects of age and education on return migration intentions are expected to contribute for return migration. Zhao Yaohui states that return propensities increase with the age, married male workers who are older than their fellow migrants are more possible to go back (Zhao, 2002). Daniel Makina indicates that migrants with university degrees, professional qualifications and post-secondary education are more likely to return than those with primary education (Makina, 2012). Hein et al. think that the highest likelihood to intend to return can be found among Moroccan migrants who have completed preschool or primary education, followed by the highest educated migrants, while unqualified migrants are the least likely to express a return intention (De Haas, Fokkema et al., 2015).

Hypothesis 2: Older migrant who doesn't receive high education are more easily to go back to their hometown.

Either understanding foreign language, or technical training more than 5 days or professional certificates can all be considered as migrants' work skills, which have been proved to be predictors for returning intention. Actually, Stark & Galor (1990) observed that acquiring additional skills can facilitate migrants´ return.

Hypothesis 3: The more professional and skilled the migrants are, the less possible they are going back, especially those who can understand foreign language.

Political status and household registration are special policies in China for social and economic development and controlling the movement of the population, under which Chinese migration has its unique characteristics. Even though few literatures have explained their significance, they are still supposed to have important functions in predicting return intention under the background of China.

Hypothesis 4: The masses are more easily to return than those members of Communist and Democratic parties. Besides, those who have agricultural household registration present more possibility to go back than those with non/agricultural household.

Variables related with working condition have been proved to be representatives of background factors of return migration intention. Stark and Galor (1990) observed that migrants who save more money than their counterparts in the destination express more interest to return. Daniel indicates that income level is a stronger determinant for returning decision than professions (Makina, 2012), they have proved that migrants earning more than R4000 (US$500) per month are less likely to return than those earning a lower monthly wage.

Hypothesis 5: Income or salary can positively determine return intention: the more migrants can earn in the destination, the less likely they are going to return.

The third group of attributes refers to job satisfaction and location that can be interpreted as subjective and simplified expressions of place utility. Job satisfaction in the destination is

supposed to have impacts on return migration intentions. The theoretical expectation is that migrants who are satisfied with their jobs in the destination are less likely to express the intention to return (Waldorf, 1995). Lichtenberger summarizes that it is those who are satisfied with their living condition and salaries (who can earn above-average income) express more interests in staying for the rest of their lives by using data of Yugoslavian men living in Austria (Lichtenberger, 1984). Besides, Hein, Tineke & Mohamed (2014) get the results that Moroccans living in Netherlands, Italy and Spain are significantly more likely to intend to return than their peers living in France, possibly because of the social and political climate towards migrants in the Netherlands and linguistic links in France and Belgium. Thus, location can be considered one of the most important factors for determining return intentions.

> *Hypothesis 6: Migrants who are strongly satisfied with their job in the destination are the last persons that will go back to their places; those who are not satisfied are more likely to return.*

> *Hypothesis 7: Respondents who were born in the west economic region present more interest in returning than those born in the central, those born in the east are the last group of persons to go back.*

In addition, several studies have demonstrated the importance of social participation. As I said above, international return migration is not strongly influenced by economic factors (Gmelch, 1983; King, Strachan et al., 1985; Jones, 1990; Bailey & Ellis, 1993), instead, the connections and ties established within the migrant community capture the key structural element (Waldorf, 1995). And stronger ties to the current location (children at school, contacts with friends and relatives, home-ownership etc.) have been shown to discourage long-distance migration (Holmlund, 1984; Antolin & Bover, 1997; Nivalainen, 2004). Hein, Tineke & Mohamed find that social connections and ties in the destination don´t have the expected impacts in the likelihood of intending to return, neither the presence of partner nor children in and outside household (De Haas et al., 2015). In this section we use the number of close friends and proficiency of speaking local dialect for presenting social connections, the result should be different.

Hypothesis 8: The more deeply respondents are connected and tied with their migrant community, the less possible they are going back to their hometown.

According to the push-and-pull theory and the dual labor market theory, determinants of return migration in the in- and out- migrated regions are supposed to be different. Greenwood announced that the characteristics of the origin and destination regions (for example, wage differentials, job opportunities, unemployment rates, region's economic structure, conditions in housing markets and location-specific amenities) provided an incentive for migration (Greenwood, 1985; Nivalainen, 2004). Waldorf analyzed the determinants of international return migration intentions with the survey data on guestworkers in Germany from 1970 to 1989, and he got the conclusion that personal attributes, residential and job satisfaction, and three time-dependent variables can affect guestworkers´ return migration intentions. At the same time he explained the influences of the above variables in detail by comparing them of different guestworker nationalities (Waldorf, 1995).

Hypothesis 9: Significant determinants in the in- and out- migrated regions are quite different, those factors that are very important in predicting return intention in in-migrated region are not significant in the out-migrated region.

5.1.3 Data

The data is from the CLDS (China Labor-force Dynamics Survey) survey of 2012, which was a rotation research and conducted every two years (the pre-research was held in 2011, until October of 2016 the first national survey and two rounds of rotation surveys have been carried out). CLDS was designed to concentrate on status quo and evolution of Chinese labors, which covers education, work, migration, health, social participation etc. In this section we choose individuals with work experiences since 2011 who was working out of their hometown to ask for their return intentions to their place of household registration. Samples covered 29 provinces (municipalities, except Hong Kong, Macao, Taiwan, Tibet and Hainan), respondents referred to labors aged between 15 and 64.

The research unit is quota sample by personal attributes, household registration, work condition, job satisfaction, social participation and location. Omitting all the missing values yields a total sample size of 997, we are trying to research the likelihood of permanently returning to the place of respondents' household registration. During the survey, respondents' answers were measured by the Likert-type scale: strongly possible, possible, not sure, impossible and strongly impossible.

Table 2 summarizes the operational definitions of the potential independent variables. The first group of variables captures personal attributes. Gender is defined via the dummy variable I1_2 (1 for men, 2 for women). The dummy variable I3_1 distinguish respondents with agricultural experiences (I3_1 = 1) from those who didn´t do any agricultural work. Other dummy variables that are defined in a similar fashion contain I1_7, I1_8, I2_1, I2_9, I2_10 etc. Variables like agegroup, political status (I1_6), attending military (I1_7), understanding foreign language (I1_8), healthy condition (I9_4) and so on are also used here to describe the individual characteristics.

Household registration factors contain current household registration, respondents´ birth household registration, household registration in this city or no, time away from the place of household registration and some related questions. These are all dummy variables (1 for agricultural household registration and 2 for urban household registration; or 1 for yes and 2 for no) to talk about respondents´ household registration related questions. Work time, income and salary, industrial type, fixed working places or not, part-time or full-time job and working status are all employed to express influences of the working condition at that moment on respondents´ return migration intention. Number of close friends, familiarity and trust with neighbors and other residents, local people in their communities and work units as well as proficiency in speaking local dialect are all important factors for social participation evaluation on respondents´ return intention. These variables are either nominal or ordinal depending on the questions.

Several variables are used to address the satisfaction with the job. These variables take the value of 1 if respondents express satisfaction with their jobs, and the value of 5 to express

their dissatisfaction. The variable I7_3_11 describes respondents' general satisfaction with their job, while the rest 10 evaluate their satisfactions from income, working security, work environment, work time, opportunity, interests of the job, cooperators or partners, work ability and technology, respects from others as well as the chance to express their suggestions.

The economic regions where Respondent's home province and birth place will be added to the location group so the location distribution would not be specified as an additional personal attribute here. China can be divided into three economic regions: the east, the central and the west, which were presented by 1, 2 and 3 separately in the database. On the one hand, our purpose to put in economic region factor is to find out if current location and birth places have influences on labors´ return intention. On the other hand, we can compare the return migration intentions in different regions of China. We are trying to find out the return intention difference among the out-migrated regions and in-migrated regions (here we consider the east part of China as the in-migrated region, and central and west as the out-migrated regions, but at the same time, there is a transition process between east and west).

Table 11 Explanation of potential variables

Variable	Definition	Variable	Definition
I1_1	age: from 15 to 64		Work status: 1, employee; 2, employer; 3, self-employed non-manual worker; 4, self-employed
		I3a_14	manual worker
I1_2	gender:1, male; 2 female	I6_3	Familiarity with neighbors:
I1_6	Political status: 1,Communist; 2, Democratism; 3, the masses	I6_4	Trust neighbors:
I1_7	Attending military: 1, yes; 2, no	I6_5	Mutual assistances with neighbors
I1_8	know foreign language: 1, yes; 2, no	I6_9	Local persons in your company: 1, yes; 2, no; 99999, not sure
I1_9_5	Born household registration: 1, agricultural household; 2, urban household	I6_10	Local persons in your neighborhood: 1, yes; 2, no; 99999, not sure
I1_9_6	Current household registration: 1, agricultural household; 2,	I6_11	Local language level: 1, fluently; 2, understand and speak some; 3, can more or less understand; 4, hardly

Code	Description	Code	Description
	urban household		understand; 5, don't know anything
	Formal education: 1, yes; 2, no	I7_3_1	Satisfaction with your income: 1, very satisfied; 2, fairly satisfied; 3, medium; 4, fairly unsatisfied; 5, very unsatisfied
I2_1			
I2_9	Technical training more than 5 days: 1, yes; 2, no	I7_3_2	Satisfaction with your work security: same as I7_3_1
I2_10	Technical certificates: 1, yes; 2, no	I7_3_3	Satisfaction with your work environment: same as I7_3_1
I3_1	Agricultural experiences: 1, yes; 2, no	I7_3_4	Satisfaction with your work time: same as I7_3_1
I3a_1	Work hours per week	I7_3_5	Satisfaction with your preferment: same as I7_3_1
I3a_3	Work days per month	I7_3_6	Satisfaction with your work interest: same as I7_3_1
I3a_6	Total income	I7_3_7	Satisfaction with your cooperators: same as I7_3_1
I3a_6_1	Salary	I7_3_8	Satisfaction with your work ability and technics: same as I7_3_1
I3a_6_2	Financial income	I7_3_9	Satisfaction with the work respect: same as I7_3_1
I3a_7	What's your career	I7_3_10	Satisfaction with expressing in your work: same as I7_3_1
I3a_8	Fixed workplace: 1, yes; 2, no	I7_3_11	General satisfaction with your job: same as I7_3_1
I3a_9	Nature of workplace: 1, exterior; 2, interior; 3, both	I9_4	Healthy condition: 1, very healthy; 2, healthy; 3, medium; 4, fairly unhealthy; 5, very unhealthy
I3a_10	Full-time job: 1, yes; 2, no	hr1	Economic region of home address: 1, east; 2, central; 3, west
I3a_11	Industrial type	Br1	Economic region of your birth place: 1, east; 2, central; 3, west
I3a_12	Unit type		

5.1.4 Methodology

Likert-type scale variables are usually measured by ordinal logistic regression (or ordered logistic regression) with one or more independent variables. It can be thought as an extension of the logistic regression model that applies to dichotomous dependent variables, allowing for more than two (ordered) response categories.[30] The purpose of the analysis is to see how well that the likelihood of people returning to their places of household registration, as a result variables of personal attributes, work condition, social participation, job satisfaction and location are selected for the determinant analysis. The following logistic

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[30] https://en.wikipedia.org/wiki/Ordered_logit

regression formula shows what function of the probabilities results in a linear combination of parameters.

$$\ln(\frac{p}{1-p})=\alpha+\beta_1 X_1+\beta_2 X_2 +\cdots +\beta_k X_k$$

In the above equation, P indicates the possibility of having propensity for migration. $\ln(\frac{p}{1-p})$ is the log of the odds that the return migration occurs (it is the ratio of the number of people who intends to return to their place of household registration in one extend to those who have other intentions). X1, X2, ..., Xk indicate various factors affecting migration intention. α is the constant indicating intercept in the model, and β1, β2, ..., βk indicate the coefficients of various factors in the model. All the computations in this paper are processed by IBM SPSS Statistics 13.

In this case coefficients and odds ratios will be employed to computes the probability of migration returning. The coefficients in the logistic regression model tell how much the logit changes based on the values of the independent variables. The larger the coefficient is, the greater influence the variable has. While odds ratios are used to determine which of your independent variables (if any) have a statistically significant effect on your dependent variable, they are also used to determine how well your ordinal regression model predicts the dependent variable. Actually, they are available for both categorical independent variables and continuous ones. If the odds ratio of a predictor variable is greater than one, returning is more likely to happen than not. If the odds ratio of a predictor variable is less than one, then people have less possibility to return.

5.1.5 Results

First of all, we use the data of whole China to test the determinants of labor migration intention. However, if we compare the impact factors of migration returning in three economic regions in China, we can find some interesting differences between the in-migrated and out-migrated regions.

General results

1127 numbers of samples in the database of are selected for the ordinal logistic regression analysis, but before our regression, we need to do some test to make sure the accuracy of the results. First of all, we need to test the sample representativeness. For total China, with 1.3 billion population, confidence level of 95% and 1127 of the final selected samples, we can get a 4% of margin of error by using a normal distribution of 50%. And based on our frequency analysis in SPSS, we get the information that only 5.2% of the respondents are illiterate, which means the proportion of respondents who received formal education is 94.8%, and this rate in total China is 95%. Considering the 4% of the margin of error, we can say that there is a 95% likelihood that these selected samples can represent the real situation in China. As a result, we can say that our samples are representative in the whole region of China.

Then I will do the correlation analysis. Since we have both nominal and ordinal variables, it´s better to use Spearman test for examining the significance between dependent variable and independent variables. Among all the 57 independent variables, we got 29 that have significant correlation with migrants´ return intention to their places of household registration, they show their significances at the level of 0.01 or 0.05. These 29 variables contain gender, political status, understanding foreign language, highest educational level, professional training and technical certificates and agegroup for personal attributes; current and birth household registration for household registration analysis; work time, income, agricultural experience, job characteristics and employment status for working situation explanation; number of close friends, local persons in the living community and proficiency in local dialect for social participation; and satisfaction with income and work promotion for job satisfaction. However, according to empirical migration research and migration theories, satisfaction with work security, work environment and work interest as well as general job satisfaction will be added to our potential independent variable list for satisfaction factor supplements.

Then we get the candidate independent variable list for testing collinearity among variables. Based on our analysis, we found that all the Variance Inflation Factors (VIF) are less than 3 (actually between 1 and 2.5), which means there are no collinearity among all the variables and we can continue with the regression analysis. Besides, we also examine the reliabilities of variables in the satisfaction group. At the beginning, I get a Cronbach's Alpha of 0.29 of reliabilities with 6 potential satisfaction variables, but as we all know the Cronbach's Alpha should at least be more than 0.7. Then I delete the items that have "Cronbach's Alpha if Item Deleted" more than the general Cronbach's Alpha (here is 0.29), finally I got 4 items of satisfaction variables with a 0.771 of general Cronbach's Alpha, which means they show high reliabilities. At the end, we have the list of all the possible independent variables for our ordered logistic regression. The likelihood ratio chi-square of 367.708 with a p-value significance of 0.00 tells us that our model, as a whole, is statistically significant, as compared to the null model with no predictors. The pseudo-R-squared of 0.279 is also given, since here we use the regression for explaining the correlation, a 0.279 R-squared is enough for our analysis.

P-value tests the null hypothesis that the coefficient is equal to zero (no effect), that is to say a predictor that has a low p-value is likely to be a meaningful addition to the model because changes in the predictor's value are related to changes in the response variable. Vice versus, a large p-value suggests that changes in the predictor are not associated with changes in the response. As a result, P-value of each variable in table below represents its significance in determining respondents´ return intention, it can be significant at the 0.01 level, 0.05 level or 0.1 level (p-value less than 0.01 indicates that you can reject 99% of the null hypothesis; less than 0.05 means reject 95% of the null hypothesis; less than 0.1 means reject 90% of the null hypothesis). In this section, we choose those variables significant at the level less than 0.1.

According to the output table below, there are always factors from personal attributes, working condition, social participation, job satisfaction and location are statistically significant for migration intention, but not household registration, whose P-values are all larger than 0.1. Typically, significant p-values help us to determine which variables to keep in

the model and which to remove. However, if we want to know the importance of one variable plays in the model from all of the others, we need to see the regression coefficients, which declares the log odds change in the dependent variable for one unit of change in the independent variable while holding other factors in the model constant. Those coefficients show either positive or negative impacts on respondents´ return intention. However, when ordinal logistic regression assumes that the logit transformation of the dependent variable has some correlation with the independent variables, which makes the interpretation of the regression coefficients somewhat tricky. The easier way to walk through this problem is trying to interpret the results with the concept of odds ratios. If the odds ratio of a predictor variable is greater than one, returning is more likely to happen than not. If the odds ratio of a predictor variable is less than one, then return migration is less likely to occur (Makina, 2012). In order to determine the unique contribution of each independent variable to the prediction of labor migration return intention, sets of predictors are entered into the model step by step for controlling variables. Order of entry of the blocks of variables was based on the need to partial out confounding variables, causal priority, and research relevance (Cohen, 1983).

Estimate 0 of the ordinal sequence includes the significance of personal attribute variables of age, gender, political status, understanding foreign language, technical training for more than 5 days and technical certificates. According to the table below, we can see that personal characteristics can contribute for determining labor´s return intention, except the age and technical training. Take gender (I1_2) for example, a 0.592 coefficient means gender shows positive effects on the log of people´s return intention. While the odds ratio tells that male respondents (for men of 1, while for women of 2) express 1.8 unit increase in the odds of being in a higher level of returning to their place of household registration than females, given all of the other variables in the model are held constant (the following explanations follow the same rule). Even though the social norms and attitudes, which are themselves products of gendered social expectations, tend to be less friendly toward women's active pursuit of economic activities outside the home, women are more and more independent

and chasing success which, in fact, discourages or prevents many women from returning. Besides, men normally bear the pressure of buying flat and offer stable life for the whole family, as a result, men are more likely to go back to their places of household registration then women. Another variable that is significant at 0.01 level is understanding foreign language, but it is negatively correlated with the return intention. Compared with respondents who cannot understand foreign language, those who can speak foreign language decrease the log odds by –0.631 with the odds ratio of 0.532. In other words, those who cannot understand foreign language are 0.532 times more likely to go back to their place of household registration than those who can. It is logical because migrate labors who can speak foreign language are well educated or trained to get high salary jobs and stable life, so they may show less possibility to return.

Same as understanding foreign language, political status and technical certificates are three other negative variables determining return migration intention. From member of Communist Party to member of Democratic Party then to the mass, for each one unit increase in the political status, we expect a 0.77 growth of being in a higher level of returning to their place of household registration. That is to say, the masses are most likely to return than the rest members. Similarly, it is those who don´t have technical certificates that are more willing to go back to their Hukou places with the odds ratio of 0.772, labors with technical certificates are normally high skilled, so they´d prefer to stay.

Personal attribute factors are basic but important variables for determining return migration intention, but other variable (like working condition) is also necessary in our analysis. In Estimate 1, we add the variables consisting of working condition since none of these predictors are likely to be affected by variables entered later in the sequence. As presented in the table below, five of these variables are significant at the 0.05 level and one at 0.1 level. Specifically, the likelihood for labors to return their places of household registration is negatively associated with previous migration experience (I2_14) and fixed workplace (I3a_8) with the coefficients of -0.255 and -0.353 separately. Labors with migration experience are less likely to go back than those without this experience, the odds ratio is 0.775. At the same

time, those who don´t have fixed workplaces are 0.703 times more likely to go back than those who are working in fixed places.

Agricultural experience (I3a_1), current employment status (I3a_13) and employment situation (I3a_14) as well as total income in group (I3a_6_1) all show positive influences on return intention. Respondents with agricultural experiences present 1.424 times more possibility to return than those who never worked in agriculture, while those who are not employed now show 1.474 more willingness to stay. Pursuing the maximum economy is always the main purpose for those persons out of their places of household registration, the easy way to realize this is being employed, so those unemployed respondents are more likely to stay and look for a job instead of going back. For those employed respondents, it they are not satisfied with their salaries in the current location, or if they are missing their hometown or for some other reasons, they are more likely to go back. Self-employed workers express less interest in returning than employers, followed by employees, the odds ratio reaches 0.69. The agricultural workers are the last groups of persons that want to go back to their place of household registration. Based on respondent´s total income, we divide this variable into four groups, the results indicate that the more money they earn, the less likely they are going back. For each one unit increase in the total income, we expect a 1.171 increase of being in a higher level of returning.

Estimate 2 adds variables representing household registration. We specify these two variables because they are special in China and are important for determining return migration intention. However, the results we get in the table imply that household registration doesn´t play significant roles in determining return intention. Only the birth household registration (I1_9_5) is significant at 0.1 level, the current household registration (I1_9_6) cannot influence respondent´s migration decision. Birth household registration is positively correspondent with return intention, respondents with non-agricultural household registration (birth) are expected a 1.494 lower level of returning than those with agricultural household. There exist slight fluctuation among significance of the previous variables, but their importance don´t change.

In estimate 3 and 4 we add variables illustrating location and social participation separately. They are all significant in interpreting migrant´s returning decision, either positive or negative. For example, current economic region (hr1) plays significant positive roles in the increase of log odds of being in a higher level of returning to their places of household registration. From east to central then to west, respondents decrease 1.494 likelihood of returning with each one unit growth of their current economic region. While birth economic region (br1) is opposite in determining their return decisions. Respondents who were born in the west are most possible to go back, the odds ratio for birth economic region is 0.717. Number of close friends in resident places (I6_1) and proficiency of speaking local dialect (I6_11) are two of the significant variables representing social participation in impacting return intention, the former is positive (coefficient is 0.099)and the latter is negative (coefficient is -0.294). The more close friends they have in the resident places, the less possible they want to return to their places of household registration. More friends mean more social connection and participation, he is one of the members in his current residence, it´s his second hometown. Likewise, one unit more proficient in speaking local dialect help to create 0.745 decrease in the proportion of log odds of returning.

The last series of variables are related with job satisfaction in estimate 5. These variables were entered last since they have been the focus of little empirical research and we were interested in whether they added unique information to the prediction of employee willingness to move over and above more proximal employee predictors (Cohen 1983). A 1.166 positive impact comes from respondents´ satisfaction with income (I7_3_1). For one unit increase in it, the odds of high possibility of returning versus the combined middle and low categories are 1.166 greater, given that all of the other variables in the model are held constant. Likewise, the odds of the combined middle and high categories versus low apply is 1.166 times greater, given that all of the other variables in the model are held constant. Respondents who are the last to go back to their places of household registration are those who are very unsatisfied with their income, which follows the philosophy of the new economy of migration theory that returning is the result of their successful work and

achievement of their goals of migrating, if they failed to earn expected salary or were thwarted in their jobs, they may receive support from the family until they get success.   It is the only factor that can predict respondent´s return intention in this category.

Final, the determinants of return migration intention in our model are shown in estimate 5: gender (I1_2), understanding foreign language (I1_8), migration experience (I2_14), fixed workplaces (I3a_8), current employment status (I3a_13), employment situation (I3a_14), total income in group (I3a_6_1), current economic region (hr1), number of close friends (I6_1), proficiency of speaking local dialect (I6_11) and satisfaction with income (I7_3_1).

Table 12 Determinants of return migration

	Estimate 0		Estimate 1		Estimate 2		Estimate 3		Estimate 4		Estimate 5	
	Coef.	Odds ratio	Coef.	Odds ratio	Coef.	Odds ratio	Coef.	Odds ratio	Coef.	Odds ratio	Coef.	Odds ratio
I1_2	,592***	1,808	,544***	1,723	,536***	1,709	,510***	1,665	,526***	1,693	,519***	1,680
I1_6	-,261**	,770	-,253**	,776	-,232*	,793	-,190	,827	-,182	,834	-,163	,850
I1_8	-,631***	,532	-,521***	,594	-,463***	,630	-,464***	,628	-,438***	,645	-,378**	,686
I2_9	-,188	,828	-,253	,776	-,268*	,765	-,260*	,771	-,194	,824	-,208	,812
I2_10	-,326**	,722	-,307**	,735	-,258*	,773	-,248	,781	-,220	,802	-,205	,815
agegroup	,008	1,008	-,034	,967	-,073	,929	-,085	,919	-,102	,903	-,071	,932
I2_14			-,255**	,775	-,258**	,772	-,227*	,797	-,210*	,811	-,223*	,800
I3_1			,353***	1,424	,271**	1,311	,247*	1,281	,180	1,197	,186	1,205
I3a_7_a			-,030	,971	-,027	,974	-,026	,974	-,013	,987	-,023	,977
I3a_8			-,353**	,703	-,364**	,695	-,391**	,677	-,422**	,656	-,387**	,679
I3a_10			,363	1,437	,340	1,406	,386	1,472	,313	1,367	,203	1,225
I3a_13			,558**	1,747	,576**	1,780	,555**	1,741	,532**	1,702	,578**	1,783
I3a_14			,395***	1,485	,399***	1,491	,360***	1,434	,319***	1,376	,307***	1,359
I3a_1_1			-,140	,869	-,133	,876	-,127	,881	-,177	,838	-,152	,859
I3a_2_1			,075	1,078	,093	1,097	,079	1,082	,139	1,149	,139	1,149
I3a_5_1			-,129	,879	-,112	,894	-,112	,894	-,130	,878	-,148	,862
I3a_3_1			-,200	,819	-,216	,806	-,149	,862	-,148	,862	-,168	,845
I3a_4_1			,129	1,138	,113	1,120	,125	1,133	,091	1,095	,095	1,100
I3a_6_1_1			,158*	1,171	,139	1,149	,137	1,146	,176*	1,193	,213**	1,238
I3a_6_2_1			-,007	,993	-,001	,999	-,015	,985	-,083	,920	-,073	,929
I1_9_5					,401*	1,494	,365	1,441	,324	1,382	,366	1,441
I1_9_6					,098	1,103	,048	1,050	,076	1,079	,052	1,053
hr1							,457***	1,580	,232**	1,262	,226**	1,253
br1							-,333***	,717	-,132	,877	-,116	,890
I6_1									,099**	1,104	,109**	1,115

I6_11	-,294***	,745	-,302***	,739
I7_3_7			,101	1,106
I7_3_1_1			,153**	1,166
I7_3_3_1			-,081	,922
I7_3_4_1			-,105	,901
I7_3_11_1			,156	1,169

Note: *** means the variable is significant at the 0.01 level; ** means significant at the 0.05 level; * means significant at the 0.1 level.

Comparison between in-and out-migrated regions

We suppose that determinants of the return migration intention in the in-migrated (the east part of China) and out-migrated (the central and west of China) regions should be different. As a result, in this part, we firstly compare these two regions, then we separate the out-migrated region as central and west, and compare the significant factors in the central and west. The table below explains that different variables exhibit different impacts on return migration intention in the three economic regions. Even though the models are the same – out dependent and independent variables that go to the model are same, but the samples are divided into different groups, thus, the chi-square test is necessary to be done to make the results comparable.

The table below shows the significance of all the possible variables. In the in-migrated region, personal attributes, working condition, location, social participation and job satisfaction all have variables that can predict respondent´s return intention to their place of household registration. While in the out-migrated region, none of the variables related with location and job satisfaction are significant. That is very interesting, because this result shows that respondents who currently located in the central and west don´t care too much about their job satisfaction when they are thinking of going back to their place of household registration, which means, whether they are satisfied with their job or not wouldn´t affect their return intention, neither their birth locations. If we compare the central and west separately, the results demonstrate different again. In the central only some certain variables related with personal attributes, social participation, location and job satisfaction that can be used to predict the return intention. While in the west, personal attributes and job satisfaction are

not significant, only the working condition, social participation and location that are important. The limited samples number could be one of the reasons that job satisfaction cannot predict respondents' intention of going back to their place of household registration. As a result, in the further research it is necessary to do a special investigation to ask the return intention of those persons who are working or living in the central and west or add more samples for our comparison.

Table 13 Determinant comparison of in- and out-migrated regions

	In-migrated region		Out-migrated region					
					Central		West	
	Coef.	Odds ratio	Coef.	Odds ratio	Coef.	Odds ratio	Coef.	Odds ratio
I1_2	,492***	1,636	,664***	1,942	1,202***	3,327	,063	1,065
I1_6	,077	1,080	-,419*	,658	-1,192***	,304	-,204	,815
I1_8	-,404**	,668	-,402	,669	-,427	,653	,139	1,149
I2_9	-,216	,806	-,137	,872	-,393	,675	,027	1,027
I2_10	-,375*	,688	,090	1,094	-,088	,916	,073	1,076
agegroup	,088	1,092	-,206	,814	-,610**	,543	,118	1,125
I2_14	-,030	,971	-,554**	,575	-,478	,620	-,710*	,492
I3_1	,190	1,209	,247	1,280	,115	1,122	,783	2,188
I3a_7	,000	1,000	,000	1,000	,000	1,000	,000	1,000
I3a_7_a	-,019	,982	-,021	,979	-,021	,980	-,021	,979
I3a_8	-,606**	,545	-,213	,808	-,538	,584	,236	1,267
I3a_10	,072	1,074	-,135	,874	,600	1,822	-1,343*	,261
I3a_11	,000	1,000	,000	1,000	,002	1,002	,000	1,000
I3a_13	,767***	2,153	,244	1,276	,720	2,055	-,278	,757
I3a_14	,372***	1,450	,213**	1,237	,233	1,262	,199	1,221
I3a_1_1	,000	1,000	-,572**	,565	-,380	,684	-1,285**	,277
I3a_2_1	-,019	,981	,544**	1,723	,544	1,722	,721*	2,057
I3a_5_1	-,075	,928	-,280	,756	-,366	,693	-,143	,867
I3a_3_1	-,368	,692	,318	1,374	,390	1,477	,126	1,134
I3a_4_1	,277*	1,320	-,361	,697	-,119	,888	-,515	,598
I3a_6_1_1	,228**	1,256	,212	1,236	,238	1,269	,011	1,011
I3a_6_2_1	-,177	,838	-,034	,966	,074	1,077	-,280	,756
I1_9_5	,000**	1,000	,722	2,059	,283	1,327	1,359**	3,891
I1_9_6	,257	1,293	-,318	,728	,264	1,302	-,627	,534
br1	-,283**	,754	,243	1,275	-,695*	,499	,979***	2,662
I6_1	,066	1,069	,180*	1,197	,193	1,213	,130	1,139
I6_11	-,237***	,789	-,311***	,733	-,347*	,707	-,283**	,753
I7_3_7	,078	1,081	,179	1,196	,496***	1,643	-,292	,746
I7_3_1_1	,080	1,083	,207	1,230	-,092	,912	,417	1,518

I7_3_4_1	-,098	,906	-,257	,773	-,098	,907	-,329	,720
I7_3_3_1	-,125	,882	,172	1,188	,155	1,167	,232	1,262
I7_3_11_1	,234*	1,264	,051	1,053	,387	1,472	-,282	,754

Note: *** means the test is significant at the level of 0.01, ** means it is significant at the level of 0.05 and * means 0.1 significant.

Since my purpose of this section is trying to see the coefficient differences among regions, we suppose that all the significant factors can be compared. To test their comparison, I have done some Wald tests to make sure that their coefficients are comparable. Table below shows the tests and the significant variables of different regions. However, if the test value for each variable is significant, the coefficients of this variable in the related two models are dramatically different, which means they are not comparable. In contrast, if the value is not significant, we can compare their coefficients for our analysis. Test 1 compares the distinctions between the east and central, test 2 compares the east and west, the central and west were compared in test 3 while the in-migrated region and out-migrated region were compared in test 4.

Table 14 Wald tests for East, Central and West

	Test 1	Test 2	Test 3	Test 4
I1_2	3,33*	0,74	3,71*	0,34
I1_6	10,01***	0,63	4,05**	3,33*
I1_8	0	0,99	0,75	0
I2_9	0,1	0,17	0,3	0,05
I2_10	0,23	0,74	0,05	1,74
agegroup	4,76**	0,01	2,54	1,65
I2_14	1,26	2,23	0,18	3,18*
I3_1	0,02	1,29	0,97	0,03
I3a_7	0,1	0,88	0	0,87
I3a_7_a	0	0	0	0
I3a_8	0,02	1,79	1,06	0,91
I3a_10	0,49	2,73*	3,94**	0,12
I3a_11	0	0,09	0	0,02
I3a_13	0,01	2,91*	1,64	1,12
I3a_14	0,61	0,53	0,02	1,34
I3a_1_1	1,1	5,32**	2,2	3,65*
I3a_2_1	1,75	3,17*	0,11	3,67*
I3a_5_1	0,67	0,02	0,18	0,57

I3a_3_1	2,98*	0,96	0,22	3,51*
I3a_4_1	1,26	4,22**	0,7	5,23**
I3a_6_1_	0	0,55	0,31	0,01
I3a_6_2_	0,43	0,11	0,68	0,31
I1_9_5	0,11	4,53**	1,01	2,35
I1_9_6	0	2,66	1,08	1,69
br1	1	20,26***	12,55***	6,15**
I6_1	0,69	0,09	0,07	0,96
I6_11	0,29	0,1	0,07	0,41
I7_3_7	4,78**	1,5	5,74**	0,43
I7_3_1_1	0,58	1,42	2,36	0,55
I7_3_4_1	0	0,6	0,39	0,68
I7_3_3_1	0,89	1,06	0,03	0,78
I7_3_11_	0,31	0,39	2,06	0,69

Note:(1) test 1 is the Wald test for comparing the east and central, test 2 compares the east and west while test 3 compares the central and west, and finally test 4 is the Wald test for the in-migrated region and out-migrated region. (2) *** means the test is significant at the level of 0.01, ** means it is significant at the level of 0.05 and * means 0.1 significant.

Understanding foreign language (I1_8) and technical certificates (I2_10) are the only two variables that belong to personal attributes and are significant to predict migrant´s return intention in the in-migrated region but not in out-migrated region. Those who cannot speak foreign language has 0.668 more possibility to return than those who can; and those respondents without any technical certificates present 0.688 more willingness to return than those who have certificates. However, political status (I1_6) is only significant in the out-migrated regions instead of the in-migrated regions: the masses are most likely to go back, and they create 0.658 more possibility in the proportion of log odds of returning than the members of Democratic Party, then the members of the Communist Party.

For the working condition variables, those that are significant in determining return migration intention are fixed workplace (I3a_8), current employment status (I3a_13), employment situation (I3a_14), work days last month (I3a_4_1) and total income in group (I3a_6_1). Except for the fixed workplace, coefficients of the rest variables are all positive. Those employees without fixed workplaces but earn less than 3000 yuan every month and worked more than 20 days last month are most likely to go back, however, none of these

variables can predict the return decision in the out-migrated regions. Only those who don´t have any migration experience (I2_14) and work more than 60 hours per week (I3a_1_1) but worked more than 106 hours last week (I3a_2_1) would most like to return to their place of household registration if they are living in out-migrated region right now. Birth household registration (I1_9_5) and birth region (br1) as well as general satisfaction with the job (I7_3_11) only play significant roles in the in-migrated region. Nevertheless, it´s interesting to see that the coefficient of birth household registration is 0 (or it has an odd ratio of 1), that means even though birth household registration is one of the important factors for predicting respondents´ return possibility, either agricultural household registration or non-agricultural household registration cannot affect their decision-making, this is correspondent with the relaxed household registration system and population migration policies. Besides, respondents who were born in the west economic region present 0.753 more interest in returning than those born in the central, those born in the east are strongest impossible to go back. At last, general job satisfaction can positively impact the retuning, the more respondent is unsatisfied with his work, the less possibility they are going back to their place of household registration. Number of close friends that can offer you support and help (I6_1) is one of the significant variables in the out-migrated region, the more close friends they have in their current location, the less likely they would go back.

However, even same in the out-migrated region, significant factors in the central and west part of China differ. With the regional development and gradual transfer of enterprises from the east to west, the central part can be considered as a transfer region for those returning migrants. From the table above, it is easier to get that variables of personal attributes, social participation and location are significant in the central, working conditions and household registration are more important in the west.

Same like those factors significant in the out-migrated region, gender, political status and age can be used to predict respondent´s returning intention in the central. Although the coefficient of the gender is also positive in our model, In other words, women in the central express 3.33 more interest in going back than men. The odds ratio in the central is 1.6 times

larger than this value in the whole out-migrated region, the possible reason for this phenomenon is that this variable is not significant in determining returning willingness in the west. This also happened in the political status, but its function is negative: the masses are those who are more willing to return. Furthermore, the odds ratio of political status in the out-migrated region is 2 times bigger than this in the central, it means the possibility for the masses to go back to their places of household registration in the former region are stronger than those in the central. Similarly, it doesn´t have any influences in the west. Age can only be used to predict respondent´s return decision in the central. The younger the respondent is, the more likely he would go back to his place of household registration; the older he is, the more possibly he would stay. It is so interesting because age is significant in neither in-migrated region nor out-migrated region, while the central part is the transferring region for migrants, age is one of the most important factors in determining their return intention.

Same like the out-migrated region, it is those who don´t have any migration experiences that are more possible to return, the odds ratio for migration experience (I2_14) is 0.492. This variable cannot be used to predict the return intention in the central since its p-value is bigger than 0.1. Other variables that can be used in the west instead of the central for determining the return intention are full-time job (I3a_10), work hours per week in group (I3a_1_1) and work hours last week (I3a_2_1). With a negative coefficient, respondents who work longer time present 0.277 more possibility to go back to their places of household registration than those who work less. In the west, this value is a little bit smaller than in the out-migrated region. That means work hours per week is more significant in the out-migrated region than it plays in the west, even though this variable is not significant in the central, it´s still one of the most important factors in determining return intention in the out-migrated region. However, work hours last week presents the opposite influences.

Another variable that can be used to predict return intention are birth household registration (I1_9_5), it is only significant in the west, neither in the out-migrated region nor in the central. From agricultural birth household registration to non-agricultural one, respondents with non-agricultural birth household registration show 3.891 more possibility to go back

than those with agricultural household. In other word, in the mind of persons in the west, birth household registration still plays important role in their movement even though the government has released the control of household registration. As shown in the table, birth economic region (br1) is both significant in the east, central and west, but different from the negative influences in the east and central, this factor can determine migrant´s return willingness positively in the west with an odds ratio of 2.662. From the east to the central then to the west, for each one unit increase of the birth economic region, the odds of different levels of possibilities to return reduce 2.662, given that the other variables in the model are held constant. Those who were born in the east economic region are more likely to go back if they are working in the west, and those who were born and are working in the west but not their places of household registration tend to not go back; while this is just opposite in the east of China, it is those who were born in the west but are working in the east are more possible to go back and those who were born in the east and are working in the east would not choose to return.

Proficiency in speaking local dialect (I6_11) always place negative roles in all the regions, all the odds ratios are around 0.7. As a result, the more frequently migrants can understand the local dialect where they are living, the less possible they would return to their places of household registration. Satisfaction with income (I7_3_7) has also been proved to be one of the most significant variables in determining return intention. Same like age, it can only be used to predict return intention in the central China. Migrants who are unsatisfied with their income have less possibility to go back in the central, but in the other regions, people care less about their salaries. Possible reason is that respondents who are living in the east now are more likely to find other jobs and they have more opportunity to stay in the east, so if they are not satisfied with their income, they can easily to find a better job; while those persons who are temporarily staying in the west are either high-level managers who normally earn high incomes or they are living near their hometown, then incomes are not their primary index for making migration decision.

5.1.6 Conclusion

Using database of CLDS 2012 in China, determinants of respondents' intentions to go back to their places of household registration are investigated, with special focus on the comparison of these factors in different economic regions. Within the neoclassical migration theory (NE), according to which migration is an income or utility-maximizing behavior by individuals, work condition determinants can be expected. According to the new economics of labor migration (NELM), migration from out-migrated regions should be understood as a household livelihood strategy and migrants will return once they have been successful in earning sufficient income to accumulate assets and to invest in the origin country.

Taking whole China as the case, factors with significance less than 0.05 can be considered as the determinants of migration return intentions, as a result, we can get the following results. Personal attributes, working condition, social participation and job satisfaction as well as location can all determine respondent´s return intention, but household registration cannot. These variables can be either positive or negative. For personal attributes, political status, understanding foreign language and technical certificates are all important and negative predictors for respondents to make returning decision, while gender is a positive factor. That means, the members of Communist Party who can speak foreign language and have technical certificates are the last persons that want to go back to their household registration places. Besides, male express more interest to return than female because of the limitations of social norms and attitudes on females. Significant variables relating with working condition include migration experience, agricultural experience, fixed workplace, employment and employment situation. Current economic region and birth economic region predict the most unique geographical variance in migrant´s return intention in China. Respondents who are living in the east but were born in the western economic region are most likely to go back. Besides, number of close friends, proficiency in speaking local dialect and satisfaction with income also significantly correlated with migrant's return intentions, answering calls for research to examine the impacts of social participation and job satisfaction (Wheeler & Miller, 1995) and adding a new and important case for return

migration analysis. What is unexpected is that neither current household registration nor birth household registration is statistically correlated with return intention. Actually, household registration is supposed to be one special policy that can affect the migration in China, but the higher p-value denies this possibility.

However, if we separate China into three economic regions (the east, the central and the west), and divide them into in-migrated (the east) and out-migrated (the central and west) regions, we can compare the difference of determinants in these two regions. At the same time, we should notice that the factors may be different in the central and west even they are all out-migrated regions. The central can be considered as a transferring region for the migrants while the west is a kind of pure out-migrated region. The hypothesis is that personal attributes and social participation are significant in the central, working conditions and household registration can affect in the west. From our results, we can see that the significant variables of in- and out-migrated areas differ: in the in-migrated region, personal attributes, working condition, location, social participation and job satisfaction all have variables that can predict respondent´s return intention; while none of the variables related with location and job satisfaction are significant in the out-migrated region.

5.2 Industrial relocation and employee´s willingness to relocate

5.2.1 Introduction

Population research has so far received huge amount of attentions among scholars and policy makers, it is one of the most important question related with social and economic development. One of the basic rules describing and explaining migration processes says that each main current of migration produces a compensating counter-current (Ravenstein, 1885). That is to say those countries which have experienced national outflows should expect that at least some of them will return to the homeland in the near or more distant future (Lesińska, 2013). Same situation can be occur among regions or even smaller areas, as a result, regional migration can be also accompanies by return migration in the future, especially after enterprise relocation or industrial restructure. Actually, large amounts of factors can influence return migration. The main purpose of this section is to see these impacts of industries on returning, as a result we attempt to find out the relationship of the industrial relocation and employee´s willingness to relocate in China to talk about the industrial relocation and labor migration.

Empirical cases have been induced to identify the factors that influence employee´s willingness to relocate (Landau, Shamir et al., 1992). The earliest study is from Veiga, he found that career stage, barriers to moving, career path factors, and motives for moving, on managers' propensity were significant in affecting employee's acceptance of career movement opportunities (Veiga, 1983). In Gould & Penley´s (1985), employee's relocation willingness can be largely influenced by time-based variables (age, job tenure, length of time in the community) and situational variables (spouse's employment status, salary, degree of job involvement). While Landau & Hammer considered job tenure, perceived match between organizational criteria for mobility and personal characteristics, and the availability of performance feedback from peers and supervisors can determinant employee's belief

regarding movement opportunities within organization (Landau & Hammer, 1986). Noe, Steffy & Barber investigated the influence of 1,076 state employees' career stage, family characteristics, job tenure and specialization, and perceptions of job favorability, movement, and career development Opportunities on willingness to accept upward, lateral, and downward mobility opportunities (Noe, Steffy et al., 1988). At the same time, Pinder (1989) investigated the effects of relocation on employees. He found out that a transfer caused the interests of the employer to invade an employee's personal life more directly and more significantly than almost any other type of organizational practice. Besides, he explored the often-neglected aspects of organizational transfer policies: the financial, social, and psychological effects on the transferred individuals.

The study differs from previous research on relocation in a number of ways. It has been proved that lots of possible variables can impact employee´s intention to relocate from the previous empirical studies, as well, few studies have investigated the effects of relocation on employees, not to say analyzing the influences of industrial relocation on employee´s migration intention. Here in this section our survey asked relocation situation of respondent´s enterprise directly and trying to find out their direct impacts on employ´s willingness to relocate. Besides, there is still dearth of data scarcity. Here, for the first time, we use the employee data from the CLDS in 2016 for Chinese relocation willingness analysis.

Trying to find out the influences of the industrials or enterprises relocation or restructure on employee´s willingness to relocate is the main purpose of this section. The structure of the whole section is organized as follows. After the introduction, this section can be divided into four parts. First of all, I briefly conclude the theoretical perspectives on industry-relocation-induced migration and some empirical cases. This is followed by the description of the data resources and methodology, the second half of this part contains both the explanation of the method used and the variables needed in the formulation. The third section focuses on the detailed analysis of the presentation and interpretation of findings. Finally, I conclude by summarizing the findings and their theoretical and methodological implication (with recommendations for further research and policy

implication as well as the limitations in the research.

5.2.2 Model and related factors

Hypothesis supposes that related factors in the model which could influence willingness to relocate include individual attributes, career attributes and industrial relocation. Derived from institutional theory and theory (about behavior), industrial relocation factor can be considered as intervening variables. In the present study, the behavior is the decision to accept or reject a job transfer that requires a geographical relocation. The behavioral intention is willingness to relocate (Brett & Reilly, 1988).

Employee´s willingness to relocate

Brett & Werbel and Gould & Penley have treated willingness of relocation as predictor of the decision to accept or reject a transfer (Brett & Werbel, 1980; Gould & Penley, 1985). Many turnover models include intent as a mediator and as the proximal predictor of behavior (Mobley, 1977; Williams & Hazer, 1986).

Personal attributes

Age, marital status, gender, political status, household registration, education are the possible demographic variables that might show significance in determining employee´s willingness of relocation. It is suggested that gender may influence employee´s willingness to move (Anderson, Milkovich et al., 1981; Markham & Pleck, 1986; Angle & Manz, 1988; Brett, Stroh et al., 1993). However, empirical evidence of relationships between some of the demographic variables and willingness to relocate is mixed. Angle & Manz (1988) and Brett & Reilly (1988) proved that age was not a significant predictor for willingness to relocate; while others suggested that older employees normally didn´t want to move, while yongger employees are more willing to move (Marshall & Cooper, 1976; Brett & Werbel, 1980; Anderson, Milkovich et al., 1981; Gould & Penley, 1985). For marital status, reseachers have different opinions on its significance on people´s willingness to relocate. For example, Brett & Reilly (1988) declared that married employees were more willing to relocate because of their

family support, but Markham announced the opposite conclusions (Markham, Macken et al., 1983), and there was also some results indicated that marital status was not significant in impacting the willingness to relocate (Angle & Manz, 1988). Education level has more or less the same influences on employees´willingness to relocate, eirhter significant or non-important. The former can be proved by researches of Blomquist in 1982, he verified that employees who are willing to relocate are better educated than those who reject to relocate; but the latter didn´t consider educational level as a predictive variable (Brett & Werbel, 1980; Brett & Reilly, 1988).

Considering the special situation in China, household registration and political status are two of the important and possible variables impacting employee's willingness to relocate. Household registration is always one of the significant policies for Chinese government to control the movement of the population. Since its establishment in the 1950s, the Chinese hukou system has categorized citizens according to both place of residence and eligibility for certain socioeconomic benefits (the latter via designation as either "agricultural" or "non-agricultural" residents), effectively limiting opportunities to migrate from rural areas to cities (CONGRESS, 2005; Wang, 2005). Then the system has been eased (during the late 1970s to the mid-2000s) somewhat over time but remains regarded as both a strain on labor movement and unfair.[31] The privatisation of farming led to a surplus of rural labour while economic development increased in urban areas[32], migrant workers don´t have the right to enjoy social benefits and public education for their children in the cities where they work, especially hard in large cities like Beijing and Shanghai. Even though government have deepened and expanded the prior Hukou reforms, Hukou system is still one of the most important policies for controlling migration in China. As a result, it is unavoidable to take household registration into consideration when we try to find out the determinants of employee´s willingness to relocate. Political status is significant in determining population migration, while job transfer is one kind of labor migration, we can suppose that political status is predictive variable for the willingness of relocation. Shi & Yang (2012) state that

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[31] https://www.cecc.gov/publications/issue-papers/cecc-special-topic-paper-chinas-household-registration-system-sustained
[32] http://economicstudents.com/2014/03/a-brief-history-of-chinas-hukou-system/

members of communist are more likely to stay in local areas instead of going out for job; Yan (2006) demonstrates that it is easier for members of communist to find an ideal job, so they would prefer to stay instead of relocating with jobs.

Work situation

We suppose that work situation variables that may influence employee´s transfer are work time, functional area and income, each of them contains 2 or 3 secondary indicators. Empirical literatures focusing on the relationship between employee willingness to relocate and functional area and income also show mixed patterns of results which are likely affected by the characteristics of the samples in various studies.

Employees work in different functional areas would vary in their willingness to relocate (Brett & Werbel, 1980; Brett & Reilly, 1988). They all reported that employees who are working in sales, operations and marketing are more willing to relocate than those in other functional areas. In most companies, certain functional areas tend to be more stable (e.g., accounting) than others (e.g., sales and marketing) (Brett & Werbel, 1980). For instance, employees in sales, operations and marketing have realistic expectations about the relationship between career advancement and geographic mobility, this willingness to relocate may reflect in part self-selecton (Brett & Reilly, 1988).

Income has been considered as a potential predictor of employee´s willingness to relocate in the previous studies, findings relating income to willingness to relocate also show no patterned relationship (Blomquist, 1982; Sell, 1983; Gould & Penley, 1985; Markham & Pleck, 1986). For example, Blomquist in 1982 found that employees with higher-than-average incomes are more likely to move. In 1983, Sell found the positive correlations between socioeconomic status and frequency of transfers, and this was further studied by Gould and Penley (1985), they proved that salary has positive function on employee´s transfer. Employees with high incomes may be more willing to take on the financial risk of relocation than lower-income employees. While Markham & Pleck (1986) report a negative relationship between perceived income adequacy and willingness to relocate. Income variables in this

article contains three parts: total income, salary and operating income. We expected a negative relation between these salaries and willingness to move because, in our sample, rejecting a transfer did not mean the employee would lose his job. Of course, I suppose that a variety of other work condition variables (such as work time) maybe also predictors of willingness to relocate.

Industrial relocation

Five of the industrial relocation variables will be examined: Migrated companies (in-migrated and out-migrated) in employee´s residence or working places; has the enterprise relocated or semi-relocated in recent years; future enterprise relocation direction/route and future enterprise relocation range. The main purpose of this section is to find out the correlation between industrial relocation and employee´s job transfer, we suppose that these variables can be assumed as predictive variables for willingness to move in this study. Since this is the first time to test the functions of enterprise movement, we didn´t find any previous literatures.

Migrated companies in the residence or working place. It contains both in-migrated and out-migrated companies in respondents´ residence or working places. In-migrated companies are supposed to be positively correlated with employee´s willingness to move. That's because in-migrated companies in employee´s residence or working places will certainly produce more choices and options. In this way, except for relocating with their companies, it would be easier for employees to change and find another job. As a result, the more companies migrated in employee´s residence or working places, the less they are willingness to relocate with their companies. However, we suppose either negative or no effects of out-migrated companies. One the one hand, as opposite to the in-migrated companies, more out-migrated companies means fewer job opportunities. If employee don´t have too many options, they would like to accept to transfer with their job. On the other hand, employees who purchase stable life would only care about their own companies, so it doesn´t matter whether there are out-migrated companies in the residence or working

places or not.

Enterprise relocated or semi-relocated in recent years. This variable asked respondents if their current companies experienced any relocation or semi-relocation in recent years. It is supposed to influence employee´s willingness to relocate positively. Employees in the companies that have relocated or semi-relocated in recent years and will relocate or semi-relocate again in the future would be more likely to transfer with their jobs, while those who are working in the companies without any relocation or semi-relocation experiences normally don´t have transfer decisions.

Future enterprise relocation direction/route and future enterprise relocation range. These two factors are both related with industrial future relocation intention. Relocation direction/route may have competing effects on an employee's willingness to move. On the one hand, employees who are working in the companies that will relocate from the periphery to the center may be eager to transfer with their jobs; on the other hand, industrial relocation between peripheries and centers may result in a gap of living standard, those who move from center to periphery with their companies are not happy to reduce their living standard while those who relocate from periphery to center may not be able to afford the higher cost of living in the new location. The final potential predictor for intention of job transfer is relocation range. We anticipated a positive relation between enterprise relocation range in the future and intention of movement, in which the further the enterprises are relocated or semi-relocated, the further employees are going to leave where they are living now, thus the less willing they are going to transfer.

5.2.3 Methodology

The data used here stem from "The China Labor Force Dynamic Survey" of 2016, conducted by Centre for social survey of Sun Yat-sen University. During July to September of 2016, face-to-face interview were carried out among 250000 residents in China, who are between the age of 15 to 65, either work or not. It is a rotation research and conducted every two

years (the pre-research was held in 2011, until October of 2016 the first national survey and two rounds of rotation surveys have been carried out). CLDS was designed to concentrate on status quo and evolution of Chinese labors, which covers education, work, migration, health, social participation etc. In order to make sure the randomness of selecting samples, this survey use computer to select potential research areas randomly. That is to say, the computer will select different number of cities as sub-unit of selection (capital city and key developed cities are necessary), then counties (or villages) followed by household. According to different size and economic development of the county (or village), some 75, 100 or 150 samples of household would be chosen. Each household was coded by a unique number based on field investigation (the field investigation was made to make sure that each household is not empty). In order to assure the randomness and accuracy of the samples as well as to save more samples for the rotation research of the next period, this survey asks interviewers to get access to each sample as much as possible. If they want to drop this sample, they need to, at least, visit and be rejected by one same household more than 3 times, then they can ask for a new sample.

However, the hypothesis in this research is about the influences of industrial relocation on employee´s willingness to relocate, so our research unit here are those employees whose enterprises have the intention to relocate, semi-relocate or restructure in the future. Finally, we can get 329 samples with missing value rate less than 2%.

The survey contains extensive information on the relocation situation of respondents' enterprises and asked their future plans responding with this relocation. This offers the unique opportunity to study a variety of factors on industrial relocation as well as their impacts on labor migration. But there is one main drawback: those labors whose enterprises don´t have the intention to relocate may also have the likelihood to migrate, only that they cannot migrate with their current enterprises, but here I only want to study those in industries with relocate intentions. Besides, respondent´s attitudes to their job, their prior migration experiences and spouse´s working situation all have been proved to be significant factors for employee´s willingness to relocate, but here we just want to see the correlation

between industrial relocation and job transfer, so we fail to put so many variables. Maybe in the future research we can put all the variables together for this analysis.

The personal attribute and work condition variables are shown in the descriptive table below. The former is constituted by gender (1=male, 2=female), age (in three age groups: 1= under 30, 2= between 31 and 45, 3= older than 45), marital status (1=single, 2=married), household registration(1=agricultural, 2=non-agricultural), political status (1=members of communist, 2=members of democratic party, 3=the masses) and educational level(1=no education, 2=high school, 3=college or bachelor, 4= master and more). 63% of the total sample is male and 77.5% have got married. Respondents who didn´t receive any education only accounts for 1.8%, and almost half part of the sample received college or bachelor degree. 58.4% of the sample has agricultural household registration, the majority of the sample ages between 31 and 45.   The latter contains work time (work hours per week and work days per month), income (total income, salary and operating income), work unit type and industrial type. The hypothesis for working time is that the longer time employees work per week and per month, the more likely they are going to migrate. Work hours per week is coded as "1" if respondents work 40 hours or less per week, "2" if they work between 41 and 60 hours, "3" means they work more than 60 hours per week; work days per month are divided into three groups ("1" for 20 days or less, "2" for 21 to 25 days which accounts for 43.5%, "3" for those who work more than 25 days per month, this part of employees reach a 38.9%. Income variables are also categorized into three groups ("1"for 50000 Yuan or less, "2" codes for income of 50000-100000 Yuan, and "3"for more than 100000 Yuan. Participants are also asked about their work unit type and industrial type. Functional areas are always considered as one of the significant factor for willingness to relocate. Nominal coding is used to indicate different type of work unit and industries as showed in the following table.

Except for respondents´ basic information, the industrial relocation information is most important. As the table shows, variables related with industrial relocation assess if there are in- or out- migrated   companies in your residence or working places, has your enterprise relocated or semi-relocated in recent years. They are all dummy variables, respondents

answer "yes" or "no" which are represented as 1 and 2 in the database. Enterprise´s future relocation intentions are assess by asking enterprise relocation direction/route and relocation range. The former question contains three answers like (1) From periphery to center or from undeveloped area to developed one; (2) From center to periphery or from developed area to undeveloped one and (3) more or less the same region. Response alternatives ranged from (1) the same city, (2) different cities of the same province and (3) different provinces for the latter question.

Table 15 Variables description

Variables	Frequency	Percent	Min	Max	SD
Employee´s willingness to relocate with company	329		1	2	0.485
Yes	206	62.6			
No	123	37.4			
Gender	329		1	2	0,4838
Male	207	62,92			
Female	122	37,08			
Marital status	329		1	2	0,4182
Single	74	22,49			
Married	255	77,51			
Education level	329		1	4	0,5745
No education	6	1,82			
High school	160	48,63			
College or Bachelor	156	47,42			
Master or higher	7	2,13			
Household registration	329		1	2	0,4937
Agricultural	192	58,36			
Non-agricultural	137	41,64			
Agegroup	329		1	3	0,7178
<=30	84	25,53			
31-45	160	48,63			
>45	85	25,84			
Political status (I1_6)	329		1	3	0,7639
Member of the Communist Party of China	58	17,63			
Member of a democratic party	1	0,30			
The masses (qunzhong)	270	82,07			
Industrial type (I3a_8)	329		1	16	4,6518
Agriculture/Forestry/Husbandry/Fishery	2	0,61			

Mining		4	1,22			
Manufacturing		119	36,17			
Production and supply of electricity, gas and water		4	1,22			
Construction		31	9,42			
prospecting and water conservancy management		1	0,30			
Transportation, storage and communication		26	7,90			
Wholesale retail trade and catering services		31	9,42			
Finance and insurance		6	1,82			
Real estate		4	1,22			
Social services		12	3,65			
Sanitation, sports and social welfare		14	4,26			
culture and arts, radio, film and television industry		27	8,21			
Scientific research and comprehensive technical services		7	2,13			
State Organizations, Party and Government Authorities and Social Group		20	6,08			
Others		21	6,38			
work unit type (I3a_9)	329			1	11	2,4695
Party and government organs, mass organization and army		12	3,65			
State owned/ collective institution		48	14,59			
State-owned enterprise		53	16,11			
Collective enterprise		7	2,13			
Village committee and other autonomous organizations		8	2,43			
Privately-owned enterprise		131	39,82			
Sino-foreign joint ventures		32	9,73			
Private non-enterprise organization, association and other social organizations		2	0,61			
Privately or individually-owned business		20	6,08			
Farming: Agriculture, forestry, husbandry and fishery production		0	0,00			
Free-lancer		16	4,86			
Total income	329			1	2	0,4420
0-50000		222	67,48			
50000-100000		80	24,32			

>100000		27	8,21			
Salary	329			1	2	0,4011
0-50000		251	76,29			
50000-100000		63	19,15			
>100000		15	4,56			
Operating income	329			1	2	0,2992
0-50000		291	88,45			
50000-100000		32	9,73			
>100000		6	1,82			
Work time per week	329			1	3	0,7039
<=40		164	49,85			
40-60		122	37,08			
>60		43	13,07			
work days per month	329			1	3	0,7223
0-20		58	17,63			
21-25		143	43,47			
26-31		128	38,91			
In-migrated companies in your residence or working places	276			1	3	0,5987
Yes		65	19,76			
No		211	64,13			
Out-migrated companies in your residence or working places	267			1	3	0,6735
Yes		89	27,05			
No		178	54,10			
Has your enterprise relocated or semi-relocated in recent years	329			1	2	0,3941
Yes		63	19,15			
No		266	80,85			
Enterprise relocation direction/route	329			1	3	0,7762
From periphery to center or from undeveloped area to developed one		82	24,92			
From center to periphery or from developed area to undeveloped one		127	38,60			
More or less the same		120	36,47			
Enterprise relocation range	329			1	3	0,6213
same city		223	67,78			
different cities of the same province		82	24,92			
different provinces		24	7,29			

With 18 independent variables totally, we are trying to study the impacts of enterprise relocation on labor migration intention. The question for respondents´ migration intention is

"If your enterprise has the intention to move in the future, do you want to migrate with it?",
the answer is measured by 1 for "Yes" and 2 for "No" . The SD value of the dependent
variable is 0.485 with the mean of 1.37.

5.2.4 Results

Before binary logistic regression analysis, data cleaning and some basic tests are quite
necessary. As we mentioned before, we have selected 329 samples and 18 variables based
on our research unit, but there are some missing values and outliers that can affect the
regression results. Because the missing value rates are all less than 3%, so we use the
Median value of the nearby points to replace the missing ones. Then we checked the outliers
in the database, and we notice that only I3a_3 (work days per month), I3a_6 I3a_9
I3a_21_w16 I3a_23_2_w16 I3a_23_2_3_w16 I3a_23_3_3_w16 that have 14 outliers totally,
as a result, the easiest way is just delete and replace them. Then we try to see the
collinearity of all the independent variables, results show that all the Variance Inflation
Factors (VIF) are less than 5 (actually between 1 and 2.5), which means there are no
collinearity among all the variables and we can continue with the regression analysis.

However, the representativeness of the data is also very important for the accuracy of the
final results, the representativeness tests indicate that the data we select is very
representative. Take highest education for instance, the percentage of respondents without
any education experiences and those with education experiences 0.02: 0.98 for our data,
compared with 0.05:0.05 for the total population of China (the margin of error for this
sample size is 5.5%). Similar representativeness is represented in the age-group, the ratio of
respondents aged between 15 and 30 divided by those aged between 30 and 65 is 0.26: 0.74,
while this number is 0.33:0.67 for the total population analysis in China. Since the difference
between these rates and the margin of error is not so big, it is still representative.

The classification table below shows the overall predicted percentage in step 0 is 62.6%. That
is to say if we put all our 18 variables into the equation, 62.6% of the situation can be

explained by the model. Then this value reaches 69.3% in step 13, it means the model after step 13 can explain the migration better with higher predicted percentage. At the same time, the variables in the equation table (1) shows that the hypothesis of none of the variables are significant with the dependent variable is small probability event, the significance is less than 0.01. For the model summary table , we can easily to see that -2 Log likelihood value increased from 365.664 to 377.228, even though their Cox & Snell R Square and Nagelkerke R Square reduce by 0.03-0.04, they don´t have too much influence on the final results. In each step the Nagelkerke R Square is around 0.2 which is not so high, but compared with this value the most important thing is the overall predicted percentage, so in general this regression can explain the influences of industrial relocation on migrants´ intentions.

Table 16 Predicted percentage of the model

Observed			Predicted		
			Do you want to migrate with your company		Percentage Correct
			yes	no	
Step 0	D_Do you want to migrate with your company	yes	162	0	100,0
		no	100	0	0,0
	Overall Percentage				61,8
Step 13	D_Do you want to migrate with your company		131	31	85,9
			54	46	41,5
	Overall Percentage				67,6

Table 17 **Variables in the Equation**

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-,482	,127	14,390	1	,000	,617

Table 18 **Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	286,849[a]	,209	,285
2	286,868[a]	,209	,285
…	…	…	…
13	296,157[b]	,181	,246

Table of variables in the equation (2) lists out the variables that construct our final model, they are the ones that are statistically significant to the migrate intentions, what we should notice is that the significance values of gender and political status is a little bit more than 0.05, but these two variables are still in the equation, that's because the default criterion for eliminating the variables from the model is 0.1, it means variables in 90% statistically significant can be in the equation.

Political status and household registration are significant variables in the personal attribute category. It is proved that political status is negatively correlated with employee's willingness to relocate, the coefficient is -0.376 with a significant value of 0.7. That means the masses are easier to migrate than members of Communist Party and members of the democratic parties. This follows the special political conditions of China, because on average, members of Communist Party are higher educated and skilled than the rest, so they normally enjoy high salary jobs and are in a relatively stable work status, they are the last ones that want to migrate. Odds ratio for political status is 0.687. That is to say, compared with the members of Communist Party, members of the democratic parties are 0.687 times more likely to relocate with their enterprises, and the masses present 0.687 times more than the democratic ones.

Household registration in China is also one of the most important policies for the government to control the movement of the migration. As mentioned before, it is just until the 1980s that the government began to release the limitation of the agricultural and non-agricultural household registration. Even until now the Hukou is directly related with the stable life of employees and their family. Obtaining the local Hukou means you can buy a flat in your work place and your kids can attend local kindergarten and primary school successfully. Same like political status, household registration also plays a negatively role in determining employee's willingness to migrate with their company, which is significant at the level of 0.05. This coefficient value is -0.727, the absolute rate is 2 times of the political status, while presented in the odds ratio, this value is 0.483. As a result, we can say that employees

with agricultural household registration is less likely to relocate with their jobs. This fits the situation that they prefer stable life, if they feel that they can earn enough money for themselves and their family, they are more likely to stay with their jobs right now instead of relocating.

Jeanne, Linda and Anne in 1993 identified that employees in production were the most willing to move, followed by those in sales and marketing and those in personnel (Jeanne and Anne 1993). However, with our data we get the opposite results. There is a negative correlation between industrial type and employee´s willingness to accept a job transfer. The industrial type in China is divided into 16 different categories: from 1 to 16 they are Agriculture/Forestry/Husbandry/Fishery, Mining, Manufacturing, Production and supply of electricity, gas and water, Construction, Geological prospecting and water conservancy management, Transportation, storage and communication, Wholesale retail trade and catering services, Finance and insurance, Real estate, Social services, Sanitation, sports and social welfare, Education, culture and arts, radio, film and television industry, Scientific research and comprehensive technical services, State Organizations, Party and Government Authorities and Social Group and others. The negative coefficient (the coefficient is -0.078, the odds ratio is 0.925) indicates that employees who are working in the Agriculture/Forestry/Husbandry/Fishery department are 0.493 times less likely to relocate with their job than those in department of mining, and those in the department of manufacturing is 0.925 times less likely to move than those in the department of production. Compared with the result of Jeanne, Linda and Anne, employees in production were less willing to migrate, followed by those in sales and marketing, and those in personnel are most likely to relocate with their job. Even the opposite result has been proved by our data, we should, at the same time, notice that the coefficient is very small (and the odds ratio is close to 1), so it means the difference between each industrial type is 5 times less than the influence of political status.

Another significant variable predicting willingness to relocate in the category of working condition is worktime, here is specially the work hours per week. The result for work hour

groups is complicated. In general, work hour group is significantly correlated with willingness to move at the level of 0.05. Considered the third group (employees who work more than 60 hours per week) as the reference, the coefficient value of employees working less than 40 hours is negative (-0.708). That means those who work less than 40 hours are 0.493 (the odds ratio is 0.493) times more likely to transfer with work than those who work more than 60 hours per week. While this coefficient is positive (0.066) when we compare those work more than 60 hours and those with 40 to 60 hours work, the odds ratio for the second group is 1.068. In other word, employees who work more than 60 hours per week are 1.068 times more willing to move than those who work 40 to 60 hours per week.

The principle purpose of this section is going to see the influences of industrial relocation on employee´s willingness to relocate, from the table below we can get that those variables that are significant in determining the willingness are in-migrated industries in your residence or working places (qc5_i3a_21_w16_1) and industrial relocation range (qc5_i3a_24_2_w16_1). Employees whose residences or working places have in-migrated industries are more likely to transfer with their jobs than those without in-migrated industries. The coefficient is 0.84, which means the former are 2.32 times (the odds ratio is 2.23) more willing to transfer with their company than the latter, this variable is significant at the level of 0.05. The correlations and a series of partial correlational analyses indicated that part of the explanation for this relationship was that older employees perceived their future career opportunities as less bright than younger employees and therefore were less willing to relocate than younger employees.

Industrial relocation range is a nominal variable, it ranges from town/city to province in 3 levels. Same like the in-migrated industries, relocation range is also positive with the willingness to transfer with a coefficient of 0.971. If the industry just relocate in the same city/region, employees are most likely to transfer with their jobs; while for those industries that will move to other provinces, their work staffs are less willing to relocate. The 0.925 of odds ratio implies that workers whose companies just have the intention to relocate in the same city or region are 2.642 times more probably to transfer with their jobs than those

whose companies will relocate to different cities/regions but in the same province, and so on. This variable is significant at the 0.01 level.

Table 19 Modelling industrial relocation and labor´s willingness to relocate

	B	Odds ratio	S.E.	Wald	df	Sig.	Exp(B)
qc3_i1_6_1	-,376	0,687	,208	3,283	1	,070	,687
qc5_i3a_8_1	-,078	0,925	,033	5,574	1	,018	,925
qc5_i3a_21_w16_1	,842	2,320	,364	5,347	1	,021	2,320
qc5_i3a_24_2_w16_1	,971	2,642	,240	16,355	1	,000	2,642
workhour_group_1		1,000		6,032	2	,049	
workhour_group_1(1)	-,708	0,493	,428	2,736	1	,098	,493
workhour_group_1(2)	,066	1,068	,417	,025	1	,875	1,068
Householdreg_1	-,727	0,483	,312	5,416	1	,020	,483
Constant	-,492	0,611	1,082	,207	1	,649	,611

However, some of the interesting findings are related with those variables that are not significant correlated with employee´s willingness to relocate in the regression. It is presented in the results that both age and gender cannot predict employees' willingness to relocate, neither does educational level nor marital status. In other word, the results imply that in 2012 in China, neither gender nor marital status (or educational level) can be used as surrogate measure of willingness to relocate. When female employees, married employees, and employees with higher educational level receive and have accepted relocations in the past, they are as willing to relocate in the future (Jeanne & Anne, 1993).

Nevertheless, it is surprising to see that neither a linear nor a curvilinear relation exist between the income (it includes total income, salary and operating income) and employee´s decision to accept a job transfer. Gould & Penley (1985) identify positive correlations between salary and willingness to relocate. Brett & Reilly (1988) think that employees with high incomes may be more willing to take on the financial risk of relocation than lower-income employees (Brett & Reilly, 1988). At the same time, factor of out-migrated

companies in employees´ residences or working places is not significant in predicting employee´s willingness to relocate, while the in-migrated industry is positively correlated.

5.2.5 Conclusion and discussion

The aim of the study is to examine the correlates of industrial relocation and employee´s migration intention. Findings suggest that migration intention can be predicted given information about the employee´s willingness to relocate with job. Personal attributes, working condition and industrial relocation are all associated with their willingness to move. Employees who are masses with non-agricultural household registration are more willing to relocate with their jobs. Working less than 40 hours per week raise employee´s willingness to move, but it doesn´t mean the less hours they are working per week, the more they are willing to transfer with job, those who work 40 to 60 hours are less likely to move than those work more than 60 hours. Different industrial type varied with respect to employee´s willingness to relocate: employees in agricultural are least willing to migrate, followed by those in production, then those in sales and marketing, and those in personnel are most likely to relocate with their job. Having in-migrated industries in respondent´s residence or working places increases their possibility of relocating. And an employee is more willing to accept short-distance relocation, like relocation between cities rather than move to other provinces.

There is no doubt that political status and household registration are two of the significant variables for predicting employee´s intention to relocate under the special conditions of China, but the lack of a significant effect of incomes on willingness to accept job relocation is really surprising. The failure to find a significant effect for incomes on employee´s willingness to accept job movement may be due to the small size of the sample. Companies with intention of relocation or semi-relocation only account for 5.9% with the total size of 5623 (5623 employees were asked if their companies had the intention to relocate or semi-relocate in the future).

This study is important because it is one of the first attempts to analyze the influences of industrial relocation on employee's willingness to relocate. Although we have got the results that in-migrated enterprises in employee´s resident or working places and industrial relocation range are positively correlated with their intention to transfer from our regression analysis, there are still lots of aspects that we need to pay attention to. First, we only have 329 samples in our study, compared with the 1.3 billion population in China, it is not so significantly representative for interpreting our results quite well. Maybe in the future study we can add more samples. Secondly, variables related with industrial relocation only contain basic questions, it´s better to design more variables related. Besides, studies that investigate the significance of job satisfaction on employees' willingness to relocate are needed.

Chapter 6 Empirical analysis of Foxconn

In the above analysis, I have compared the differences of determinants that can affects labors´ returning to their places of household registration in the in-migrated regions and out-migrated regions, as well as the impacts of industrial relocation on labor mobility. They are all quantitative analysis based on questionnaires of CLDS (2012 and 2016). Quantitative Research is used to quantify the problem by way of generating numerical data or data that can be transformed into useable statistics. It is used to quantify attitudes, opinions, behaviors, and other defined variables – and generalize results from a larger sample population, is one of the most convenient and practical methods for researching. Nevertheless, it demands high quality and quantity information and materials, also it has limitation in explaining complex and diverse causes of human behavior.

However, qualitative research is more frequently used in in-depth exploration of the nature of the object. It gathers information that is not in numerical form, for example, diary accounts, open-ended questionnaires, unstructured interviews and unstructured observations. Qualitative data is typically descriptive data and is useful for studies at the individual level, and to find out, in depth, the ways in which people think or feel. Thus, qualitative research can offer various information that quantitative research cannot get, is the compensation of quantitative research, is another way for interpreting labor mobility.

As a result, in this chapter I will take the Foxconn as my case study to take some in-depth interviews for knowing how its employees respond when it relocates to other regions. There are several reasons why I choose this company: first of all, Foxconn is the world's largest electronics manufacturing services (EMS) provider, it expanded rapidly in China from the south to north then to the central and west, until 2015 it has more than 30 subsidiaries and branch offices in China. Its relocation is typical for understanding the industrial movement in China. Secondly, Foxconn has a workforce of around one million employees, it is normal to

see labor mobility in this company. Therefore, Foxconn is the best choice for us to understand the labor mobility under industrial relocation. Then we will start our explanation from the basic introduction of the industrial relocation and employees in Foxconn.

6.1 Introduction

Foxconn Technology Group (also named Hon Hai Precision Industry), is a Taiwanese multinational electronics contract manufacturing company headquartered in New Taipei City, Taiwan. Foxconn is the world's largest contract electronics manufacturer[33] and the third-largest information technology company by revenue. [34] Information processing technology is a cornerstone of Foxconn's sustainable business strategy. Foxconn adopts an industry-leading e-enabled Components, Modules, Moves and Services (eCMMS) business model that enables our company to provide innovative, efficient, cost-effective, and flexible one-stop integrated service solutions to leading electronics companies operating throughout the global computer, communications and consumer electronics (3C) industry. In addition to delivering on our strategic business blueprint, Foxconn is leveraging the immense opportunities presented in the Internet of Things and Big Data era to ensure that our company remains at the core of the ICT ecosystem, driving synergy and opportunities across the industry value-chain, from hardware to services and other technology solutions. In 2013, the value of Foxconn's manufacturing accounted for 3.5 percent of China's total imports and exports. In addition, Foxconn is ranked number 31 on the 2015 Fortune Global 500, a ranking of the top 500 global companies by revenue.

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[33] "Strikes End at Two Chinese Automotive Suppliers". Reuters. 2010-07-22.
[34] "Top 50 Global Technology Companies". Datamonitor.
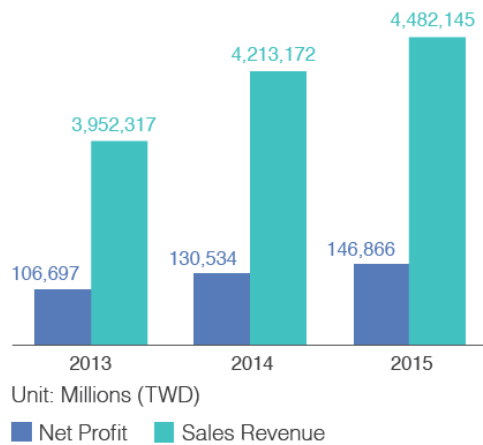
Figure 22 Foxconn sales revenue and net profit growth

6.2 Industrial relocation and employees in Foxconn

Founded in 1974 by Terry Gou as a manufacturer of electrical components.[35] Recently, Foxconn continuously invests in enhancing our capabilities in research and development (R&D), design and engineering services. With China as the center of the Group's business and development, Foxconn has continued to expand our footprint to countries across the globe. Our international operations and global expansion are guided by our strategy of having two R&D clusters, one in Greater China and the other in the United States, and three design and manufacturing zones across Asia, the Americas and Europe, with Mainland China as the center, and operations that enable worldwide delivery to our global customers. To date, Foxconn has more than 200 subsidiaries and branch offices in Asia, the Americas, and Europe.

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[35] Balfour, Frederik & Culpan, Tim (September 9, 2010). "Everything is Made by Foxconn in Future Evoked by Gou's Empire". Bloomberg News.

Figure 23 Subsidiaries and branch offices of Foxconn in the world

6.2.1 Industrial relocation in mainland China

Foxconn initiated its first investment in mainland China in Longhua Town, Shenzhen city in 1988[36] then until 2016, it has expanded to more than 20 provinces in China, from the Pearl River Delta to the Yangtze River Delta, from southeast to southwest and northwest. The following figure shows the distribution of Foxconn in mainland China.

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[36] "The Forbidden City of Terry Gou". The Wall Street Journal. 2007-08-11.

Figure 24 Subsidiaries and branch offices of Foxconn in mainland China

From this figure, it can be observed that up to 2016, the subsidiaries and branch offices of Foxconn were mainly concentrated in the east and central parts of mainland China, while there were few companies located in the bigger cities in the west. In this figure, the branches are also arranged in chronological order, which clearly demonstrates the relocation process of Foxconn in mainland China.

In 1988, Foxconn built 3 industrial parks in Shenzhen: Shenzhen Longhua information technology industrial Park, Fuji Kang Guanlan and Shenzhen Huangtian Foxconn. They cover an area of more than 300 hectares and have over 340,000 employees. These parks are three of the earliest subsidiaries of Foxconn in mainland China and have recently become the

expansion centers for Foxconn's development. Then in 1993, Kunshan Chengbei Foxconn Industrial Park was established in Jiangsu province, thus representing the first relocation for Foxconn from the Pearl River Delta to the Yangtze River Delta. Covering an area of 93.33 hectares, with more than 50,000 employees, this branch is mainly engaged in notebook computer shell production and research and development. The following two expansions occurred in Shenzhen (in 1994) and Dongguan (in 1996), providing more than 40,000 jobs. Therefore, until 1996, the main growth of Foxconn was still located in the Pearl River Delta region. However, the Tianjin Binhai Science & Technology Park in Tianjin, which opened in 1998 (there are only few hundreds of employees here, most of whom are skilled employees) and the opening of the Science and Technology Industrial Park in Beijing in 2001 changed all this. Since then, Foxconn began to develop into the Jing-Jin-Ji metropolitan area. While, two years later, Foxconn set up another science and technology industrial park in Taiyuan in the Shanxi Province. Subsequently, in the same year, Kunshan Foxconn Wusongjiang industrial Park and Foxconn Qiantan Technology Park were constructed in Jiangsu and Zhejiang in order to enhance the development of Foxconn in the Yangtze River Delta region. Hereafter, Foxconn went on to build subsidiaries and branches in Yantai (Shandong Province), Jincheng (Shanxi province) and Langfang (Hebei province). The characteristics of Foxconn's relocation before 2006 were quite clear: taking the Pearl River Delta as the center, all the companies were gathering in the coastal region, but represented a northward movement as the time went on.

In response to the "Rise of central China plan" and the "industrial westward expansion", Foxconn thus began to relocate to Wuhan (Hubei province) and Huainan (Anhui province) in 2006. The Wuhan Donghua North Development Zone, Liufang Industrial Park covers an area of 1000 hectares after completion, employing more than 150,000-200,000 employees; while the Jiangsu Huaian Foxconn Technology Zone covers an area of 760 hectares and has over 42,000 employees. Yet, development was still focused in the coastal region, especially the Pearl River Delta, with three branches (the Foshan Shancheng Zhangcha Pulihua industrial zone, the Foshan Nanhai Science & Technology Industrial Park and the Shenzhen Songgang

Foxconn industrial area) being set up in Guangdong province and one other (the Nanjing Pukou Software Base) being constructed in Jiangsu province in the same year. Meanwhile, the "Revitalize the old northeast industrial bases" policy also encouraged Foxconn to relocate and expand in the northeast of China, with the Foxconn Technology Group (Yingkou) Industrial Park and the Shenyang Foxconn Technology Park being set up in 2007 and that have since become two of the most significant companies in Liaoning province. Whilst, in the same year, Foxconn consolidated its importance in the east of China by relocating to Qinhuangdao (Hebei province), Tianjin, Shanghai, Jiashan (Zhejiang province) and Huizhou (Guangdong province). Moreover, two years later, benefiting from the "west development policy", Foxconn began trading in Chengdu and Chongqing, setting up the Foxconn Chengdu Technology Park and the Chongqing Shapingba District Xiyong micro electric garden, offering work to more than 200,000 employees. The characteristics during this period are quite obvious; the expansion of Foxconn relied hugely on the national policies of the time. This is probably due to the fact that these policies were normally accompanied with free land and free tax, as well as convenient infrastructures, which offered great potential for industrial relocation. What's more, these provinces (or regions) have always had large numbers of cheap and low-skilled surplus workers, which could be utilised by Foxconn.

For the next step, Foxconn transferred its focus to central China and some of the cities in the west instead of the east. This is mainly due to the fact that the increasing land prices and salaries in the coastal region were restricting its continuous expansion, hence this provided great opportunities for the central and western regions. For example, in 2010, three subsidiaries of Foxconn (Foxconn Technology Group, Zhengzhou Technology Park, Zhengzhou Economic and Technological Development Zone, the Ninth Avenue Export Processing Zone and New plant site, Zhongmou County Baisha Town) were built in Zhengzhou of Henan province, which was one of the biggest cities in central China, alongside one company (Foxconn Nanning Technology Park) being set up in Nanning of Guangxi province, which is located in the west. Meanwhile, there was also the setting up of the Changshan CLP software Park, situated in Changsha, and the Hengyang Baishazhou Industrial Park, which is in

Hengyang of Hunan province in 2011, as well as the Huling Technology Park and the Wolong Longsheng Industrial Park in Henan province in 2012, Anqing Technology Park in Anhui province in 2014, PuyangTechnology Park and Lankao Technology Park in Henan province in 2015. Furthermore, there were some new constructions in the Yangtze River Delta region (Ninbo Export Processing Zone & Free Trade Zone in Zhejiang and Jiangning Development Zone, IT science Park in Jiangsu province) and the Jing-Jin-Ji metropolitan area (West Tianjin Development Zone and Dongguan Huangjiang Yuyuan Industrial zone in Guangdong). In addition, in 2016, Foxconn continued to relocate in the west. Nanning Technology Park in Xining of Guangxi province and Lanzhou Technology Park in Gansu province were two of its newest expansions in western China.

6.2.2 Employees

Employees are Foxconn's most important asset. As of December 31, 2015, Foxconn has a workforce of around one million employees including 50,466 persons from minority groups. Foxconn endeavors to provide employment opportunities to the local workforce in each country where we operate and we strive to achieve a high employee localization rate. Over 99% of Foxconn's employees are in job positions that are lawfully recognized as formal positions, which are also known as full-time employees. Foxconn also hires contractors and dispatch employees based on our manufacturing cycles and business needs and they constitute less than 1% of the company's total number of employees. The following figure shows the evolution of employees in Foxconn since 1996, from which we can see that the number of employees in Foxconn have witnessed booming increase since 2004, which was contributed by its great expansion in mainland China. However, this growth met a peak of 1.3 million employees in 2012, after the employees maintained at approximately 1 million. There were several reasons that can affect the employee decrease after 2012. One is the "hysteresis effect" of the famous "Foxconn suicides"[37] started from 2010. When people consider Foxconn as their job choices, they would think about their risks of suicide. Another

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[37] https://en.wikipedia.org/wiki/Foxconn_suicides

possible reason is that Foxconn decided to use robots to replace the cheap labor forces, thus they were changing their labor-orientated situation step by step.
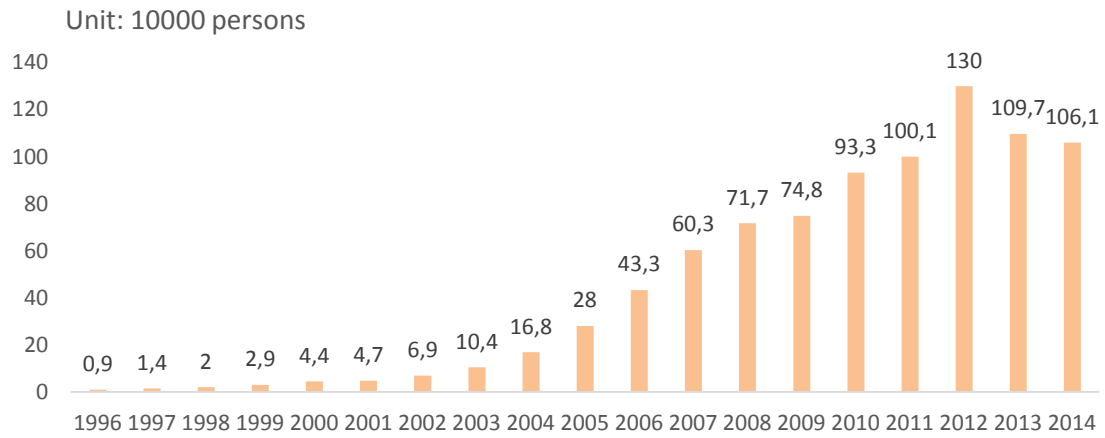
Unit: 10000 persons

Figure 25 Number of employees in Foxconn

Foxconn recruits employees through social and educational institutions using an unbiased screening process while maintaining respect for the rights of applicants and our commitment to diversity in the workforce. Foxconn prohibits the employment of under-aged workers and forced labor. In 2015, there were no cases of workplace discrimination, child labor or forced labor at Foxconn. In fact, Foxconn has a relatively young workforce, the following chart illustrates a breakdown of the employee population by age: with 78.22% of the employees being under the age of 30, 21.74% of them aged from 30 to 50.
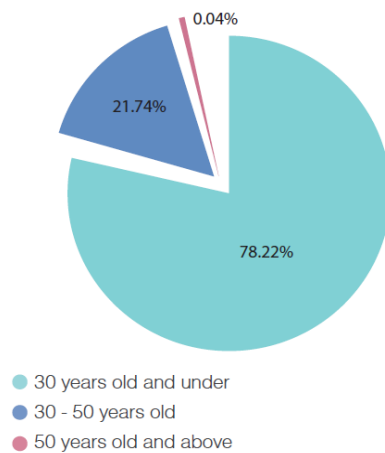
Figure 26 Foxconn Employee Age Distribution in 2015

In addition, as part of our commitment to support greater collaboration between the private and education sectors, and to provide practical working experience to students prior to their graduation, Foxconn provides a number of short-term internship programs in partnership with designated educational and training institutions. In terms of level of education, 76.8% of the employees are high school or technical school graduates or higher in 2015, and only 2% of its employees had master degree or above, which showed a low education level of employees in Foxconn. Most of them have attended senior high (vocational or technical) school and accounted for 44.75%. Employees with tertiary education had accounted for more or less the same rate as those only entered junior high school or below. Nevertheless, the situation was quite different in 2013: employees with senior high (vocational or technical) level of education reached to 50%, and those entered junior high school or below accounted for 35.8% which increased by 12.6% than those in 2015, while the proportion of those had received tertiary education was only 8.7% (it was about one third of that in 2015). As a result, this was a huge increase in the educational level, which illustrated that those days Foxconn started to realize the importance of knowledge and skilled labors, and tried to enhance its educational level during their development gradually.
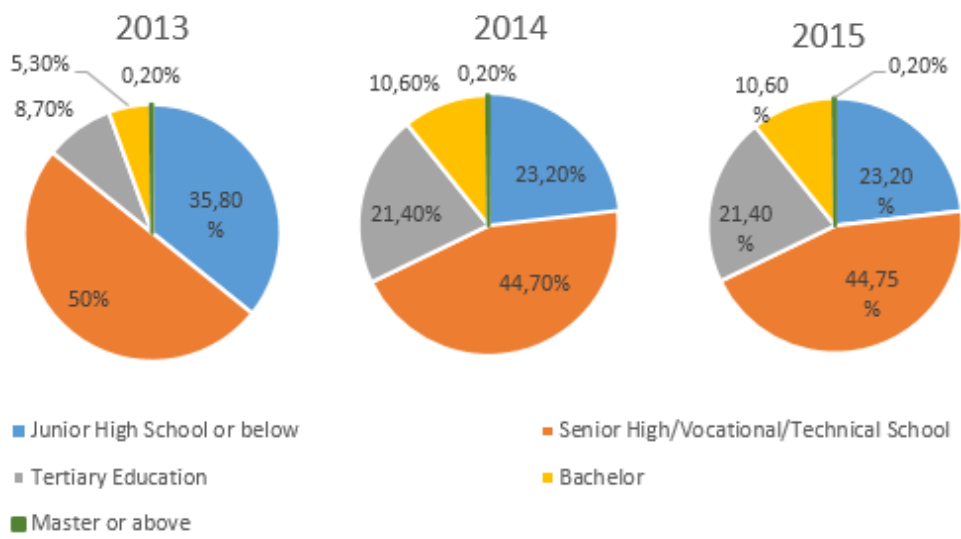
Source: collected from the social and environmental responsibility report of Foxconn.

Figure 27 Educational Qualification of Employees

Until 2005, the gender ratio of employees has remained consistent over the past six years, with male employees making up around 64% to 65% of the workforces, and female employees making up approximately 35% to 36%. But the proportion of male employees was less than 60% before 2009, and even in 2007 this rate was only 36% which was lowest during 2006 to 2015. However, these days male tended to dominant the work positons in Foxconn.
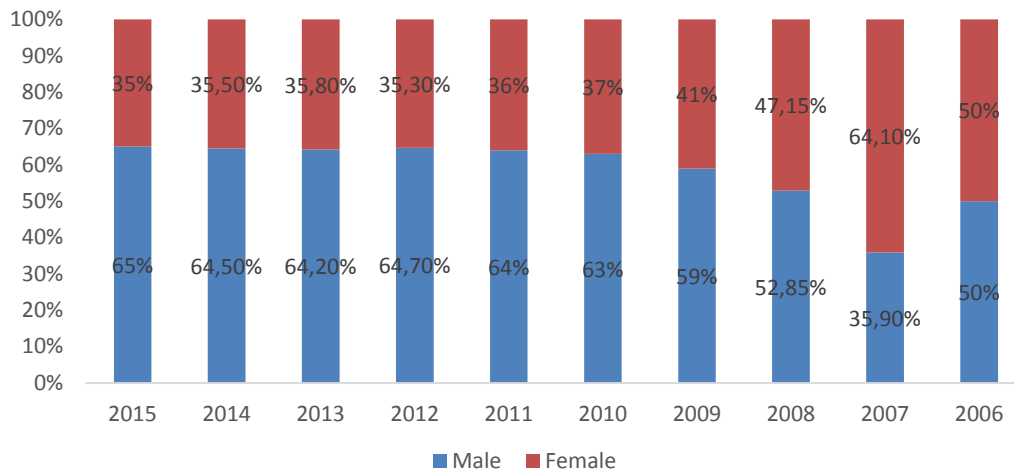
Source: collected from the social and environmental responsibility report of Foxconn.

Figure 28 Gender ratio of employees in Foxconn

Foxconn provides remuneration to all employees based on merit. Foxconn treats and evaluates all employees fairly based on their ability when determining promotions and wage increments, with no differentiation between remuneration of male and female employees. Each campus has recruited employees at wages that are at least 10% higher than the local minimum wage. After completing a three-month probation period, employees receive increased wages that are at least 20% higher than the local minimum wage. Foxconn also provides all employees with legally stipulated insurance that is in compliance with local laws and regulations.

Additionally, Foxconn signs a collective bargaining agreement with the Labor Union every year to ensure that employee rights are protected, with nearly 99% of employees in China being covered by this agreement. On January 9, 2015, Foxconn signed an agreement with the Labor Union stipulating the following commitment.

In 2015, employees who served at least one year in the Group and met performance requirements, received average wage increments of 3%. To encourage employee retention, Foxconn has also implemented annual bonuses, time-based incentives, and other incentive programs. Employees also receive gift items and monetary gifts for traditional holidays, such as the Mid-Autumn Festival and the Dragon Boat Festival. Employees are also rewarded for their productivity, and those with outstanding performance may be rewarded with stock and housing incentives. In campuses in Mainland China, employees are entitled to maternity leave and paternity leave and may resume work after the designated leave period. In Taiwan, employees are also entitled to family incentives such as maternity healthcare advice, subsidies and nutritional supplements for maternity care.

Being a people-oriented company, Foxconn considers employees as our most important asset. Foxconn provides favorable terms, assurances and benefits to employees in their employment contracts. Foxconn separately invests in employee insurance, providing support to employees in times of emergency, such as accidents, hospitalization, outpatient or emergency medical fees. The group insurance benefits for employees in China cover, for example, both personal and work-related situations and allow employees to claim reimbursement using the social security card provided by the company at designated hospitals. All employees are eligible for group insurance benefits. In 2015, the total amount of employee assistance disbursed was RMB 50,441,662.54.

6.3 Research question and objective

It is very interesting to observe that the industrial relocation of Foxconn followed the migration pattern that was identified in the migration chapter: concentrated mainly in the coastal region and having a northward movement tendency, and more importantly, beginning to penetrate central China and some of the bigger cities in the west. Hence, this large scale and interregional industrial relocation would result in huge labour flows and increased migration. At the same time, Foxconn endeavors to provide employment opportunities to the local workforce wherever it operates and strives to achieve a high

employee localisation rate, which therefore lead to some intercompany migration of its employees. Therefore, how the workforce behaves when the company relocates to other regions would be a very interesting topic for discussion. In this thesis therefore, some Foxconn employees have been selected, both managers or normal workers, as part of the research sample in order to undertake some in-depth interviews. Through gathering more information about workers' impressions of working for Foxconn and the influence of industrial relocation on the participants' experience of work and overall lifestyle, this section intends to learn more about the issues of labour mobility and industrial relocation.

While, as one of the most famous manufacturing companies in China, a huge amount of research has already been conducted on Foxconn, yet if you enter "Foxconn" as a keyword and search on "Google Scholar", there are less than 20 articles available. Additionally, most of them deal only with the famous issue of "its suicides and pressure". Thus, it is believed that studying its labour mobility and industrial relocation would be of interest.

The purpose of this chapter is to use the in-depth interviews of Foxconn employees in order to explore the identified themes. The research questions are therefore as follows:

1) How do the employees respond when Foxconn relocates to other regions?

2) Does the industrial relocation of Foxconn have an impact and influence upon employees' work and overall lifestyle?

3) What's the future plan of these employees?

6.4 Methodology

This thesis uses the employees who are working at Foxconn as the research sample. They were either selected by sending them emails to ask if they wanted to be involved with the research by being interviewed about the labour mobility of Foxconn, or introduced by some friends who have friends working in Foxconn, yet two were also known to the researcher beforehand, 8 employees from Foxconn company were selected for the analysis.

As we all know, true random sampling is always difficult to achieve, it is often necessary to

employ the non-probability sampling technique. Subjects in a non-probability sample are usually selected on the basis of their accessibility or by the purposive personal judgment of the researcher. An unknown proportion of the entire population was not sampled, therefore, the results of the research cannot be used in generalizations pertaining to the entire population. For example, in quota sampling, samples are selected nonrandomly according to some fixed quota. Nonproportional quota sampling is less restrictive, research can specify the minimum number of sampled units he want in each category. This method is the nonprobabilistic analogue of stratified random sampling in that it is typically used to assure that smaller groups are adequately represented in the whole research. It is not necessary to concern with having numbers that match the proportions in the population. Instead, if the sample size is simply enough to assure to understand the phenomenon even small groups in the population. In this section, the case study of Foxconn is just employed to support the impacts of industrial relocation on labor's intention of returning, eight employees have been interviewed which contains 3 interviewees from the east, 3 from the central and 2 from the west have been interviewed for the analysis. Besides, these 8 persons have been divided into two groups – the managers (skilled workers) and normal workers, both HR (human reources) mangers, workshop directors, engineers and operators are included. Meanwhile, those respondents do not only tell their own situation, but also they were asked about the people around them. Since 6 of them are either managers or engineers, they could give information of the other workers. Furthermore, it is not easy to interview workers in Foxconn. Due to the issue of the "Foxconn suicides", Foxconn is sensitive about doing questionnaire and interviews. As a result, 8 participants would be enough for explaining the future migration intentions with the relocation of Foxconn in mainland China.

Before the interview, the purpose and the outline of the research was explained to interviewees, the interview time was arranged via email or via a message on the Wechat or QQ applications. If agreed, the interviews were also recorded. Some interviewees preferred not to chat directly, therefore some were conducted with QQ (one chatting application special in China). The interviews were anonymised and remain confidential so as to protect

interviewees´ privacy. In order to ensure the reliability and validity of the interviews, it is important to interview workers from different economic regions. Among them, there were five men and three woman. They originated from different cities and economic regions across China: three from the east, three from the central and two from the west.

Table 20 Participant information

Status	Interviewee	Gender	Age	Education level	Economic Region	Work duration (year)
Managers or skilled workers	A1	Male	35	Bachelor degree	West	10
	A2	Male	29	Bachelor degree	East	8
	A3	Male	32	Bachelor degree	Central	5
	A4	Female	33	Bachelor degree	East	7
	A5	Female	36	Bachelor degree	Central	10
	A6	Male	30	Bachelor degree	Central	3
Normal workers	B1	Female	21	High school	West	2
	B2	Male	19	Tertiary education	East	0,2

A1 is 35 years old, male, married, and works in the Foxconn Chengdu Technology Park (in the western economic region of China, Sichuan province), and has been working for the company for more than 10 years. He is now the manager of equipment maintenance. He was born in a small town near Chengdu of Sichuan province. When he finished his bachelor degree in 2005, he found a job in Foxconn, although in the beginning he worked in the Foxconn of Shenzhen in Guangdong province. When Foxconn built a branch in Sichuan province in 2009, he applied to go back to his hometown and has continued to work there up to 2016 (when this research took place).

A2 is 29 years old, unmarried, and is working in the Shandong Yantai Economic and Technological Development Zone in Shandong province, which is located in the east of China. He has worked in Foxconn for more than 8 years and is now the quality control manager. He decided to stay in Yantai when he finished his bachelor degree, but his hometown is Jinan ----

the capital city of Shandong province. He has always worked for Foxconn.

A3 is 32 years old, married, and is working in the Foxconn (Taiyuan) Science and Technology Industrial Park (locating in Taiyuan of Shanxi province, which is one of the most important provinces in the central economic reigon of China). He has worked for the company for around 5 years. His hometown is Taiyuan city of Shanxi province, which is where he works. Before he joined Foxconn, he worked as a programmer in Shanghai.

A4 is a woman, 33 years old, and has been working in Yantai Economic and Technological Development Zone in Shandong province for amost 7 years. She comes from Jilin province, which locates in the northeast of China, but there were not enough job opportunities so she chose to come to Yantai. Right now she got married with a Koera guy and settlled down in Yantai.

A5 is 36 years old, working also in Yantai Economic and Technological Development Zone in Shandong province. During the 10 years she works in Foxconn, she stayed in Shenzhen for 2 years and 8 years in Yantai. It is her that introduced the PCEBG products totally from Shenzhen to Yantai, but unfortunately these products moved to Guizhou after 5 years. Yantai is her hometown, she already got married and had child.

A6 is 30 years old man, who has his own business in his hometown right now. He has worked in Foxconn for 3 years since he graduated from university, then his family asked him to go back to hometown for getting married and settle down, finally he went back, got married and bought a flat in his hometown. Right now he works in Haier Group Corporation in Shandong province.

B1 is a young woman, she is 21 years old and married. She has workedat Foxconn's (Guizhou) fourth Green Industrial Park for 2 years. Her education level is high school and she didn´t get any further education and training.

B2 is 19 years old, he received tertiary education and has only worked for Foxconn for 2 months. He is working in the Langfang Technology Park of Hebei province, which lies in the Jing-Jin-Ji metropolitan area (the east economic region of China). Jinan city of Shandong

province is his hometown. He is young and has only just finished his studying, thus he wants to leave home and see the world. Due to the low threshold and freedom to leave Foxconn for normal workers, he has chosen to try to find a job in Foxconn on a temporary basis.

The interview was designed to gain understanding of the attitude of each person regarding the labour mobility in Foxconn, since there are many Foxconn branches and subsidiaries in China, one of the purposes of this thesis is to observe the differences among the various economic regions. The interview questions contains five parts: background, basic information regarding Foxconn, industrial relocation information, migration flows of Foxconn and future plans.

1. Background: this part talks about the personal attributes of interviewees and their experiences at Foxconn, as well as their basic thoughts about their company.

2. Industrial relocation of Foxconn: the primary purpose is to understand their beliefs in terms of the industrial relocation of Foxconn in order to better understand the issue of labour migration.

3. Migration flows of Foxconn: mainly discussing the flow of workers at Foxconn from different categories of staff members, as well as their characteristics.

4. Future plans: mainly mentioning the future plans of interviewees for the next 5 years, and simultaneously, the migration plans of their colleagues and the persons they know that also work for Foxconn.

6.5 Results

This thesis uses typological analysis in order to interpret the interviews. Typological analysis is "a strategy for descriptive qualitative (or quantitative) data analysis whose goal is the development of a set of related but distinct categories within a phenomenon that discriminate across the phenomenon" (Given, 2008). Typologies are organised by categorisation, but not by hierarchical arrangement; the categories in a typology are related to one another, not subsidiary to one another   (Given, 2008).37F This method analyses the

collected materials according to "categories and contents", that is to say, researchers can do their research based on their own categorisation, the purpose of which is to determine a set of categories that are different but correlated with one certain phenomenon. Since there were only five participants, the recordings were transcribed by hand. According to the questions asked, the content was divided into different categories and some possible conclusions attempted to be established.

(1) Staffs in Foxconn

Workers in Foxconn are normally quite young. Among all the interviewees, the oldest was 36 years old, while the youngest was 19 years old. Meanwhile, there were more male workers than females, which corresponded with the general gender ratio of the whole company (as explained above). In addition, the educational level of the whole company could be enhanced since the skilled workers were generally undergraduates, while the unskilled workers had normally inly finished high school. According to the interviewees´ reply, this situation is quite common in the foundry industries like Foxconn.

> *"I am 35 years old now, and my colleagues are more or less the same age as me. But most of the normal workers were born after the 1990s, they normally have quite a low educational level, like middle school or high school and don't have work skills but like freedom." (Sample A1)*

> *"Until this December, I will be 29 years old …… when I graduated from our university, I have been at Foxconn as always until now. Lots of my classmates came to Foxconn with me together in 2009, but some of them have left in the end. The engineers or managers are older, aged between 40 to 45 years, and they normally have bachelor degrees, some even a Masters." (Sample A2)*

As sample A1 and A2 said, staffs in Foxconn were always low-level educated, even the engineers or skilled workers who had bachelor degrees were new graduates, hence, some induction trainings are quite necessary. Actually, Foxconn has offered this kind of training at the beginning. Sample A3 told that *"After university, I received some training organised by my*

company (the previous one and Foxconn) for a short time", evern for unskilled workers--*"Foxconn always give basic training for one week for its normal workers, and it's not complicated for me to finish my job"(Sample B1)* . Because of the low threshold and relatively high salary at that moment, Foxconn attracted more than 1.2 million workers and has built more than 30 subcompanies in the mainland China.

The number of local people and migrant workers differed in different regions. In the coastal region, migrants dominant the Foxconn workforce, while in the central and western regions, the workers were normally from the same provinces or nearby areas. In general, there are more job opportunities and work places for both skilled and unskilled workers in the east cities than the central and west, and local citizens in the coast benefit a lot on its convenient facilities and welfare. As a result, costal citizens prefer to choose relaxer jobs with higher salary. However, those in the central and west don´t have that much chance for job access, they´d like to attend the company near their hometown. Sample A1 worked in both Shenzhen and Sichuan Foxconn, he talked about the same situation of work staffs in Foxconn as follows.

> *"In Sichuan most of the workers come from Sichuan province, while large amounts of them are from Chengdu city or nearby peripheries. It had a public recruitment of normal workers in 2010 when it was built in Chengdu. A s a result, the workers are mainly local citizens, even though some of the staff came from Shenzhen, but they are limited at the mid-level executives, managers and engineer levels. Actually, more than half of these people are from other Foxconn branches, few of them were employed from the local area."*
> *(Sample A1)*

> *"Workers in Shenzhen principally came from Hunan province. Shenzhen is located in Guangdong province, while Hunan lies next to Guangdong and is an out-migrating province. There is no doubt that there are large numbers of workers from Hunan in the Shenzhen Foxconn. Originally, Henan is the key contributor for labuor supply of Shenzhen Foxconn. Because of the construction of Foxconn in Zhengzhou of Henan province, the majority of its migrant workers went back to Zhengzhou Foxconn. Therefore, benefiting*

from the location, Hunan became the main labour supplier for Shenzhen Foxconn."
(Sample A1)

"In general, most of the workers are outsiders." "Employees come from Henan province for the most part, then there are people from the south of China." "Do you know why? I remember I told you before, because the predecessor of Foxconn in Yantai is Longhua Science and Technology Park, whose main business is producing notebooks, thus the group leader took all his team members from Shenzhen to Yantai, including a large proportion of the normal workforce and some of the technicians and managers. The other group of its employees were from the local employment pool (made up of mainly normal workers and bachelor students). They are from everywhere, but most of them come from Henan or Yantai. While bachelor students in Yantai are not local students (only few of them are from Yantai), they were employed by Foxconn of Yantai, plus those who came from Shenzhen, leading to there being more outsiders in Yantai Foxconn then local persons."(Sample A2)

Meanwhile, low-skilled (like normal workers) and high-skiled staffs (like engineers and managers) show their location differences since they were doing different kind of jobs. Normal workers can be easily hired in the cental and west, actually Foxconn relocates to these regions for cheap labor and low tax. On the one side, there are large amounts of extra labors in the central and west due to the machine produce and agricultural modernization; on the other side, the threshold for them to enter Foxconn is quite low, receiving few days basic training, almost everyone can work in Foxconn. However, well-developed regions are more attractive for high-educated people. Graduated form universities, some professional and skilled workers would like to find a job in their university cities, most of which concentrate in the east of China, finally resulting in the migrant skilled workers in the east.

"It depends, the ones for normal workers and for managers are quite different. For instance, there are few managers that come from Taiyuan or even from Shanxi, they are normally migrants from Shenzhen or Yantai. Shenzhen is the headquarters of Foxconn, you know, all the technicins and professions come from Shenzhen. In the last few years, Yantai

has also offered for managers and engineers to go to other regions of Foxconn, while few of these workers were employed from the local areas." "For the normal workers, at least in Taiyuan, most of them come from Shanxi province For other provinces, they all have Foxconn and foundry industries, so those who need work like this can find a position in their own province instead of Shanxi, but there are some normal workers from Henan, but it's not the main trend." (Sample A3)

"I have lots of fellows from the same village or town in Foxconn, as I said above. It is my fellow that introduced me to come here. He said he had been working here for many years and earned a salary that was not so bad, as well, he likes the stable job and also Foxconn offered very good profiles and insurance. So I decided to follow him, and it's true that they are almost all my fellows from the same town or province. In my dormitory, there are 8 girls and 6 of them come from the same town as me. There are also some ones who come from the peripheries of Sichuan province. " (Sample B1)

(2) Foxconn relocation

One of the reasons for participants choosing to work for Foxconn was that they all considered Foxconn to be a large enterprise with relatively high salaries on offer, as well as good welfare and insurance.

"I was looking for some jobs and felt the position at Foxconn was available so I entered Foxconn ……, Foxconn offers good welfare and insurance for their staffs, such as dormitories, gymnasiums and dining halls etc., what's more important is that it covers all the insurance needed" Sample A1 said during the interview.

Another important reason is that Foxconn offers opportunities for internship for both skilled and unskilled workers. In fact, most of them entered Foxconn because their universities or colleges had cooperation with Foxconn for offering internship or jobs.

"We have cooperation with technical schools and colleges in Henan and Guizhou province, like Henan Vocational and Technical College, sending large amounts of students to our Foxconn for internship……"(sample A6). "Foxconn is a very good choice for new graduates

with relatively high salaries and stable jobs"(sample A2).

There also exist someone chose Foxconn because of its location. Thanks to the expansion and relocation of Foxconn in mainland China, thousands of persons could work near their hometown and any out-of-hometown cities.

Sample A3 mentioned that "the reason I chose Foxconn is that it's closer to my home. The price of a flat in Taiyuan is also very high, so I can only afford one in the periphery of Taiyuan, so every day I took 2 hours to get to work previously. It's much better when I am working for Foxconn." Sample B2 said that "...... my parents wanted me to look for a job near my hometown, but I feel I am still very young and I want to go and see the world. At the beginning, ... I went to Yantai ...... But one thing made me upset about Yantai Foxconn, then I came to the Foxconn of Langfang in Hebei province".

Foxconn has relocated to different regions of China, especially in the central and western parts, and they think it will continue to expand in the future. Yet only some of the workers mentioned that Foxconn was planning to relocate to Singapore, Malaysia and other countries due to the increasing workers' salaries in the central and western areas of China, as well as the growing land prices and taxes (due to the expiration of government policies, such as free land and lower taxes).

"Shenzhen was the first company of Foxconn in mainland China, then it expanded to Kunshan in the coastal region, then to Shanxi and Wuhan and other regions, but they are all old expansions. Later, Foxconn put its concentration into Zhengzhou, then Chongqing and Chengdu; these were all necessary for business extension." (Sample A1)

"Sometimes the local governments need companies like Foxconn to relocate to their provinces in order to promote local economic development and offer more positons for local workers so as to improve the development of other industries, such as supermarkets or stores and others."(Sample A2)

But notably, with the fading of the demographic dividend in mainland China, the Original Equipment Manufacturer has already realized their disadvantages so as to do the internal

transition or extend to other countries with cheaper labors. Parts of Foxconn in the east were thinking about transformation in order to get rid of the label "OEM" gradually and focus more on independent research and development, yet, apparently in the west, the main task was still producing material products for other companies.

"In fact, I want to tell you that this topic is out of date, there are not too many movements from the coast to the interior land, lots of industries have begun to relocate to foreign countries. Guo has invested large amounts of money in India and other Southeast Asia countries." (Sample A1)

"Since each industrial park of Foxconn is responsible for different products and brands, this means that only when Foxconn has more businesses, then it will relocate. However, because of increasing land prices and higher salaries, Foxconn is also thinking about moving out of China for more expansion. What I heard is that Foxconn was planning to build companies in some southeast Asian countries where salaries are cheaper than in China." (Sample A3)

"Foxconn, you know, is an original equipment manufacturer but these days, it has less and less business and benefits. As a result, they considered transformation and tried to produce some of their own brands. Actually, Foxconn has already done some OEM with its own brand, then extended its business to Guizhou, and then to Zhengzhou of Henan province, then to the west part of China. For instance, it is building a brunch in Gansu. What we are doing now is producing some televisions, educational screens and so on, but these all belong to Foxconn's own business. Gradually, it will transfer from manufacturing to trading and other products. In this sense, it will have a very bright future." (Sample A2)

"That transformation doesn't have any function, Guo always mentions that transformation. He had electricity business plans to sell equipment, but it doesn't work for promoting him to do their own products." "For me personally, I think Foxconn would never develop its own business, and it's also very hard for Foxconn to do it." "The reason for the transformation of Foxconn is not trying to develop their own products, what he wants to do is an "electricity business" or an "Internet" business. Many years ago, Guo did

something related with the "internet" but finally failed, then he decided to do the electricity business, similar to sales (in other words, he was trying to control the sales channels). Actually, it is very significant for controlling the supply, but I don't know why Foxconn cannot do it very well. Anyway, I didn't see any improvements in transformation, they have just repeated this concept again and again." (Sample A6)

(3) Fluidity of Foxconn workers

From the aspect of floating, high-skilled workers were less likely to move and migrate. Even if some migration existed, the movements were voluntary between different subsidiaries or branches. Nevertheless, it was common and frequent for low-skilled workers to move, especially young workers (who would like to leave their positions in 2 or 3 months and after come back again).

"What I can say is that the low-skilled workers always float. My job doesn't have lots of connection with them so I don't know their situation quite well, but my friends sometimes complain with me about their migration. However, the technicians and managers hardly change their work place. Around me, my friends and colleagues or leaders have all worked here a long time and don't have plans to move or change." (Sample A3)

"You can always see some people come and some go. In my dormitory, almost every week, I saw new faces but when I got married, I moved to live with my husband. I don't know what is happening now, it should be the same. I also introduced some of the fellows from my hometown to come to work here, but in general, they wouldn't work a long time. They always feel there are some jobs that are more relaxing and they can earn more, I don't want to care about them anymore. I am pregnant now, so all I care about is my baby."(Sample B1)

Furthermore, the migrant Foxconn workers differ because of the gender, age and marriage. Generally, men are more likely to move than women, either migrating between the same company or change to other companies. It seems that men are more willing to take risks to

improve their quality of life, and women tend to pursuit of a stable life. This is quite common in China that men bear more pressures than women by affording the flat and supporting the family. At the same time, younger workers who don't get married prefer frequent movement, yet old staffs that married are keen on stable life.

(4) Influences of Foxconn relocation

Almost all of them mentioned that, in general, the relocation of Foxconn doesn't have any influence on their work and lifestyle, but sometimes, they get the chance to visit and undertake training in other places (normally these benefits can only be enjoyed by managers or skilled workers). Even though all the branches and subsidiaries of Foxconn have connections and business dealings, they are overall independent from one another. However, in some aspects, Foxconn offers the opportunity for those workers who were previously working away from their hometown to work closer.

"I have mentioned above that only when Foxconn has more businesses, it will relocate to other regions, so different industrial parks take responsibility for different products. For instance, Foxconn in Taiyuan mainly engages in the production and assemblage of the IPHONE 4. There is an Apple Free Trade Zone so the products can be imported directly to America. Foxconn in Shenzhen is the headquarters of all the Foxconn in mainland China; it has more workers engaging in research and development. Yet, it also has companies for production, in Shenzhen it has more than 3 zones. I heard that Foxconn in Yantai works for Samsung and other Korea companies." "What I want to say is that each part of Foxconn's branches and subsidiaries are practically independent, so relocation doesn't have an influence on other zones or parks." "I attended some of the conferences or training in Zhengzhou Foxconn and once in Shenzhen, but it's not migration, it's just some temporary training or study. But Foxconn has rules for its employees moving between regions. I am always working in Taiyuan so I don't quite know these rules, you can check on internet."(Sample A3)

"There is no difference before and after the relocation, because different companies have different business, there is also no competiton between each other. Sometimes we

have the chance to visit other companies for training or meeting, sometimes vedio chat, but there is almost no cooperation." (Sample A4)

"its relocation is not related with our work and life, maybe it has impacts on the leaders but not on normal workers. It's like the 19tn national congress, we go to work and go back home as usual, they don't need us to vote or do something extra ......even they have relocated some subcompanies to the central and west, for instance, I transferred the PCEBG products from Shenzhen to Yantai, then they moved to Wuhan, it's like Guo put something from his left pocket to the right one. For those who were working in that business, they can choose either to move with this transfer or stay in the same place. At the same time, before the relocation, the company will always do some plans before. For example, the production of motherboards and graphics cards belongs to Business Group A originally, some business can be transferred from Group B at the beginning of the intergration.That mean the relocated business would be compensated by new one."(Sample A5)

(5) Job satisfaction

Interviewees´ opinions on the job satisfaction in Foxconn show great difference, there are both employees who are satisfied with their job and those who are not. However, according to our interview that I did in 2016, professional and skilled interviewees were, comprehensively, satisfied with their job. Yet, with the declines of productions and workloads in Foxconn, skilled workers showed their impatience because of the low salary and work pressure. For example, the two interviews that I did in 2017 presented that they were all not pleased in working in Foxconn. Even though Foxconn announced that they offer the best infrastructures and facilities, the real utilization rate is quite low. What´s more, the boring work and small future development potential all lead to this dissatisfaction.

Nevertheless, it seems low-skilled workers are more satisfied with their jobs because of their temporary stay in Foxconn. Since they are young and adventurous, it´s hard for them settle down in a certain city. Only if they can earn as much money as they expected, they would like to work temporarily.

I am satisfied with my salary and my position at Foxconn, and as I said above, I just bought a flat nearby so I like my job and the location of the company, so why would I change? Besides, Foxconn is a big company with a great future; it has strict technical management and a wide sphere of production, so I don't need to worry about losing my job." (Sample A3)

(6) Future plans

Either satisfied with their current job in Foxconn or not, almost all skilled workers all expressed that they didn't want to move within three to five years, but also they had plan to leave for their own business or look for other jobs. Yet it also depends on their location. Foxconn staffs in the east regions, most of whom are migrated workers, showed their interests in switching their jobs in a long future; while those in the central and west, who are local staffs or are working close to their hometown, were satisfied with their current situation and didn't have plan to change or move. For the low-skilled workers, they didn't intend to work there a long time and they appear more interested in resigning and going to other places or pursuing other careers where they will earn a certain amount of money.

"For me, I want to stay at Foxconn for many years more, at least in the next 3 years, I don't have plan to change my job. The normal workers' coming and leaving are very common to see, especially those who were born after the 1990s; they come for one or two months, then they leave. When they don't have money again, they come back. However, the technicians or engineers who moved from other provinces or have worked in the company for a long time are more interested in a stable life. If they choose to come here, they stay. I seldom hear that such people move here and there. And my colleagues have the same attitude as me; they treat Foxconn as a potential company and they don't want to change or start a new undertaking." "Take my group leader for example, he has been working for Foxconn for more than 10 years; only when he migrated from Shenzhen, he has always been here and his family has all moved to Taiyuan. So I think he would continue to work for Foxconn. Engineers who work like me also chase a stable life. I feel I am old now; what I want is stable job and a happy family. If there are no big changes to

the company, I won't leave. But if the company wants me to move to another industrial park, I won't go also." (Sample A3)

"I won't work here for a long time, my plan is to leave when I get this month's salary. It's not what I imagined when I came from my hometown for a job; this month, I think I can only earn 1000 yuan more or less because I only worked a few days this month. There was one week that, for 7 days, I only worked 3 days. Foxconn in Langfang doesn't now have enough businesses for its staff; I cannot see my future here and I can earn more in my hometown and be close to my family and friends." "My colleagues and friends have the same idea, maybe they would leave with me together."(Sample B2)

Nevertheless, sample A5 gave different information. The low salary would result in more and more staff turnover, especially the skilled workers. As a resule, workers in the coastal regions expressed more willingness to change their jobs.

" it has been a long time Foxconn hasn't raised worker's salary, I have been here for 10 years, inmy memory only once in 2014, unfortunately I was pregnant at that moment so I missed that chance. Then until this year every worker rised 100 yuan. However, moving change a lot about the salary. For example, if one engineer or other skilled worker dropped their job in Foxconn right now and looked for a similar job in other company, even though they would work more hours or overtime, they could, on average, earn two or three times more than they stay here. As a result, Foxconn is gradually losing skilled workers because of the low salary and decreasing business." (Sample A5)

6.6 Summary

Foxconn is the world's largest electronics manufacturing services (EMS) provider, it expanded rapidly in China from the south to north then to the central and west, until 2015 it has more than 30 subsidiaries and branch offices in China. Its relocation is typical for understanding the industrial movement in China. As a result, it is common to see labor mobility in Foxconn.

Doing interviews with staffs and group leaders of Foxconn to talk about the labor mobility and migration intention is quite representative.

Typological analysis could help us to analyse the attitudes and willingness of mobility in Foxconn according to "categories and contents", that is to say, we can do the research based on our own categorization. The contents of my research contains the following part: personal attributes, the reason for choosing Foxconn, relocation of Foxconn, influences of the relocation of Foxconn (both on life and work), local and migrant workers of Foxconn, labor mobility and future plans.

Based on the analysis above, it´s is easier to see that the relocation of Foxconn doesn't have any influence on their work and lifestyle generally, but simultaneously, it offers opportunity for those workers who were previously working away from their hometown to work nearby hometown. Migrant workforces dominant the Foxconn in the coastal region, while in the central and western regions, the workers were normally local citizens. High-skilled workers were less likely to move and migrate, but it was common and frequent for low-skilled workers to move, especially young workers. Finally, the group leaders and high-skilled workers are satisfied with their work and salaries, and don't have plan to leave, yet, the low-skilled workers appear more interested in migrating.

Chapter 7 Conclusion and discussion

This chapter presents a summary and discussion of the findings of migration in China under the background of industrial relocation. This is followed by an outline of the possible limitations that have occurred during my research and the process of collecting data. The thesis will be concluded with some recommendations with regard to what can be done so as to formulate suitable population policies and balance the development of population and enterprises.

7.1 Summary of research findings

Whilst some media sources declare that under the background of industrial relocation from the coast to inland China, migrants that went to the east in order to find jobs have begun to return to their hometown or big cities near their hometown for employment over a gradual period, this thesis attempted to establish how these migrants move among provinces in mainland China and how industrial relocation influences migration. In order to assess the migration trends in China, the general migration pattern in China firstly needed to be determined, not only from a historic perspective, but also in terms of the future tendency. Secondly, industrial relocation in China needed to be understood appropriately. After establishing the overall situation of migration and industrial movement in China, the influences of industrial relocation on migration were analysed, which was then followed by an empirical case study of Foxconn to see if these impacts are occurring in real life.

Chapter three of this thesis can be divided into three parts. First of all, it highlights the history of migration and industrial relocation, the main reasons why people decide to migrate to other regions and the key government policies that may place restrictions on interregional population migration. Tracing the development of population migration in China and based on the census data analysis, it can be observed that Chinese interregional population migration increased continuously, as well, the original "inland (central and western areas of China) to coastal transition" gradually being replaced by a "two-way

transfer" system. This phenomenon can be further studied by doing a migration pattern analysis. Using the concept of interaction value and the proto-system, which originated from the gravity model, it is easier to understand the migration flows in China. The results confirmed this thesis' hypothesis in some sense as migrants, who came from the central and western regions but are now working in the east, appear to exhibit an interest in returning. Despite most of the migrants still being concentrated in the eastern region, a "stronger eastern-ward and weaker western-ward" bidirectional migration pattern exists. Additionally, some detailed conclusions can be reached regarding the migration pattern in China based on the analysis that was undertaken, which highlighted the importance and attraction of the big centres, showing a northward mobility trend, mainly from Pearl River Delta to the Yangtze River Delta. Except for the polycentric pattern of Chinese population mobility since 2000, nearby transfer in the central and western regions has gradually accelerated.

However, in order to observe this return tendency more clearly, it is necessary to evaluate the possible future migration trends. As a result, the constrained gravity model was employed so as to identify both the adjustable attractive parameter for the destination and the spatial friction parameter in order to forecast the future migration distribution. The prediction further confirmed the hypothesis since it showed the normal tendency of floating from the central and western regions to the east of China in the next 20 years. As was found above, there will also be a northward movement to the attractive centres, for instance, Yangtze River Delta and even Jing-Jin-Ji metropolitan, will become two of the most important in-migrating regions. At the same time, some of the well-developed regions, such as the Central Plains in the central region and Chengyu metropolitan in the west, will become increasingly significant, while Guangdong will gradually lose its population and will not maintain its status in attracting migrants.

Chapter four firstly summaries the literatures related to Chinese industrial relocation in order to confirm that it has been one of the most significant phenomena that can affect socio-economic development and element flows. Subsequently, the

relationship and connection between industrial relocation and population migration was explored on a national level.

Afterward, detailed information was used in order to verify this influence. A questionnaire regarding the dynamic labour forces of China was utilised so as to study the internal mechanism between industrial relocation and labour mobility, through: (1) Using the database of CLDS 2012 in China, determinants of respondents' intentions to go back to their places of household registration were investigated, with special focus being paid to the comparison of these factors in different economic regions; (2) additionally, the correlates of industrial relocation and employee´s migration intentions were explored via the labour-force dynamic survey of 2016 by asking interviewees questions relating to industrial relocation.

In view of the former analysis here, aside from the household registration, personal attributes, working conditions, social participation and job satisfaction, as well as location, can either positively or negatively determine respondent´s intention of returning to their places of household registration. For instance, male members of the Communist Party, who can speak a foreign language and have technical certificates, are the least enthusiastic about going back to their household registration places; while employees with migration experience and fixed workplaces but no agricultural experience are more likely to stay; whereas those who are living in the east but were born in the western economic region are the most likely to go back. However, it was expected that these determinants in the in-migrated regions and out-migrated regions would be different, thus we use the concept of the three economic regions in China (the east can be considered as the in-migrated region, while the central and west are the out-migrated regions), and divided them into in-migrated (the east) and out-migrated (the central and west) regions in order to compare the difference in determinants for these regions. From the results, it can be observed that the significant variables of in- and out-migrated areas differ: in the in-migrated region, personal attributes, working conditions, location, social participation and job satisfaction all have variables that

can predict respondent´s return intention; while none of the variables related with location and job satisfaction were significant in the out-migrated regions.

Findings of the latter analysis therefore suggest that migration intention can be predicted by personal attributes, working conditions and industrial relocation. In detail, employees who are masses with non-agricultural household registration, work more than 60 hours per week, and move a short-distance are more willing to relocate because of their jobs. However, industries varied with respect to the employee´s willingness to relocate: employees in agricultural were the least willing to migrate, followed by those in production, then those in sales and marketing, whilst those in personnel were the most likely to relocate with their job. Yet, surprisingly, there appeared to be no significant effect in terms of incomes on employee´s willingness to accept job movement.

Finally, some of the findings from the interviews with employees working for Foxconn in mainland China will be summarised. In this chapter, a typological analysis was used to deal with the interviews, therefore, according to the questions asked, the content was divided into different categories and the impacts of industrial relocation on labour mobility were attempted to be identified empirically. The conclusions are as follows: (1) most of the workers in Foxconn are young and normally have a low education level, and there are more male workers than females; (2) the main reason for choosing Foxconn was that they all considered Foxconn to be a large enterprise with relatively high salaries and complete welfare and insurance, thus it is attractive to either bachelor students or low skilled workers; (3) even though almost all of them mentioned that, in general, the relocation of Foxconn didn't have any influence on their work and lifestyle, they would have to visit and undertake training in other branches and subsidiaries at times, and they all agreed that in some aspects, Foxconn offered the opportunity for those workers who were working away from their hometown to work more closely; (4) in the coastal region, the migrants dominate the labourers in Foxconn, either high-skilled workers or low-skilled ones, while in the central and western regions, the workers were normally from the same provinces or nearby areas; (5) high-skilled workers were less likely to move and migrate, except those who move between

different subsidiaries or branches voluntarily, but it was common and frequent for low-skilled labourers to move or to see turnover, especially with young workers; (6) high-skilled workers are more satisfied with their work situation and salaries, and don't have a plan to leave, yet low-skilled workers normally don't intend to work for a long time and they are more interested in resigning and going to other places or taking on other careers when they have earned certain amount of money.

7.2 Implications and limitations

7.2.1 Substantial implications

This thesis uses both qualitative and quantitative analysis to study the relationship between industrial relocation and population, as well as the influence of industrial relocation on labour mobility. It is important as this is one of the first attempts to analyse labour mobility under the background of industrial relocation, since the previous research has paid more attention to the impacts of population migration or labour mobility on economy or social development, or they have researched the concepts of migration or relocation separately. Not only was the census data used for the migration pattern analysis and the questionnaires for mechanisms analysis, yet staff who work for Foxconn were also interviewed so as to better understand this phenomenon.

During this research, some representative and new methods have been used. For instance, the interaction value model was attempted to be used in order to study the migration patterns in China, and the concept of "proto-system" and "functional distance" was also adopted for further interpretation. These concepts may constitute a real contribution to the field of migration study, which can possibly be utilised in other cases. For instance, it can be applied to similar cases, such as traffic flows (trains, buses or airplanes etc.) and interregional economic investments etc. Additionally, two regression analysis were applied in order to study the mechanism between industrial relocation and labour mobility. Yet regression is not a new methodology for solving social problems, the contribution of the study is that the

questionnaire used covers the labour forces of the whole of China, as well as a relatively complete index system, which contains personal attributes, working conditions, social participation, job satisfaction and so on. For the binary regression analysis, special questions were asked of respondents in relation to industrial relocation and their future plans if their companies relocate. In the end, interviews that were undertaken with the Foxconn workers were also added so as to conduct a qualitative analysis and to compensate the research in terms of relationship between industrial relocation and labour mobility.

7.2.2 Limitations

There are also shortcomings of the conceptual framework drawn in this study, which need to be further elaborated and fixed in future research. The hypothesis has been identified and verified by the above analysis, yet it's important to note that it is not the complete trend with regard to population mobility. Furthermore, labour migration can be affected by various elements in real life, all of which cannot be covered in this research. Due to the data limitation, despite the researcher attempting to collect as much data as possible, it's still not sufficient for interpreting all the characteristics of labour mobility in China. Hence, new methods are required for collecting and gathering data in order to analyse industrial relocation and labour migration.

Interaction value has been proved to be one of the most useful methods for interpreting the evolution and migration patterns, the advantages of which were explained in the above section, yet it is necessary to keep in mind that even though there are some return flows from the coastal region of China to the central and western regions and nearby transfer, the "eastward movement of the central and western migrants" is still the principle trend of population migration in China. Therefore, it's very hard to detect those return flows, at least at this point in time. What's more, population census data offers us the most convenient and quickest way to do migration analysis since it doesn't only contain information relating to total migrants for each province, it also provides a matrix concerning where the migrants

are located now, as well as where they were five years ago. Nevertheless, this is all data of a provincial level, so although we can observe the interprovincial migration trend, it is difficult to assess what has happened at an intra-provincial level, which normally accounts for more than 60% of the migration of each province. With the rapid development of technical information and the ways in which to collect information, for example, the popular usage of big data, traditional way of obtaining database seem harder and harder to go further.

Despite the above results showing the future tendencies for population migration in China, it is also important to note some aspects related with the hypothesis, which are: (1) the migration parameters of a and b came from the coefficients of 2005-2010, which means there will be no change in terms of the attractiveness and distance friction relating to each province for the future. Although some of the tendencies for migration were shown during 2005-2010, the rapid socio-economic development and introduced population policies, as well as the progress of transportation and other equipment, will change these indexes correspondingly. (2) It was supposed that the total population in 2010 would be available for migrating, and all the provinces could offer enough positions for all those migrants. Besides, the total number of migrants wouldn´t change. This is impossible in real life, as experience demonstrates that the population aged between 20 and 45 are more interested in migrating, while those who are younger or older don´t want to move. What´s more, the capability of offering employment positions for each province is dependent on its economic development and potential. Finally, the number of migrants would change with time.

Using the database of CLDS 2012 in China, the determinants of respondents' intentions in terms of going back to their places of household registration were investigated, with a special focus on the comparison of these factors in different economic regions, as well as in- and out-migrated regions. The dependent variable of this regression analysis is "the possibility for migrants going back to their places of household registration" but not going back to their hometown, since, in some cases, it

cannot represent people's intention of going back to their hometown. This is very interesting as some of the migrants may have changed their places of household registration due to their work or thinking about getting an urban "hukou". The migrants, especially those high-skilled labourers, would be more likely to obtain household registration in their working cities, as maybe they want their children to go to the best middle school, or maybe they want to buy flats or cars in their current locations. As a result, the answers relating to this topic in the sample is not representative in terms of explaining the possible factors that can predict returning. In addition, to the researcher attempted to understand as many factors as possible, from personal attributes to social participation, yet population migration is too complicated to be just explained by these limited factors. Hence, further studies need to be conducted in order to offer a more accurate analysis.

Although the regression results indicated that in-migrated enterprises in employee´s resident or working places and industrial relocation range are positively correlated with their intention to transfer from the regression analysis, there are still lots of aspects that need to be paid attention to. First, there were only 329 participants in the study sample, compared with the 1.3 billion population of China, thus it is not so significantly representative in terms of interpreting the results. In a future study, the sample could be bigger. Secondly, the variables related with industrial relocation only contained basic questions, therefore more relative variables would be needed in the future study. Besides, studies that investigate the significance of job satisfaction on employees' willingness to relocate are also necessary.

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Appendix

Table 21 One-way interaction value matrix during 1995-2000

	Anhui	Beijing	Fujian	Gansu	Guangdong	Guangxi	Guizhou	Hainan	Hebei	Henan	Heilongjiang	Hubei	Hunan	Jilin	Jiangsu	Jiangxi	Liaoning	Inner Mongolia	Ningxia	Qinghai	Shandong	Shanxi	Shaanxi	Shanghai	Sichuan	Tianjin	Tibet	Xinjiang	Yunnan	Zhejiang	Chongqing
Anhui	0.0000	0.0006	0.0005	0.0000	0.0003	0.0000	0.0007	0.0001	0.0002	0.0013	0.0001	0.0005	0.0001	0.0001	0.0097	0.0004	0.0002	0.0000	0.0000	0.0000	0.0006	0.0001	0.0002	0.0044	0.0002	0.0001	0.0000	0.0002	0.0022	0.0026	0.0001
Beijing	0.0041	0.0000	0.0008	0.0007	0.0007	0.0000	0.0001	0.0001	0.0845	0.0123	0.0036	0.0017	0.0002	0.0020	0.0048	0.0003	0.0044	0.0045	0.0003	0.0001	0.0132	0.0061	0.0016	0.0002	0.0015	0.0026	0.0000	0.0004	0.0001	0.0020	0.0002
Fujian	0.0027	0.0001	0.0000	0.0000	0.0017	0.0001	0.0040	0.0001	0.0000	0.0005	0.0000	0.0031	0.0008	0.0000	0.0003	0.0464	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0002	0.0136	0.0000	0.0000	0.0000	0.0002	0.0015	0.0047
Gansu	0.0001	0.0001	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0002	0.0008	0.0000	0.0002	0.0000	0.0000	0.0004	0.0000	0.0001	0.0001	0.0057	0.0289	0.0003	0.0002	0.0053	0.0000	0.0004	0.0001	0.0001	0.0027	0.0000	0.0009	0.0000
Guangdong	0.0026	0.0002	0.0055	0.0003	0.0000	0.1229	0.0147	0.0037	0.0001	0.0253	0.0002	0.0554	0.1695	0.0001	0.0009	0.0488	0.0002	0.0000	0.0000	0.0000	0.0007	0.0001	0.0050	0.0001	0.0737	0.0000	0.0000	0.0001	0.0006	0.0008	0.0102
Guangxi	0.0001	0.0001	0.0008	0.0000	0.0145	0.0000	0.0020	0.0006	0.0000	0.0001	0.0000	0.0004	0.0058	0.0000	0.0001	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0000	0.0000	0.0013	0.0009	0.0001

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Guizhou	0.0000	0.0000	0.0004	0.0000	0.0019	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0013	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.00000	0.0000	0.0000	0.0000	0.0061	0.0000	0.0001	0.0000	0.0048	0.0006	0.0032
Hainan	0.0001	0.0000	0.0003	0.0000	0.0085	0.0021	0.0001	0.0000	0.0000	0.0002	0.0001	0.0013	0.0014	0.0001	0.0000	0.0003	0.0001	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0000	0.0007	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002
Hebei	0.0005	0.0046	0.0002	0.0004	0.0001	0.0000	0.0002	0.0000	0.0000	0.0032	0.0156	0.0008	0.0001	0.0038	0.0004	0.0000	0.0042	0.0112	0.0001	0.0002	0.0041	0.0058	0.0020	0.0000	0.0011	0.0062	0.0000	0.0003	0.0003	0.0008	0.0001
Henan	0.0011	0.0006	0.0003	0.0005	0.0008	0.0000	0.0001	0.0001	0.0018	0.0000	0.0003	0.0023	0.0001	0.0002	0.0008	0.0001	0.0005	0.0002	0.0001	0.0007	0.0042	0.0067	0.0046	0.0001	0.0006	0.0001	0.0001	0.0017	0.0005	0.0015	0.0001
Heilongjiang	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0002	0.0000	0.0002	0.0000	0.0342	0.0007	0.0000	0.0096	0.0096	0.0000	0.0000	0.0068	0.0001	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0003	0.0000
Hubei	0.0003	0.0002	0.0013	0.0002	0.0024	0.0003	0.0003	0.0005	0.0005	0.0065	0.0000	0.0000	0.0019	0.0001	0.0007	0.0007	0.0001	0.0001	0.0001	0.0005	0.0014	0.0006	0.0013	0.0001	0.0013	0.0001	0.0001	0.0004	0.0003	0.0019	0.0047
Hunan	0.0001	0.0002	0.0009	0.0001	0.0109	0.0008	0.0017	0.0008	0.0002	0.0003	0.0001	0.0053	0.0000	0.0000	0.0002	0.0010	0.0001	0.0000	0.0000	0.0000	0.0002	0.0002	0.0001	0.0001	0.0004	0.0000	0.0000	0.0003	0.0010	0.0010	0.0004
Jilin	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0002	0.0200	0.0001	0.0000	0.0000	0.0004	0.0000	0.0161	0.0040	0.0000	0.0000	0.0038	0.0001	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0002	0.0000
Jiangsu	0.093	0.000	0.001	0.000	0.0005	0.0000	0.0037	0.000	0.000	0.003	0.0003	0.001	0.000	0.000	0.000	0.001	0.0003	0.0001	0.000	0.000	0.0030	0.000	0.000	0.0086	0.004	0.000	0.000	0.0008	0.003	0.0083	0.0006

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
(continued)	4	6	3	2				1	2	1		6	3	1	0	0			0	2		2	8		4	1	0		0		
Jiangxi	0.00005	0.00001	0.00045	0.00000	0.0085	0.0001	0.0007	0.00001	0.00001	0.00001	0.0000	0.00008	0.00010	0.00000	0.00004	0.00000	0.0000	0.0000	0.00000	0.00000	0.0002	0.00000	0.00000	0.0002	0.00001	0.00000	0.00000	0.0000	0.00001	0.0033	0.0000
Liaoning	0.00005	0.00002	0.00002	0.00000	0.0001	0.0000	0.0000	0.00000	0.00013	0.00008	0.0707	0.00001	0.00000	0.00418	0.00006	0.00000	0.0000	0.0203	0.00000	0.00000	0.0050	0.00002	0.00001	0.0000	0.00003	0.00002	0.00000	0.0000	0.00000	0.0006	0.0000
Inner Mongolia	0.00000	0.00002	0.00001	0.00030	0.0000	0.0000	0.0000	0.00000	0.00070	0.00002	0.0094	0.00000	0.00000	0.00026	0.00001	0.00000	0.0050	0.0000	0.00028	0.00001	0.0005	0.00104	0.00038	0.0000	0.00001	0.00002	0.00000	0.0000	0.00000	0.0002	0.0000
Ningxia	0.00001	0.00001	0.00000	0.00203	0.0000	0.0000	0.0000	0.00000	0.00001	0.00006	0.0000	0.00000	0.00000	0.00000	0.00001	0.00000	0.0000	0.0010	0.00000	0.00001	0.0001	0.00001	0.00081	0.0000	0.00001	0.00000	0.00000	0.0001	0.00000	0.0001	0.0000
Qinghai	0.00000	0.00000	0.00000	0.00094	0.0000	0.0000	0.0000	0.00000	0.00001	0.00005	0.0000	0.00000	0.00000	0.00000	0.00001	0.00000	0.0000	0.0000	0.00001	0.00000	0.0001	0.00001	0.00010	0.0000	0.00003	0.00000	0.00003	0.0001	0.00000	0.0002	0.0000
Shandong	0.00017	0.00011	0.00004	0.00003	0.0001	0.0000	0.0001	0.00000	0.00018	0.00030	0.0417	0.00006	0.00000	0.00183	0.00032	0.00001	0.0044	0.0023	0.00000	0.00005	0.0000	0.00009	0.00007	0.0002	0.00003	0.00004	0.00000	0.0013	0.00025	0.0020	0.0001
Shanxi	0.00003	0.00003	0.00002	0.00002	0.0000	0.0000	0.0001	0.00000	0.00062	0.00038	0.0001	0.00004	0.00000	0.00001	0.00002	0.00000	0.0002	0.0113	0.00000	0.00001	0.0007	0.00000	0.00034	0.0000	0.00019	0.00003	0.00000	0.0000	0.00003	0.0007	0.0001
Shaanxi	0.00002	0.00004	0.00002	0.00104	0.0003	0.0000	0.0000	0.00001	0.00009	0.00040	0.0001	0.00009	0.00001	0.00001	0.00007	0.00000	0.0002	0.0007	0.00029	0.00016	0.0011	0.00035	0.00000	0.0000	0.00009	0.00002	0.00006	0.0029	0.00001	0.0010	0.0001
Shang	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0000	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
hai	713	003	035	001	05	000	002	000	001	015	2	009	002	001	821	034	002		000	000	14	001	002	000	021	001	000	0161	00	194	03
Sichuan	0.0001	0.0009	0.0006	0.0008	0.0031	0.0001	0.0014	0.0002	0.0005	0.0002	0.0001	0.0004	0.0002	0.0001	0.0004	0.0001	0.0003	0.0001	0.0001	0.0006	0.0002	0.0005	0.0010	0.0002	0.0000	0.0001	0.0064	0.00517	0.018	0.0013	0.0366
Tianjin	0.0008	0.0007	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000	0.0273	0.0013	0.0031	0.0002	0.0000	0.0011	0.0006	0.0000	0.0011	0.0022	0.0001	0.0000	0.0131	0.0010	0.0002	0.0000	0.0002	0.0000	0.0000	0.0001	0.0004	0.0000	0.0000
Tibet	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0011	0.0000	0.0000	0.0002	0.0000	0.0051	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002
Xinjiang	0.0008	0.0000	0.0000	0.0713	0.0000	0.0000	0.0000	0.0000	0.0001	0.0216	0.0000	0.0006	0.0001	0.0000	0.0016	0.0000	0.0000	0.0000	0.0028	0.0013	0.0009	0.0001	0.0043	0.0000	0.0172	0.0000	0.0000	0.0000	0.0004	0.0000	0.0022
Yunnan	0.0001	0.0000	0.0009	0.0000	0.0013	0.0002	0.0162	0.0000	0.0001	0.0001	0.0000	0.0007	0.0015	0.0000	0.0001	0.0002	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0000	0.0186	0.0000	0.0001	0.0000	0.0019	0.0000	0.0072
Zhejiang	0.0366	0.0002	0.0019	0.0001	0.0004	0.0002	0.0139	0.0000	0.0000	0.0030	0.0001	0.0058	0.0024	0.0000	0.0032	0.0477	0.0001	0.0000	0.0000	0.0000	0.0005	0.0000	0.0004	0.0019	0.0110	0.0000	0.0000	0.0001	0.0000	0.0015	0.0038
Chongqing	0.0000	0.0003	0.0005	0.0000	0.0020	0.0000	0.0025	0.0001	0.0001	0.0001	0.0000	0.0006	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0222	0.0000	0.0005	0.0009	0.002	0.0005	0.0003

Table 22 One-way interaction value matrix during 2000-2005

	Anhui	Beijing	Fujian	Gansu	Guangdong	Guangxi	Guizhou	Hainan	Hebei	Henan	Heilongjiang	Hubei	Hunan	Jilin	Jiangsu	Jiangxi	Liaoning	Inner Mongolia	Ningxia	Qinghai	Shandong	Shanxi	Sichuan	Tianjin	Tibet	Xinjiang	Yunnan	Zhejiang	Chongqing
Anhui	0.0000	0.0027	0.0005	0.0000	0.0012	0.0000	0.0002	0.0000	0.0001	0.0006	0.0001	0.0002	0.0001	0.0001	0.0258	0.0002	0.0003	0.0000	0.0000	0.0000	0.0009	0.0002	0.0002	0.0003	0.0000	0.0001	0.0008	0.0167	0.0000
Beijing	0.0030	0.0000	0.0005	0.0020	0.0003	0.0000	0.0001	0.0000	0.0741	0.0097	0.0069	0.0021	0.0004	0.0040	0.0023	0.0004	0.0074	0.0062	0.0002	0.0001	0.0115	0.0073	0.0027	0.0028	0.0000	0.0003	0.0001	0.0012	0.0004
Fujian	0.0020	0.0002	0.0000	0.0000	0.0041	0.0001	0.0089	0.0001	0.0000	0.0011	0.0000	0.0080	0.0012	0.0000	0.0003	0.0364	0.0001	0.0000	0.0001	0.0000	0.0001	0.0000	0.0125	0.0000	0.0000	0.0000	0.0005	0.0010	0.0110
Gansu	0.0000	0.0002	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0002	0.0003	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0001	0.0002	0.0027	0.0154	0.0001	0.0003	0.0002	0.0000	0.0013	0.0054	0.0000	0.0003	0.0000
Guangdong	0.0017	0.0002	0.0055	0.0009	0.0000	0.1349	0.0153	0.0049	0.0002	0.0363	0.0003	0.0568	0.1449	0.0002	0.0004	0.0310	0.0003	0.0000	0.0000	0.0000	0.0010	0.0001	0.0458	0.0000	0.0000	0.0001	0.0019	0.0006	0.0147
Guangxi	0.0000	0.0001	0.0005	0.0000	0.0405	0.0000	0.0003	0.0003	0.0000	0.0001	0.0000	0.0004	0.0032	0.0000	0.0001	0.0002	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0005	0.0007	0.0001
Guizhou	0.0000	0.0000	0.0001	0.0000	0.0289	0.0002	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0021	0.0000	0.0000	0.0001	0.0032	0.0111	0.0009

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
(cont.)	0	2	9	0					0	0		1	9	0		1						0		0	1				
Hainan	0.0000	0.0000	0.0002	0.0000	0.0036	0.0007	0.0001	0.0000	0.0000	0.0002	0.0002	0.0005	0.0010	0.0001	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0001	0.0000	0.0007	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
Hebei	0.0004	0.0102	0.0001	0.0005	0.0000	0.0000	0.0004	0.0000	0.0000	0.0019	0.0104	0.0002	0.0001	0.0020	0.0001	0.0000	0.0026	0.0147	0.0001	0.0002	0.0016	0.0036	0.0009	0.0031	0.0000	0.0001	0.0001	0.0006	0.0000
Henan	0.0002	0.0012	0.0001	0.0001	0.0040	0.0001	0.0000	0.0000	0.0016	0.0000	0.0002	0.0009	0.0001	0.0001	0.0003	0.0000	0.0001	0.0002	0.0000	0.0009	0.0006	0.0036	0.0003	0.0000	0.0000	0.0006	0.0001	0.0005	0.0003
Heilongjiang	0.0001	0.0001	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001	0.0000	0.0001	0.0000	0.0219	0.0000	0.0001	0.0069	0.0116	0.0000	0.0000	0.0027	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0001	0.0000
Hubei	0.0001	0.0014	0.0007	0.0001	0.0151	0.0001	0.0002	0.0003	0.0002	0.0019	0.0001	0.0000	0.0009	0.0002	0.0003	0.0002	0.0002	0.0000	0.0000	0.0002	0.0003	0.0002	0.0005	0.0001	0.0000	0.0005	0.0001	0.0022	0.0013
Hunan	0.0001	0.0002	0.0005	0.0000	0.0634	0.0004	0.0005	0.0003	0.0000	0.0002	0.0000	0.0020	0.0000	0.0000	0.0001	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0001	0.0004	0.0011	0.0001
Jilin	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0002	0.0210	0.0001	0.0000	0.0000	0.0001	0.0000	0.0123	0.0033	0.0000	0.0000	0.0022	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0001	0.0000
Jiangsu	0.1119	0.0007	0.0026	0.0004	0.0005	0.0001	0.0026	0.0000	0.0003	0.0137	0.0002	0.0027	0.0003	0.0002	0.0000	0.0011	0.0004	0.0001	0.0000	0.0002	0.0052	0.0001	0.0093	0.0001	0.0000	0.0006	0.0022	0.0041	0.0012
Jiangxi	0.0	0.0	0.0	0.0	0.044	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.00	0.0000	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.01	0.000

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	0.0001	0.0003	0.0071	0.0000	6	000	001	001	0.0001	0.0000	0	0.0005	0.0006	0.0000	0040	0.0000	0.0000		000	000	0.0000	0.000	001	0.000	0.000	000	002	03	1
Liaoning	0.00001	0.00002	0.00001	0.00000	0.00000	0.0000	0.0000	0.0000	0.00012	0.00007	0.0699	0.00001	0.00000	0.00434	0.00003	0.00000	0.00000	0.0224	0.00001	0.00000	0.00030	0.00001	0.00001	0.00002	0.00000	0.0000	0.0000	0.00002	0.0000
Inner Mongolia	0.00001	0.00003	0.00000	0.00130	0.00000	0.0000	0.0000	0.0000	0.00023	0.00004	0.0012	0.00000	0.00000	0.00010	0.00001	0.00000	0.00027	0.0000	0.00096	0.00000	0.00002	0.00159	0.00001	0.00001	0.00000	0.0000	0.0000	0.00003	0.0000
Ningxia	0.00000	0.00000	0.00000	0.00117	0.00000	0.0000	0.0000	0.0000	0.00001	0.00003	0.0000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0005	0.00000	0.00000	0.00002	0.00000	0.00000	0.00000	0.00000	0.0002	0.0000	0.00001	0.0000
Qinghai	0.00000	0.00000	0.00000	0.00056	0.00000	0.0000	0.0000	0.0000	0.00000	0.00005	0.0000	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000	0.0000	0.00001	0.00000	0.00000	0.00001	0.00004	0.00000	0.00006	0.0000	0.0000	0.00001	0.0000
Shandong	0.00008	0.00010	0.00002	0.00002	0.00000	0.0000	0.0000	0.0000	0.00028	0.00044	0.0377	0.00003	0.00001	0.00154	0.00036	0.00001	0.00046	0.0021	0.00000	0.00005	0.00000	0.00012	0.00004	0.00004	0.00000	0.0009	0.0012	0.00005	0.0001
Shanxi	0.00001	0.00003	0.00001	0.00000	0.00000	0.0000	0.0001	0.0000	0.00031	0.00019	0.0000	0.00002	0.00000	0.00002	0.00001	0.00000	0.00001	0.0038	0.00000	0.00000	0.00003	0.00000	0.00005	0.00000	0.00000	0.0000	0.0003	0.0004	0.0000
Shaanxi	0.00001	0.00001	0.00005	0.00029	0.00004	0.0000	0.0000	0.0000	0.00005	0.00024	0.0000	0.00002	0.00000	0.00001	0.00003	0.00000	0.00001	0.0002	0.00005	0.00007	0.00004	0.00020	0.00011	0.00000	0.00000	0.0008	0.0001	0.0004	0.0003
Shanghai	0.00637	0.00004	0.00029	0.00004	0.00004	0.0000	0.0005	0.0000	0.00001	0.00046	0.0004	0.00021	0.00006	0.00003	0.00709	0.00037	0.00005	0.0001	0.00001	0.00000	0.00040	0.00001	0.00047	0.00001	0.00000	0.0003	0.0001	0.0086	0.0016

No column headers are visible on this page (the header row is cut off at the top). The table below reproduces the data rows as read. Columns are labelled C1–C29 in left-to-right order.

Province	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29
Sichuan	0.0000	0.0018	0.0014	0.0015	0.0332	0.0001	0.0006	0.0002	0.0005	0.0001	0.0000	0.0002	0.0001	0.0000	0.00041	0.0001	0.0002	0.0000	0.0000	0.0002	0.0002	0.0005	0.0000	0.0001	0.0074	0.0054	0.0078	0.0032	0.0074
Tianjin	0.0004	0.0008	0.0001	0.0006	0.0000	0.0000	0.0000	0.0000	0.0408	0.0020	0.0124	0.0003	0.0000	0.0013	0.00040	0.0000	0.0010	0.0019	0.0001	0.0001	0.0365	0.0018	0.0002	0.0000	0.0000	0.0001	0.0000	0.0002	0.0001
Tibet	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
Xinjiang	0.0001	0.0001	0.0000	0.0361	0.0000	0.0000	0.0000	0.0000	0.0001	0.0113	0.0000	0.0002	0.0000	0.0000	0.00030	0.0000	0.0000	0.0000	0.0012	0.0016	0.0004	0.0001	0.0067	0.0000	0.0000	0.0000	0.0000	0.0001	0.0010
Yunnan	0.0000	0.0001	0.0006	0.0000	0.0004	0.0003	0.0061	0.0000	0.0001	0.0001	0.0000	0.0003	0.0008	0.0000	0.00012	0.0002	0.0001	0.0000	0.0000	0.0000	0.0001	0.0001	0.0091	0.0000	0.0000	0.0000	0.0000	0.0013	0.0033
Zhejiang	0.0439	0.0004	0.0022	0.0001	0.0014	0.0005	0.0371	0.0000	0.0001	0.0111	0.0001	0.0095	0.0048	0.0001	0.00491	0.0301	0.0001	0.0000	0.0000	0.0000	0.0014	0.0001	0.0193	0.0001	0.0000	0.0001	0.0072	0.0000	0.0080
Chongqing	0.0000	0.0004	0.0008	0.0001	0.0098	0.0000	0.0011	0.0001	0.0001	0.0001	0.0000	0.0005	0.0001	0.0000	0.00010	0.0000	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0073	0.0001	0.0002	0.0011	0.0011	0.0012	0.0000

Table 23 One-way interaction value matrix during 2005-2010

	Anhui	Beijing	Fujian	Gansu	Guangdong	Guangxi	Guizhou	Hainan	Hebei	Henan	Heilongjiang	Hubei	Hunan	Jilin	Jiangsu	Jiangxi	Liaoning	Inner Mongolia	Ningxia	Qinghai	Shandong	Shanxi	Shaanxi	Shanghai	Sichuan	Tianjin	Tibet	Xinjiang	Yunnan	Zhejiang	Chongqing
Anhui	0.0000	0.0026	0.0008	0.0001	0.00009	0.0000	0.0002	0.00001	0.00002	0.00012	0.0000	0.00004	0.00002	0.00001	0.00160	0.00003	0.0002	0.0000	0.00000	0.00001	0.0006	0.00001	0.00002	0.0173	0.00002	0.00002	0.00000	0.0001	0.00005	0.0110	0.0001
Beijing	0.0019	0.0000	0.0006	0.0019	0.0004	0.0001	0.0001	0.00001	0.00882	0.00118	0.0069	0.00024	0.00005	0.00043	0.00015	0.00005	0.0073	0.0057	0.00003	0.00001	0.0155	0.00085	0.00020	0.0002	0.00015	0.00036	0.00000	0.0007	0.00001	0.0008	0.0003
Fujian	0.0011	0.0001	0.0000	0.0001	0.0034	0.0002	0.0104	0.00002	0.00000	0.00020	0.0000	0.00040	0.00015	0.00000	0.00003	0.00269	0.0001	0.0000	0.00000	0.00000	0.0002	0.00001	0.00004	0.0003	0.00130	0.00001	0.00000	0.0001	0.00017	0.0010	0.0081
Gansu	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.00000	0.00002	0.00008	0.0000	0.00003	0.00001	0.00000	0.00002	0.00000	0.0001	0.0001	0.00017	0.00045	0.0002	0.00002	0.00025	0.0000	0.00005	0.00001	0.00005	0.0017	0.00000	0.0004	0.0001
Guangdong	0.0009	0.0001	0.0045	0.0007	0.0000	0.1406	0.0110	0.00038	0.00001	0.00194	0.0002	0.00467	0.11347	0.00002	0.00002	0.00282	0.0002	0.0000	0.00000	0.00001	0.0004	0.00002	0.00053	0.0001	0.00339	0.00000	0.00000	0.0002	0.00036	0.0005	0.0106
Guangxi	0.0001	0.0001	0.0011	0.0000	0.0256	0.0000	0.0005	0.00006	0.00001	0.00002	0.0001	0.00005	0.00039	0.00001	0.00001	0.00003	0.0001	0.0000	0.00000	0.00000	0.0001	0.00001	0.00001	0.0000	0.00003	0.00001	0.00000	0.0001	0.00004	0.0006	0.0001
Guizhou	0.0001	0.0000	0.0014	0.0000	0.0052	0.0002	0.0000	0.00001	0.00000	0.00001	0.0000	0.00003	0.00018	0.00000	0.00002	0.00001	0.0000	0.0000	0.00000	0.00000	0.0001	0.00000	0.00000	0.0001	0.00035	0.00000	0.00000	0.0000	0.00019	0.0052	0.0023
Hainan	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0001	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	001	000	004	001	37	009	001	000	001	003	3	004	007	001	001	002	001		000	000	011	001	001	000	007	001	000	001	00	0011	02
Hebei	0.0003	0.0159	0.0002	0.0002	0.0001	0.0000	0.0001	0.0001	0.0000	0.0027	0.0097	0.0004	0.0001	0.0021	0.0003	0.0001	0.0038	0.0061	0.0001	0.0001	0.0022	0.0025	0.0008	0.0000	0.0005	0.0038	0.0000	0.00021	0.0003	0.00031	0.0001
Henan	0.0007	0.0007	0.0003	0.0002	0.0010	0.0000	0.0000	0.0001	0.0010	0.0000	0.0002	0.0011	0.0002	0.0001	0.0005	0.0001	0.0002	0.0001	0.0001	0.0002	0.0013	0.0016	0.0007	0.0001	0.0003	0.0001	0.0001	0.00051	0.0001	0.00081	0.0001
Heilongjiang	0.0001	0.0004	0.0001	0.0000	0.0001	0.0000	0.0000	0.0000	0.0007	0.0001	0.0000	0.0001	0.0000	0.0123	0.0002	0.0000	0.0069	0.0042	0.0000	0.0000	0.0026	0.0001	0.0000	0.0001	0.0000	0.0004	0.0000	0.00000	0.0000	0.00020	0.0000
Hubei	0.0003	0.0005	0.0010	0.0001	0.0069	0.0002	0.0002	0.0004	0.0003	0.0029	0.0001	0.0000	0.0014	0.0001	0.0007	0.0006	0.0001	0.0002	0.0001	0.0002	0.0005	0.0004	0.0005	0.0002	0.0007	0.0001	0.0000	0.00042	0.0002	0.00252	0.0016
Hunan	0.0001	0.0002	0.0007	0.0001	0.0381	0.0006	0.0007	0.0005	0.0001	0.0003	0.0000	0.0025	0.0000	0.0001	0.0002	0.0006	0.0001	0.0000	0.0000	0.0001	0.0002	0.0001	0.0001	0.0001	0.0003	0.0000	0.0000	0.00024	0.0002	0.00121	0.0001
Jilin	0.0001	0.0002	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001	0.0005	0.0002	0.0124	0.0001	0.0000	0.0000	0.0002	0.0000	0.0094	0.0029	0.0000	0.0001	0.0019	0.0002	0.0000	0.0000	0.0000	0.0001	0.0000	0.00010	0.0001	0.00030	0.0000
Jiangsu	0.0885	0.0003	0.0016	0.0013	0.0005	0.0001	0.0023	0.0000	0.0005	0.0176	0.0004	0.0039	0.0008	0.0003	0.0000	0.0016	0.0003	0.0001	0.0001	0.0002	0.0090	0.0005	0.0036	0.0039	0.0063	0.0001	0.0001	0.00037	0.0017	0.00451	0.0013
Jiangxi	0.0004	0.0001	0.0049	0.0001	0.0199	0.0002	0.0004	0.0004	0.0001	0.0003	0.0000	0.0007	0.0008	0.0000	0.0005	0.0000	0.0001	0.0002	0.0001	0.0001	0.0002	0.0002	0.0001	0.0009	0.0002	0.0001	0.0000	0.00001	0.0000	0.00751	0.0001

Liaoning	0.0004	0.0002	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0013	0.0009	0.0673	0.0001	0.0000	0.0362	0.0004	0.0000	0.0000	0.0177	0.0000	0.0000	0.0029	0.0003	0.0001	0.0000	0.0003	0.0003	0.0000	0.0001	0.0003	0.0001
Inner Mongolia	0.0001	0.0006	0.0001	0.0069	0.0000	0.0000	0.0000	0.0000	0.0061	0.0007	0.0035	0.0001	0.0000	0.0018	0.0003	0.0000	0.0037	0.0000	0.0047	0.0001	0.0012	0.0120	0.0057	0.0000	0.0005	0.0003	0.0000	0.0000	0.0001	0.0001
Ningxia	0.0001	0.0000	0.0000	0.0175	0.0000	0.0000	0.0000	0.0000	0.0002	0.0007	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0008	0.0000	0.0000	0.0002	0.0002	0.0033	0.0000	0.0001	0.0000	0.0000	0.0001	0.0001	0.0000
Qinghai	0.0000	0.0001	0.0000	0.0087	0.0000	0.0000	0.0000	0.0000	0.0001	0.0005	0.0000	0.0002	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0001	0.0000	0.0002	0.0001	0.0008	0.0000	0.0005	0.0000	0.0009	0.0001	0.0001	0.0000
Shandong	0.0009	0.0006	0.0004	0.0008	0.0001	0.0000	0.0001	0.0000	0.0039	0.0043	0.0251	0.0005	0.0001	0.0104	0.0028	0.0001	0.0032	0.0028	0.0002	0.0004	0.0000	0.0019	0.0007	0.0001	0.0003	0.0005	0.0000	0.0007	0.0008	0.0001
Shanxi	0.0002	0.0003	0.0003	0.0001	0.0000	0.0000	0.0000	0.0000	0.0052	0.0037	0.0001	0.0004	0.0001	0.0002	0.0004	0.0000	0.0003	0.0022	0.0000	0.0000	0.0009	0.0000	0.0016	0.0000	0.0005	0.0002	0.0000	0.0001	0.0003	0.0001
Shaanxi	0.0002	0.0002	0.0003	0.0071	0.0004	0.0000	0.0001	0.0001	0.0008	0.0030	0.0001	0.0006	0.0001	0.0001	0.0005	0.0001	0.0002	0.0019	0.0027	0.0010	0.0008	0.0062	0.0000	0.0000	0.0012	0.0001	0.0008	0.0016	0.0005	0.0011
Shanghai	0.0583	0.0006	0.0033	0.0009	0.0009	0.0001	0.0006	0.0001	0.0002	0.0084	0.0005	0.0033	0.0009	0.0003	0.0594	0.0036	0.0006	0.0001	0.0001	0.0001	0.0061	0.0003	0.0012	0.0000	0.0042	0.0001	0.0000	0.0003	0.0083	0.0155
Sichuan	0.0000	0.0001	0.0001	0.0000	0.0128	0.0001	0.0008	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001	0.0000	0.0000	0.0004	0.0000	0.0000	0.0007	0.0000	0.0000	0.0002	0.0026	0.0005	0.0155

Region	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
(cont.)	1	0	0	7				2	3	4		6	3	1	7	2			1	8		4	7		0	1	9		0		
Tianjin	0.0006	0.0005	0.0002	0.0009	0.0001	0.0000	0.0000	0.0000	0.0410	0.0035	0.0041	0.0004	0.0001	0.0018	0.0005	0.0001	0.0017	0.0023	0.0001	0.0001	0.0176	0.0039	0.0005	0.0000	0.0003	0.0000	0.0000	0.0003	0.0000	0.0003	0.0001
Tibet	0.0000	0.0000	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0000	0.0000	0.0001	0.0000	0.0041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002
Xinjiang	0.0002	0.0001	0.0001	0.0356	0.0001	0.0000	0.0000	0.0000	0.0002	0.0067	0.0000	0.0002	0.0001	0.0000	0.0004	0.0000	0.0001	0.0000	0.0026	0.0006	0.0006	0.0001	0.0023	0.0000	0.0054	0.0000	0.0000	0.0000	0.0000	0.0001	0.0006
Yunnan	0.0000	0.0001	0.0007	0.0000	0.0007	0.0002	0.0046	0.0001	0.0001	0.0002	0.0000	0.0004	0.0011	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0070	0.0000	0.0001	0.0001	0.0000	0.0009	0.0029
Zhejiang	0.0500	0.0002	0.0020	0.0003	0.0020	0.0005	0.0512	0.0000	0.0001	0.0173	0.0002	0.0114	0.0067	0.0001	0.0047	0.0337	0.0001	0.0000	0.0000	0.0000	0.0015	0.0001	0.0017	0.0019	0.0146	0.0000	0.0000	0.0001	0.0105	0.0000	0.0072
Chongqing	0.0000	0.0002	0.0007	0.0001	0.0035	0.0000	0.0013	0.0001	0.0001	0.0001	0.0000	0.0004	0.0001	0.0000	0.0002	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0262	0.0000	0.0001	0.0008	0.0008	0.0008	0.0000

Table 24 Changes of alfa coefficient

α	1995-2000	2000-2005	2005-2010	AVERAGE
Anhui	0.997718	0.975911	1.001055	0.991561
Beijing	1.025683	1.042604	1.034384	1.034223
Fujian	1.028658	1.02272	1.018191	1.02319
Gansu	1.024914	1.034484	1.029111	1.029503
Guangdong	1.023774	0.934732	0.9402	0.966235
Guangxi	1.022728	1.000053	1.008085	1.010289
Guizhou	1.080742	1.021419	1.021264	1.041142
Hainan	0.964016	1.030052	1.02354	1.005869
Hebei	1.022977	0.932898	0.955077	0.970318
Henan	1.019523	0.899473	0.899965	0.939654
Heilongjiang	1.024878	0.99883	1.004536	1.009415
Hubei	1.042292	0.983541	1.001684	1.009172
Hunan	1.053639	0.967748	0.983121	1.001502
Jilin	1.036268	1.024977	1.019228	1.026824
Jiangsu	1.033439	0.943827	0.957558	0.978275
Jiangxi	1.04239	1.022832	1.015899	1.027041
Liaoning	1.01113	0.998706	1.002257	1.004031
Inner Mongolia	0.990448	1.018436	1.014282	1.007722
Ningxia	1.052615	1.026762	1.02103	1.033469
Qinhai	1.013284	1.014064	1.010819	1.012722

Shandong	1.023147	0.902945	0.902999	0.94303
Shanxi	1.047285	1.047912	1.03243	1.042542
Shaanxi	1.041982	1.022327	1.021941	1.02875
Shanghai	1.033371	1.035027	1.02602	1.031473
Sichuan	1.033035	0.91555	0.915428	0.954671
Tianjin	1.043734	1.039015	1.031157	1.037969
Tibet	0.967358	1.005028	1.003495	0.99196
Xinjiang	1.010653	1.018243	1.014356	1.014417
Yunnan	1.033311	1.00658	1.008446	1.016112
Zhejiang	1.018638	1.01125	1.007721	1.012536
Chongqing	1.021442	1.046138	1.03564	1.034407

Table 25 Evolution of industrial potential

E-Name	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Anhui	147,74	146,54	148,40	157,39	171,62	187,51	288,54	260,05	293,57	337,39	428,30	465,41
Beijing	256,52	283,17	256,78	248,23	258,56	239,12	374,13	361,33	376,51	384,06	381,68	397,22
Fujian	54,81	52,22	54,58	59,15	66,00	76,05	102,71	105,98	117,92	131,55	147,52	161,77
Guansu	17,82	18,15	18,52	18,67	19,68	20,01	24,80	24,77	27,18	29,93	29,95	33,48
Guangdong	57,16	59,13	60,28	62,69	67,09	70,70	94,00	95,85	102,96	116,68	187,38	203,60
Guangxi	20,73	20,47	20,64	20,72	21,52	22,21	29,44	29,92	32,69	36,32	47,13	52,63
Guizhou	24,15	24,02	24,05	23,89	25,29	26,40	34,24	35,49	38,31	41,46	47,32	52,93
Hainan	16,54	16,33	16,44	16,49	17,34	18,32	23,85	24,02	25,92	28,31	44,21	48,09
Hebei	98,64	96,06	94,83	97,36	101,90	106,08	142,68	147,50	162,14	173,38	173,89	193,78

Henan	85,35	82,24	82,20	81,52	85,18	86,37	117,03	116,77	129,79	145,07	159,73	182,62
Heilongjiang	21,84	20,72	20,36	19,96	21,07	21,31	30,23	28,97	33,01	37,30	37,32	43,20
Hubei	69,64	67,61	66,11	67,04	71,37	75,06	98,25	99,65	111,60	127,42	145,56	170,19
Hunan	47,62	47,30	46,52	47,28	50,89	53,88	70,94	73,20	81,73	92,62	109,61	125,72
Jilin	36,99	35,04	34,73	34,14	36,33	37,33	53,62	52,11	60,41	68,24	67,26	77,70
Jiangsu	192,45	191,18	194,67	210,21	230,73	254,16	399,40	357,30	401,65	460,04	583,43	625,64
Jiangxi	62,43	61,12	60,73	62,26	66,70	71,27	98,27	98,96	111,61	126,77	146,23	164,56
Liaoning	51,94	49,69	51,36	52,10	57,30	63,03	94,11	96,68	116,45	130,71	127,74	145,07
Inner Mongolia	29,34	28,83	28,35	28,90	30,39	31,39	43,07	43,55	47,94	51,46	52,05	57,76
Ningxia	22,81	22,50	21,80	22,14	23,11	23,97	32,37	32,83	36,34	38,74	41,63	46,70
Qinghai	16,89	18,32	19,91	20,43	21,39	21,14	23,14	22,61	24,45	26,80	26,62	29,76
Shandong	98,99	97,56	98,53	102,00	109,80	120,18	173,06	187,64	212,20	235,40	259,42	298,05
Shanxi	83,60	80,02	78,87	80,85	84,48	87,47	114,79	116,67	127,82	135,64	130,61	143,90
Shaanxi	34,50	33,62	33,51	33,24	35,13	36,05	47,95	48,28	53,64	58,64	63,25	72,25
Shanghai	1080,21	1054,51	990,28	1120,66	1174,68	1276,57	1833,86	1776,88	1771,52	1878,81	2083,84	2130,65
Sichuan	25,51	25,02	25,17	25,58	27,20	28,93	39,40	42,07	46,25	52,44	46,40	50,79
Tianjin	361,51	355,15	373,25	388,01	379,76	379,56	475,18	472,67	495,69	509,93	545,40	634,06
Tibet	3,64	3,57	3,60	3,68	3,90	4,09	5,46	5,59	6,16	6,81	7,15	7,96
Xinjiang	3,13	3,01	2,97	2,96	3,12	3,25	4,34	4,40	4,83	5,33	5,75	6,46
Yunnan	13,37	12,85	12,90	12,89	13,68	14,20	18,58	19,17	20,99	23,07	25,07	28,08
Zhejiang	171,44	168,55	174,94	205,12	230,89	259,49	401,66	390,46	432,65	486,70	552,95	593,86
Chongqing	42,72	42,19	42,90	43,46	45,62	48,44	63,14	68,29	74,97	86,45	91,26	101,03

Questionnaire (2016)

-----Personal situation

B3 Respondent's gender: 1 Male   2 Female

B4 When were you born?   Year _____ month _____

B5 What's your marital status?

    1.Single   2.Married   3.Remarried   4. Divorced   5. Widowed   6. Cohabitation

C1 How many family members do you have except you? _____(persons)

(Note to interviewer: family members mentioned here are those whom were considered as family members by respondent)

    I1.3.1 Your correct registered residence is in _____province(municipality) _____city_____ county/district.

I1.6 Your political status is：

    1. Member of the Communist Party of China, joined the Party in year:___

    2. Member of a democratic party, joined the party in year: ___

    3. The masses (qunzhong)

I1.14 What is your household registration (hukou) type at present?

    1. Agricultural   2.Non-agricultural

    3Resident (with agricultural registration before)

    4.resident(with non-agricultural registration before)

    5.Other (please specify)_____

I2.1 What is your highest academic qualification? (see code 3) _____

(If the respondent is studying at school or research institute, then that's the highest qualification)

Note to interview: If the respondent failed to graduate from one certain degree, we consider this degree as the highest degree. For example, respondent just finished primary school but hadn't

1.Never went to school   2.Primary school/ old-style private school

3.Middle school   4.General high school

5.Vocational high school   6.Technical school

7.Secondary specialized school   8.Junior college

9.Bachelor   10.Master

11.PHD   12. Other(please specify)_____

99999.Don't know

I2.14 Your place of birth: ___ province (autonomous region/ directly-controlled municipality), ___ city (prefecture/league/ autonomous prefecture), ___ county (district/banner/county-level city)

I3a.6 Your total income of all kinds (including agricultural income, salaries and operating income etc.) in 2015 was: ____(in 10,000 yuan)

I3a.6.1 Among your total income, the amount of your wage-related income after personal income tax, social insurance and housing fund (including all wages, bonusesand subsidiesafter individual income tax) in 2015 was ___(in 10,000 yuan)

(If the respondent hasn't worked for one whole year, record their monthly average wage-related income ×12)

I3a.8 The industry type of your job is_____ (see the occupational code scheme)

I3a.9 Which type of work unit does your job belong to?

(Note to interviewer：Work unit should be an unique organization with its own financial and personnel management authority. If respondent's work unit can be divided into many levels, and it's hard to distinguish which level his/her work unit belong to, interviewer can give hints that it's the same level as their salary relationship. For example, for Security staffs, service workers and housekeeping staffs dispatched by the dispatch service agencies, their dispatch agencies are their work unit; self-employed people also need to answer. If respondent doesn't have work unit, fill 10 or 11.)

[Work unit]

1. Party and government organs, mass organization and army

2. State owned/ collective institution

3. State-owned enterprise   4.Collective enterprise

5. Village committee and other autonomous organizations

6. Privately-owned enterprise   7. Sino-foreign joint ventures

8 Private non-enterprise organization, association and other social organizations

9.Privately or individually-owned business(including registered privately or individually-owned business and unregistered shopkeepers)

[No workplace]

10.Farming: Agriculture, forestry, husbandry and fishery production(e.g., farming, poultry breeding and aquaculture etc.)

11. Free-lancer (free-lance, short-term hired labour, vendor, nanny without dispatch unit, self-operating driver, craftsman

I3a1.14.0 In general, do you work overtime?

1.Yes   2.No (skip to I3a1.15)

I4a.2.7 What's the scale of your recent/current work unit? _____persons

I4a.5.1 How many work experiences do you have totally since you started to work? _____times

I4b.1 Do you have any experience of working outside the village (cross-county migration for more than half a year)?

1.Yes (skip to I4b.2.1)   2.No

I4b.4.5 Can you get the bouns or other interest benefits in your village?

1.Yes   2.No

I6.1 How many close friends/ acquaintances do you have who can give you support and help in this locality? _____(persons)

I6.3 How familiar are you with the neighbors and other residents in this community (village)?

1.Very unfamiliar   2.Unfamiliar   3.Moderate   4.Familiar   5.Very familiar

I6.4 How much do you trustthe neighbors and other residents in this community (village)?

1.Very little   2.Little   3.Some   4.Much   5.Very much

I6.5 Is there mutual support between you and your neighbors and other residentsin this community (village)?

1.Very little   2.Little   3.Some   4.Much   5.Very much

I6.13 What's your proficiency in speaking the local dialect?

1.Understand quite well   2. Almost understand all

3. Partially understand   4. Can barely understand

5.Do not understand at all

I6.14 What's your probability of permanently residing here in the future?

1.Very high   2.Fairly high   3.Not sure   4.Fairly low   5.Very low

I6.14.2 Where do you mostly want to settle down if don't want to resident here permanently?(see code 26)

1.Hometown in countryside   2.The town center of native place

3. County town or prefecture-level city of native place   4.Capital city of native place

5.Other middle-sized and small cities   6.Other metropolis

7.Don't know   8. Other(please specify_____)

----Industrial relocation

I3a.21.w16 Are there any in-migrated industries in your residence or working places or peripheries in recent years(new built industries are not included)?

1.Yes   2.No   3.Don't know

I3a.22.w16 Are there any out-migrated industries in your residence or working places or peripheries in recent years(new built industries are not included)?

1.Yes   2.No   3.Don't know

I3a.23.w16 Has your enterprise relocated or semi-relocated in recent years?

    1.Yes   2. No

I3a.23.1.w16 Do you know the relocation direction/route?

    1.From center to periphery or from undeveloped area to developed one

    2.From periphery to center or from developed area to undeveloped one

    3.More or less the same

I3a.23.2.w16 What's the range of the movement?

    1.Movement in the same city/region

    2.Movement in different city/region but in same province

    3.Movement between provinces

I3a.23.3.w16 Does the relocation have any influences on your collegues who migrated his/her work department?

	Getting worse seriously	Getting worse	No influence	Getting better slightly	Getting better obviously
Income					
Living circumstance					
Future development					

I3a.24.w16 Does your company intend to migrate in recent years?

    1.Yes   2. No

I3a.24.1.w16 Do you know the relocation direction/route?

    1.From center to periphery or from undeveloped area to developed one

    2.From periphery to center or from developed area to undeveloped one

    3.More or less the same

I3a.24.2.w16 What's the range of the movement?

1. Movement in the same city/region

2. Movement in different city/region but in same province

3. Movement between provinces

I3a.24.3.w16   Do you want to migrate with your company?

1. Yes   2. No