China's Rural-urban Migration and Its Impact on Economic Development

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Abstract. Since the initiation of the well-known economic reform and opening-up policy in 1978, hundreds of millions of Chinese rural labourers have left the countryside to work in towns and cities. This biggest labour flow in the world history has not been fully studied due to limited data availability. This paper investigates some major perspectives in terms of rural-to-urban migration in China, including the determinants of migration and its impacts on urbanization and economic development. The main findings can be summarized in the following points. With respect to the determinants, the perceived income differentials between rural and urban areas are the primary source of internal population mobility. Age, gender, dependent children and education level significantly affects decisions to migrate. Referring to the impacts of the labour flow, cityward migration has been a great contribution to economic growth and a dominant source of growth of the urbanization. The huge flow of rural labour disrupts agricultural production, but positively affects per capita income of rural households through remittances, which can further catalyze income growth in self-employed activities in the long run.

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I. Introduction and Background

Since China started its economic reform and adopted opening-up policies in 1978, its economy has leapt forward and enjoyed three decades of great economic prosperity. China has transformed from a traditional agricultural society to a modernized industrial society. It is not merely the most populous nation in the world, but its strong economic expansion (rapid GDP and export growth) has already made China the second largest economy in the world, after the United States (evidence is seen in the first three figures in Appendix). On the pace of urbanization and industrialization in the post-reform era, China has also experienced an unprecedented peacetime population flow from the countryside to the city, ever the highest witnessed in world history. China's economic miracle, to a significant extent, has been attributed to the large-scale movement of surplus labour from the low productivity rural sector to the high productivity urban sector. The massive population flow from rural to urban areas has provided modern industries with cheap labour and facilitated the rapid growth of labour-intensive manufacturing exports. Hence, rural labour migration, which has accelerated the process of urbanization and promoted the development of economy of China, has become one of the most significant socio-economic phenomena.

Before 1978, the predominant work force in China was employed in the agricultural sector. After a set of agricultural reforms, however, the reallocation of labour from agriculture to non-agricultural sectors has dramatically increased, which has been promoted as a path to development. The volume of the migrant population is full in swing as China transitions towards a market economy. The floating population was estimated to be below 10 million before 1985 (Liang et al, 2002), while recent estimates place the migrant population somewhere around 158.6 million people (Figure 4). The Urban population increased from 18.96

percent of the total population in 1979 to 42.99 percent in 2005, and rural to urban migrant population contributed to 79.9 percent of the growth of urbanization (see Figure 5). As China's economy continues to expand, the flow of labour to urban regions will continue and even accelerate. Thus, migration issues have risen to the top of the policy agenda in China. Since in the early 1980s, politicians in China have turned their attention to the problems of population growth and economic development. Policies that emphasized industrialization should not only aim to increase national incomes, but also to relieve the overpopulation of the countryside.

Migration's inherent importance and pervasiveness have attracted development economists to study migration from several perspectives. Research on rural-urban migration in developing countries (see, e.g. Zhao, 1999b; Zhang, 2003a; and Meng & Zhang, 2010) has examined the size and composition of the labour flow, and the income gain of the relevant migration unit (the individual or the household). A mass amount of the literature focuses on the describing patterns of population movement and studying the determinants of migration (e.g. Mendola, 2012; Liang et al, 2002; and Zhu, 2002), but little research emphasizes the effects of migration on source communities that migrants leave (e.g. Brauw et al, 2002 and Démurgera & Xu 2013). According to the early neoclassic approaches of migration and development, technological innovation lowered the demand of farm labourers, and therefore surplus labour force in agriculture migrated to cities in order to obtain manufacturing jobs and higher income (Taeuber, 1941). Migrations from some industrialized Western countries (Britain, Ireland and Germany) were mainly driven by agricultural enclosure, land consolidation, technological improvements, and the application of new methods of land cultivation.

Distinctive features of China's rural-out-migration compared to other countries are legacies of the past policies and the previous central planning economic system. Through the *hukou* system, a household registration system, China has maintained a strict separation of the urban and rural sectors, making rural-urban labour mobility more difficult than in other countries. The strict separation of the urban and sectors has also made income inequality in China the highest in Asia (Henderson, 2009). China's migration was highly contained with regions and provinces, with relative little long-distance migration compared to other large countries such as Brazil and the USA. Recent research suggests that because of the strict control of residents, many prefecture-level cities are about half their efficient size (Henderson, 2009). Relative to the rest of the world, China distinctly lacks cities in the range of 1-12 million in population, while Shanghai, Beijing, and Guangzhou, for example, have evolved into megacities. Hence, China's experience of urbanization and massive rural-urban migration is somewhat relevant to other countries even though the unique *hukou* system of China distinguished Chinese migration from migration in other countries.

This paper aims to provide an overview of China's rural to urban migration and uses the data gathered by the RUMiCI project (Rural Migration in China and Indonesia) to estimate the determinants of migration, and investigate the impact of China's rural-urban migration in both sending and receiving communities, and the significance of remittances on urbanization and economic development. What are the demographic characteristics of workers in the city who originate from countryside? What are migrants' attributes? How well are we able to assess the impact of migration on development in China in terms of its immediate contribution to economic growth and poverty alleviation and in terms of its long-run implication for stratification and social relations? These are the major

questions that will be considered in this paper with an eye on the importance of internal labour flow in China.

The organization of the rest of the paper is as follows. The second section provides brief information on China's evolution of rural-urban segregation and migration, and describes the household registration system and its reform. The third section examines the determinants and investigates explanations of massive internal migration. The following section reveals the significant impact of rural-out migration on economic development in both source and destination regions. The final section concludes and discusses some policy implications of the study.

II. The Evolution of Rural-Urban Segregation and Migration

Before the 1980s, China had tightly restricted internal migration of its population between urban and rural areas, within the rural sector, between big and small cities and between regions. Rural peasants rarely moved to work outside their village under strict control of the household registration system, the *hukou* system[1], which was adopted by the government in 1951, and extended to the rural areas in 1955 (Chan & Zhang, 1999). The original purpose of this policy was to control population migration and labour mobility between rural and urban areas as well as across regions. For a long time China's *hukou* system led to a rural-urban segregation that kept peasants away from cities (Liang et al, 2002). The central government intensified the *hukou* system and strictly restricted the mobility of the population following the collapse of the Great Leap Forward[2] and the devastating famine that occurred in the 1960s because of the shortage of food (Zhao, 1999a). At that time, the government was responsible for feeding the population, so it needed to tie the farmers to the land to provide cheap agricultural products to the industrial sector. Then the *hukou* system intended to promote the development of heavy industry and to speed up industrialization (Zhao, 2003b). In this sense, the strict rural-urban migration segregation had more profound reasons.

[1] A *hukou* is a record in the system of household registration required by law. *Hukou* officially identifies a person's registered residency status and includes identifying information such as name, parents, spouse and date of birth. In Mainland China, all nationals' personal *hukou* status is classified by two related parts: one by residential location and one by socioeconomic eligibility (often called agricultural and non-agricultural) (Chan & Zhang, 1999).

[2] The Great Leap Forward was an economic and social campaign led by Mao Zedong, the leader of the Communist Party of China, from 1958 to 1961. The campaign was aimed to rapidly transform the country from an agricultural-based economy into a communist society through rapid industrialization and collectivization. However, the erroneous policies did not promote industrialization and led to the Great Chinese Famine (Trueman, 2013).

The Chinese government employed two primary methods (Zhao, 1999a) that could achieve the segregation although controlling the rural to urban labour flow was extremely comprehensive. One method was to impose a high opportunity cost for leaving rural areas, tying incomes to participation in daily collective farm work by the people's commune system. The other was to make it difficult for outsiders to live in urban regions. The *hukou* system limited the number of people who could access low-priced food, guaranteed non-agricultural employment and subsidized public services, such as education, health care, and transportation (Cai and Wang, 2008). These linkages made it almost impossible for rural people without urban *hukou* to live in cities.

The *hukou* system severely restrained the urbanization process in China, and it also deprived both rural and urban residents of their freedom of mobility (Zhao, 2003b). In the transition towards a market-oriented economy since the reform in 1978, controls over labour mobility have been gradually loosened (Cai & Wang, 2008). The introduction of a household responsibility system (HRS)[3] in rural areas returned some degree of personal freedom to the rural people, and allowed farmers to earn income based on their effort, thus helping to solve the long-standing incentive problem associated with the egalitarian compensation of the commune system (Cai & Wang, 2008). The household responsibility system has increased the efficiency of agricultural production and contributed almost half of the total agricultural output growth during 1978-1984 (Figure 6). Due to the increase of the availability of food in the urban market, a large number of rural

[3] HRS was first adopted in agriculture in 1981 and later extended to other sectors of the economy. The system allows farming households to manage agricultural production on their own initiatives while the farmland remains in the ownership of the rural collectivity. It enables farmers to use land through long-term contracts and keep the produce after paying taxes. Thus, it raises productivity and increases agricultural output (Wikipedia, 2013).

labourers, therefore, have suddenly found themselves no longer needed in agricultural work and thus have been forced to look for work elsewhere (Liang et al, 2002). After the reform, the creation and development of the special economic zones and the expansion of the non-state-owned enterprises created demand for migrants in the urban areas (Zhao, 2003b). The higher returns to labour in non-agricultural sectors motivate peasants to migrate out of the agriculture, which produced an increase pressure to reform the *hukou* system.

The basics of the *hukou* system remained intact until very recently, and official restrictions on migration still exist, but the Chinese government has begun to reform the *hukou* system. The evolution of the migration policy can be divided into 4 periods (Huang and Pieke, 2003). The first period is from 1979 to 1983, in which the government still prohibited internal migration. The second period is from 1984 to 1988, in which the government started to allow farmers to enter the urban areas on the condition that they provided necessities for life by themselves. The third period is from 1989 to 1991, in which the first rural migrant wave appeared and an enormous number of rural migrants moved outside villages. The last period is 1992 to 2000. In this period, the central government to some degree encouraged the rural-urban migration by relaxing limitations on migration to small towns and cities. The Chinese government has also introduced the official anti-discrimination policies to eliminate discriminatory local regulations that limit urban employment from prospective migrants (CECC, 2005). Although tens of millions of rural migrants are employed in non-agricultural sectors, urban residents are still unwilling to share their higher living standards with rural people. Besides, the media associate migrants with chaos, crime, violence, high fertility and illicit sex (Davin, 2000). Thus, the integration and desegregation of the rural-urban labour market in China still has a long way to go.

III. The Explanations of Rural-Urban Migration

i. Determinants of Migration

In order to explain the motives and determinants of rural-out migration, it is essential to first investigate the driving forces of migrants' decisions to move and their social-economic and personal features. Different economic approaches offer varying explanations to assessing the determinants of population movements. In the 1950s, development economists viewed that the growing modern industrial complex created the increasing demand for labour (Williamson, 1988). The Todaro's (1969) model[4] suggested that the expected income maximization objectives and the probability of obtaining an urban job, as well as wage differentials between origin and destination areas, mainly affected potential risk-neutral migrants' the decisions to move. In the Harris-Todaro's (1970) model migration was regarded as the adjustment mechanism of the Todaro model by which workers allocated themselves between different labour markets, some of which were located in urban areas and some in rural areas, while attempting to maximize their expected incomes. The neoclassical framework of the Todaro's model has led to a series of traditional economic literature on labour movement, and most agree that the relative wage differences and the perceived probability of finding a job were indeed important determinants of the decision to migrate (Riadh, 1998).

[4] A simple Todaro (Todaro & Smith, 2012) migration model is explained as follows: assume the economy consists of two sectors, rural and urban, and workers can move freely from rural to urban sector. Under conditions of wage flexibility, workers will always search for highest wage rate, so that the equilibrium will require wage equalization between the two sectors.

In the case of China, the existing excessive income differences have become the predominant force in fostering the cityward migration. Figure 7 reports the rural-urban income gap from 1978 to 2010 in China, and Table 1 shows the ratio of urban to rural income. The per capita income was 3.23 times greater in urban areas compared to rural areas. The gap was relatively narrow before 1980s and reached the lowest level (1.86) in 1985. The widening gap since 1985 has been primarily caused by the government financial transfer program in favour of the urban sector. As rural-urban income differences notably enlarged after 1985, the number of migrants increased sharply, which coincided with the hypothesis of the Todaro's model.

The prediction from the Harris-Todaro's model was challenged by empirical evidence, and this approach failed to include other important aspects (risk aversion, priority hiring, informal sectors, and moving costs) that shaped potential migrants' decisions. Later, economists realized that migration was caused not only by labour market imperfections, but also by a variety of market failures and the importance of household. A recent theory, New Economics of Labour Migration (NELM) (see e.g. Katz & Stark, 1986; Stark & Bloom, 1985; and Stark & Taylor, 1989) conceives that migration is a result of labour market imperfections and missing or incomplete capital and insurance markets. Migration decisions are taking place within a larger context than the domain of isolated individuals, typically the household or family. The economic position of the household at the community level or their relative deprivation influences the household behaviour with respect to migration (Mendola, 2010). The theoretical insights of the NELM can be summarized under five main headings (Abreu, 2010):

1) The emphasis on the relative deprivation as a determinant of migration.
2) The emphasis on household as the relevant decision-making unit.

3) The emphasis on migration as a strategy to diversify risk and overcome market incompleteness;
4) The introduction of information-theoretical considerations in migration theory.
5) The interpretation of migration as a process of innovation adoption and diffusion.

Central to the NELM is the idea that the relevant decision-making unit in the migration process is the household rather than the individual. The decision by the household to have one of its members migrate to a different location can be understood primarily as a way to hedge against risk and overcome the market incompleteness (Abreu, 2010). Compared to the neoclassical approach of migration that assumes that migration is an individual optimal decision, the NELM holds that it is the household that optimal labour organization in order to maximize income. Migrants and resident household members act collectively to maximize income and minimize risks by diversifying income earnings and loosening financial constraints through remittances (Mendola, 2010). In this way, migration serves to hedge against the risks of crop failure, falling prices of agricultural products and unemployment. Therefore, a more likely propensity to migrate is to be expected from those areas where there is greater market incompleteness and lesser availability of formal and informal collective self-insurance schemes (Abreu, 2010).

Besides the desire for individual income gain and the attempt to self-insure against household income uncertainty, there is another condition that also greatly influences the decision to migrate. The information-theoretical character of the NELM, the network theory of migration (e.g. Gurak & Caces, 1992), highlights the role of social relationships in perpetuating migration across time and in space.

It emphasizes that the likelihood to migrate is likely to be increased if there exists strong interpersonal ties, such as kinship, friendship and shared community origins between migrants, former migrants and non-migrants in sending and receiving communities (Mendola, 2010). The information conveyed by previous migrants reduces the uncertainty surrounding the migration option itself (Abreu, 2010). As labour migration incurs not only material costs but also information and psychological costs, it is definitely worth noting that migration networks are important and their effects materialize through practical assistance in the process of migration (Zhao, 2003a). Migrant networks reduce information costs by providing specific job information to potential migrants, reduce psychological costs by providing supportive relationships to migrants in destinations, and reduce the probability of unemployment by providing direct job search assistance from fellow villagers (Zhao, 2003a).

Referring to the determinants of rural-urban population mobility, no element can be considered as the single contributing force in fostering the migration phenomenon but the relative importance of each may be highly context-specific (Mendola, 2010). The NELM considers a greater sophistication and adherence to reality as a theory of migration compared to the neoclassical approaches, and it achieves a better balance between migrant agency and structure than the historical-structural perspectives (Abreu, 2012). In these cases, the NELM has been portrayed as a more successful attempt to overcome the insufficiencies associated with the neoclassical theories.

ii. Characteristics of Migrants: the Empirical Study

Migration is essentially selective. The human capital plays a very important role in migrant selectivity. Even though they have the same household economic positions, opportunity to obtain a job in cities, or favourable interpersonal ties, rural labourers with diverse characteristics may act differently when deciding to migrate. Thus, it is important to note that individual characteristics have significant effects on interregional migration.

According to the human capital migration theory (Taylor & Martin, 2001), migrants' self-selection is driven by factors such as education level, skills, age, risk taking capacity, ability to face new situations, entrepreneurship and ethnicity. The empirical analyses of personal and household characteristics and also later (in section IV) effects of remittances rely on cross-sectional data from the 2008 wave of a large scale Rural and Urban Household Surveys and Migrant Household Survey conducted in China under the RUMiCI project[5]. The survey covers the nine largest provinces sending and receiving migrants (Shanghai, Jiangsu, Zhejiang, Hubei, Sichuan, Guangdong, Henan, Anhui and Sichuan), and the Urban Survey is conducted in 15 cities within these provinces. The sample size is around 18,000 households, 5,000 migrant, 5,000 urban, and 8,000 rural households, and in total 8,446 migrants, 31,791 rural individuals, and 14,683 urban residents. It includes detailed information on migrants and labour market outcomes along with a wide range of household and individual socio-economic characteristics.

[5] See http://cbe.anu.edu.au/schools/eco/rumici/ for more information on the surveyed provinces and for survey questionnaires

Personal characteristics of migrants, nonmigrants and urban households are reported in Table 2. In the 2008 sample, migrants were nearly 8 years younger than the remaining individuals (28.79 vs. 36.28 years). Fewer migrants are married, and migrants have a relatively higher education level compared to nonmigrants. Migrant workers are generally young, single males with above-average education, while urban residents are indeed better educated than the workers from the countryside (31.6 percent higher for the years of schooling). Income level in the urban sector is also much higher than in rural sector, and rural remainders receive the lowest annual per capita income.

Table 3 presents a simple logit migration model describing a profile of migrants. The dependent variable is a binary choice of migration (equals 1 if migrate, and equals 0 if not migrate). The independent variables represent personal, household, and community characteristics. It confirms the pattern that migratory workers tend to be younger, male, unmarried, and well educated. Age negatively affected the probability of migration. The age group of 16-25 and 26-35 are those most likely to migrate. Age has a negative influence on migrant mainly because the benefit period for the elder migrants is much shorter than younger migrants (Hare, 1999 and Zhao, 1999a). Compared to male workers, female workers have a lower probability to migrate (3.3 percentage point lower). The probability of migration is 4.6 percentage points lower for married rural-out migrants than for those unmarried. The number of preschool children in a family has no significant effect on the migration decisions. This may reflect a tradition in China that grandparents help raise children.

Migration is a response to income differentials. Next we will analyze the impact of income gaps on migration. Following Zhu's (2002) research on the determinants of migration decision, to introduce the differences in urban to rural

income into the model, the method of "switching regression and structural probit" can be used. The estimation method involves three steps. First estimate the rural and urban income equations. Suppose there are two wage regimes (e.g., urban and rural, agricultural and nonagricultural sectors, etc.):

$$\log W_{ui} = \beta_u X_i + \mu_{ui} \qquad (1)$$

$$\log W_{ri} = \beta_r X_i + \mu_{ri} \qquad (2)$$

where W_{ui} and W_{ri} represent the migrant's income and the non-migrant's income, respectively. The wage gap can be expressed as $\log W_{ri} - \log W_{ui}$.

Second, estimate the structural equation. Equation (1) and equation (2) predict for each individual i the value of log wage rate is $\log \hat{W}_{ui}$ if the person migrates, and that is $\log \hat{W}_{ui}$ if the person stays in the countryside. Suppose B_i is some factor that influences the migration decision other than the wage gap: $B_i = \alpha Z_i + \varepsilon_i$. Thus, the structural probit equation is:

$$P_i^* = \eta(\log W_{ui} - \log W_{ri}) + B = \eta(\log W_{ui} - \log W_{ri}) + \alpha Z_i + \varepsilon_i \qquad (3)$$

where P_i^* represents the migration decision and Z_i represents the independent variables of the selection equation.

Finally, the reduced form probit equation is:

$$P_i^* = (\beta_u - \beta_r)X_i + \alpha Z_i + \mu_{ui} - \mu_{ri} + \varepsilon_i = \beta' X_i + \alpha Z_i + \varepsilon_i' \qquad (4)$$

where X_i represent the independent variables of the income equation. From this equation, we obtain estimates of impacts of income factor and non-income factors on migration decisions.

The potential determinants of migration decision were grouped into three categories: first, human capital endowment, including education attainment, working experience of migrants; second, household demographics, such as

household size, household labour, number of brothers and sisters, and eldest status; and finally, external institutional constraints, taxes, village fees, agricultural land size of household (Liu, 2003). Household demographics and external institutional constraints are included in Z_i to reflect influences on migration decisions. Land size and land-tenure insecurity that affect household's agricultural employment play a very important role in migration decisions. We might expect that members of household with small holdings to have more time for non-farm work (Tuan et al, 2000). Due to the limitation of the data, we only include the household size in the model.

Table 4 summarizes the estimation results of the income equations, and Table 5 reports the results of the reduced form probit regression and structural probit equation. The income gap generates population mobility. It brings surplus rural labourers to urban regions, and it has significant influence on migration decisions. Again the predominant migrants are male workers. Age has significantly negatively affected migration. The relations between age and migration are inverted U shapes (Zhu, 2002). Age reflects the accumulation of human capital, including the setting up of personnel connections and the accumulation of experience (Li, 1997), but on the other hand, elder unqualified workers have obvious disadvantages in unskilled manual labour in informal sectors since most rural-urban migrants are employed in urban informal sectors. For female migrants, the effects of age are more significant. Using regional per capita GDP as a proxy of the regional development level, prosperity of an area positively influences migrants' income.

The effect of education seems to be ambiguous. Formal education had an insignificant effect on migration outcomes in the first migration logit model. This

may contradict a general belief that schooling promotes population mobility and migration. However, in the probit regression after, education is one of the most important factors that determines migration choices, especially for male migrants. Some females are associational, such as the women who migrate to cities to accompany their husband, their migration decision depends more on the primary migrant, so the impact of education level on migration probability for females is not as important (Zhu, 2002).

Existing literature reflects different views on the role of human capital in determining migration choice. Some studies prove that education plays an important role in foresting rural labour away from their villages, since higher education level brings a stronger capacity to overcome migration obstacles and lower migration costs (Zhu, 2002). However, other scholars suggest that education is not a significant factor in migration decisions. Zhao (1999b) and Liu (2003) argue that formal education had insignificant effects on migration outcomes, but it indeed affects the shift from the agricultural sector to the non-agricultural sector. Additionally, education plays an inevitable role in migrants' decision to temporary or permanent move (Zhu, 2002). Besides that, permanent migration largely depends on government regulation; permanent migrant workers are generally highly qualified and well educated, having urban *hukous*, and integrated in urban sectors and government social protection programs. Furthermore, total years of schooling of all household members has a statistically significant positive effect on the propensity to migrate (Liu, 2003).

Expected wage differences and the rural-urban income gap are the most crucial elements, but they are not the only factors that affects the outcome of migration. Several nonincome factors influence the potential migrants' decision to move. For example, differences in the quality of life between rural and urban areas, the costs

of migration, and information advantage of education may all alter the migration decisions. Mundlak's study (1979) suggests that in wealthier economy if the quality of farm life is more attractive than city life, it would require a premium to encourage people move out of agriculture even when the income differences justify migration. However, the quality of life is a broad concept that lacks a common definition making it difficult to implement of different life qualities between rural and urban areas (Kahila and Scherbenske, 2012). There are two additional major deterrents to migration in terms of implicit psychological costs. The first factor that inhibits family migration is personal safety and housing situations in cities. The other factor is the prospect of separation from families (Zhao, 1999a), although expected earnings are much higher in migratory work. The attractiveness of urban jobs is greatly discounted by these psychological hardships. Otherwise, most migrant labourers were willing to continue migratory work because of the high earnings.

Generally, the expected wage differentials remain the primary sources of rural-urban migration, confirming the hypothesis of the Harris-Todaro's model that migrants move out of rural areas to seek higher income. According to the NELM theories that the migration decision is actually at the household level, migrants also struggle to maximize the household earnings and minimize risks. At the same time, those motives, the perceived gap in incomes, the prospect of greater household security, and the existence of social networks would be different by age, sex, skills and levels of education. However, the real challenge of research on migration is to answer how the economic development impact of migration affects the process of urbanization and rural households' ability to achieve sustainable living standards. New efforts are needed to enhance understanding of the effects of internal migration on economic development in sending and receiving regions, and these will be discussed in the next section.

IV. Rural-urban Migration and Economic Development

Like in other countries, labour mobility and internal migration in China are one of the extremely important components of the transformation from a predominantly agricultural economy to an industrial economy. Migration is part of the unique economic transition from a planned economy to a market economy (Cai & Wang, 2008). Rural-urban migration is socially beneficial, as surplus human resources are shifted from rural areas to provide a workforce for urban industrial growth process. However, migration may play a complex role in developmental achievements and poverty alleviation in origin communities (Mendola, 2012).

i. The Effect of Migration on Urban Areas

Labour Migration is the driving force in the process of urbanization and economic development. Labour mobility has made tremendous contributions to the economy. The reallocation of labour from agriculture to non-agricultural sectors to China's economic growth has been estimated to be 16 percent from 1978 to 1995 (World Bank, 1996). The overall combination of labour input, human capital accumulation, and labour reallocation has contributed to nearly 75 percent of GDP growth since the economic reform was initialed (Zhang & Song, 2003). The irreversible shift of surplus rural labour from agricultural to non-agricultural industries has had a profound impact on economic growth.

China's labour market is fragmented across regions and sectors because of the *hukou* system, and the remains of the *hukou* system reinforce this fragmentation. The basic principle of *hukou* system has been to restrict internal migration in China. Thus, the *hukou* system, on one hand, allows the government to control and regulate internal migration; on the other hand, it hampers economic progress.

As a consequence, China's urbanization is relatively small and slow compared to it economic growth (Wang, 2011). Cai and Wang (2008) agree that the constraints of the *hukou* system on labour mobility have a negative impact on urbanization, which have resulted in sub-optimal size and under-agglomeration in cities, leading to significant losses in economic welfare. The gradual abolition of institutional obstacles has been the key to increase labour mobility. If the government gradually relax the *hukou* system and abolish institutional obstacles, the gain from market integration and accumulation of human capital could be tremendous (Cai and Wang, 2006). There have been many calls and proposals for reforming and even abolishing the *hukou* system on the grounds of justice and equal citizenship (Wang, 2011). In practice, the central and local Chinese governments have adopted various measures to tear down household registration obstacles and encourage labour mobility between rural and urban areas (Cai and Wang, 2006 and Roberts, 2013). A recent report of China's National Development and Reform Commission for *hukou* reform allows rural residents the right to get residency in smaller cities, and reforms will be introduced from small cities to megacities gradually (Roberts, 2013).

In the prereform era, the pace of urbanization in China was stagnant (Cai, 2001). The relative decline of the urban share of the total population can be attributed to two factors: one is that the enforcement of the *hukou* system, and the other is that the natural growth rate of the rural population was much higher than that of the urban population (Cai & Wang, 2008). After the initiation of the economic reform and the opening-up policies, the pace of China's urbanization has picked up considerably. Assuming that the growth in the urban population comes from a combination of natural population growth and net rural-urban migration, rural-urban net migration accounted for almost 70 percent of urban growth in the 1980s, and more than 80 percent of urban growth in the process of urbanization (Cai &

Wang, 2008). In addition, cityward migration affects the structure of the urban population, bringing demographic changes with regard to age, gender, and education level. With the reduction in the dependency ratio of the urban population, migration has cumulative and aggregate implications for the development of the urban economy.

Table 6 presents the empirical research from Cai and Wang (2008) on the estimated contribution of the transfer of agricultural labour to GDP growth. Taking 2001 as a base year, moving 1 percent of the labour force out of the agricultural sector would lead to a 0.7 percent growth in GDP. A 10 percent of labour force movement could even raise GDP growth by 6.4 percent. The gains form the reallocation of labour are much higher in the less developed western and central regions than in the eastern and northeastern areas. GDP in the western and central regions would grow by 8.2 and 5.7 percent respectively, if 10 percent of the labour force moved out of the agricultural sectors. Thus, facilitating labour mobility and integration improves economic efficiency.

The numerous Chinese rural labourers mostly become temporary or migrant workers in the booming cities, regardless how many years they have worked and lived there (Wang, 2011). These so called “second-class citizen” constitute the majority of the Chinese industrial work force allocating the mighty Chinese factories. Despite the fact that increasing labour mobility has promoted modernization and economic growth in urban regions, it has not reduced inequality and even increased income inequality and regional disparities. China’s economic reform has created an institutional environment that favours labour mobility, which is also responsive to regional disparities (Cai & Wang, 2003 and Lin et al, 2004).

The fact that the increasing mobility of labour has not reduced income inequality is mainly due to the unfinished reform of the *hukou* system. Table 7 illustrates the complete treatment of local residents and rural migrants. Under the *hukou* system, the labour market is highly segregated. It is very difficult for rural residents to find formal employment in urban areas. Most of the outsiders can only find jobs in informal sectors, which are temporary, dirty, tedious, physically demanding, and often with lower protection and wages (Cai & Wang, 2008). They do not have the full citizenship rights and thus are highly flexible, cheap to hire, and easy to fire. They are akin to the "illegal migrants" working in United States or the European Union (Wang, 2011). Therefore, migrants have a relatively low standard of living compared to their real incomes, and they remain economically and culturally separated from urban society. Even though a number of rural migrants are employed in the urban formal sector, they are paid less and enjoy fewer benefits than urban residents. Wage differences and indecent material treatment, which are caused by policy and social discriminations, do exist in urban society. The numerous Chinese rural labourers still have been temporary or migrant workers in the booming cities, regardless of how many years they have worked and lived there.

ii. The Impact of Rural-out-Migration on Source Areas

Rural-urban migration deeply transformed the structure of household incomes in rural China; however, the impacts of migration on sources areas are more complicated. The most conspicuous influence of migration on sending communities is remittances. Remittances gradually became an important source of income for rural households and served as an engine of growth for rural areas. The total value of remittances cannot be precisely calculated but according to Huang and Zhan's estimate (2008), migrant workers' remittances amounted to 340 billion yuan (56.66 billion USD) in 2004. The huge influx of money sending communities has significant effects on enhancing rural development, reducing rural poverty, paying basic education and health care, and promoting consumption and investment, thus favouring transformation towards a more modern agriculture (Taylor et al, 2005). Additionally, rural migration in China is circular: migrants plan to spend a specific amount of time away from home, and they leave and return home several times a year since they have little attachment to the places in which they find work (de Brauw et al, 2003). Because rural residents are still tied closely to their home village, it is reasonable to assume that migrants have economic incentives to promote and enhance the welfare of those left behind.

Using RUMiC data (Table 8) to study the impact of remittance on household incomes in rural areas, we follow the conceptual framework of Rozelle et al (1999) and Du et al (2005). If production is constrained and migration, MIG, and Remittances, REM, affect production constraints, then the constrained vector of income sources Y depends on REM and MIG, in addition to other exogenous household characteristics. Through production, migration and remittances may have different effects on different income sources. We can define rural household

income sources, other than remittances, as agricultural and nonagricultural income. Thus, household income can be written as follows:

$$Y = \alpha_0 + \alpha_1 MIG + \alpha_2 REM + \alpha_3 X + \alpha_4 Z + \varepsilon_1 \qquad (5)$$

In Equation (5), Y is log income per capita, REM is remittance from migrants, X is pre-existing home earnings, and Z is exogenous household characteristics. MIG is a dummy variable indicating whether the household has a migrant. The variables Z in Equation (5) control for different demographic, human capital and physical capital characteristics across households. The null hypotheses associated with NELM are that neither migration, nor remittances affect income sources, i.e. $\alpha_1 = 0$ and $\alpha_2 = 0$.

We consider remittances as a potential substitute for home earnings instead of an exogenous transfer because the migration decision is not just a short-term shock, which is more often a long-term alternative choice of participation in agricultural activity for households (Zhu & Luo, 2010). Remittances are produced by allocating family members to labour migration, MIG. Given migration, remittances are also affected by pre-existing home earnings, X, and other exogenous household characteristics, Z:

$$REM = \beta_0 + \beta_1 MIG + \beta_2 X + \beta_3 Z + \varepsilon_2 \qquad (6)$$

The main difficulty with regression-based estimated of the effect of migration in income is endogeneity of the migration decision. According to NELM, migration and remittances are endogenously determined along with the income sources, as in Equation (5). To statistically control for endogeneity bias when estimating the system of equations, we need instruments that identify both migration and remittance. However, due to the research limitation and the lack of data, the endogeneity problem can be hardly addressed in this paper. Existing literature (Mackenzie and Rapoport, 2004; de Brauw et al, 2003; Du et al, 2005; and

Rozelle et al, 1999) suggests that village migrant social networks can be used as an identifying instrument for the migration decision[6]. Village migration network is an attractive instrument because it is not influence because it does not affect the level of household remittances, nor do networks affect incomes from sources within the village. In both theoretical and empirical work, migration networks have been shown to be among the most important variables driving migration (Carrington et al, 1996). Members of a village who have already migrated help drive down some up-front costs of migration, as they share information about jobs and working environment in other areas with their relatives or neighbors (de Brauw et al, 2003). Therefore, households in villages with histories of migration have better opportunities to send out migrants.

Table 9 represents the empirical results of core equations. The estimators measure the effects of remittances on household income sources. As expected, remittances are a positive function of migration: each additional migrant is associated with 1091.0 yuan increase in remittances income. Migration has a negative effect on agricultural production, cropping income and also nonfarm income. If a household sends out one more migrant, the nonfarm income reduces by 1245.6 yuan. Cropping income declines even sharply: one more migrant reduces agricultural earnings by 2718.9 yuan. As industrial and other off-farm activities generate a higher return than those from agriculture, it is quite attractive for rural households to allocate labourers to the non-agricultural sector. While migrants are away, household members have less to allocate to production activities in the village, so crop production falls. When migrants leave the household along with their human capital, the ability of the household to produce cropping income is

[6] de Brauw et al (2003) tested the proportion of households in the village that sent out migration in 1988 and a dummy variable that is 1 (0 otherwose) is a village had rural-our migration in 1988 as two proxy variables for migration networks.

reduced as they shift their labour endowment into non-farm activities with higher returns (Zhu & Luo, 2010). It is not surprising that crop income declines dramatically when a labourer leaves the household. The adverse effect of lost labour may be magnified by the fact that most migrants are male, younger, and better educated than the average rural labourers (de Brauw et al, 2003).

The outflow of rural labour has immediate adverse effect to the agricultural production, while remittances directly contribute to household earnings and indirectly contribute to income by stimulating both agricultural and nonfarm activities. The NELM hypothesizes that migrants play the role of financial intermediaries, enabling rural households to overcome credit and risks constraints on their ability to achieve the transition from familial to commercial production (de Brauw et al, 2003). Remittances could be used to expand purchases of production factors, such as fertilizers and pesticides, which may lead to higher farm production. Remittances also allow a household to purchase more inventories for self-employed business, and as a result the off-farm production could be higher. Each additional yuan remitted by a migrant raises farm income and nonfarm income by 1.64 and 1.56 yuan, respectively. The results support the NELM hypothesis that rural-out-migration and migrant remittances, to certain extent, relax market and capital constraints on different types of household production, stimulating both farm and nonfarm productivities in China's rural economy (de Brauw et al, 2003).

Since the negative impact of migration on on-farm activity may be offset by the favourable outcomes of remittances on household income sources, the net effect of migration on household total income is unclear, and thus further research is needed. The net effect of migration on household total income is a sum of direct and indirect effect of migration on income sources. According to de Brauw et al

(2003), by using the bootstrapped method, they find that the net effect of migration on total income is surprisingly negative. It is important to point out that when the household sends out a migrant, there is also a decrease in clothing and the number of mouths to feed within a household (de Brauw et al, 2003). Therefore, the net effect of migration on total income may not be as important as the net effect on per capita income. When considering changes in per capital income rather than total income, migration has an unambiguously positive effect on household's per capita income. Households experience an increase in per capita income through migration. Moreover, based on Liu's research findings (2003), if grain output decreases by an amount of less than 2 percent upon migration, the household net income increases by 16 percent after migration, and thus the real per capita income of rural members, after adjusting for remittance received, rises by 10 percent, so that migrant households on average enjoy higher growth of per capita income than non-migrant households.

After exploring the links among migration, remittances, cropping and other incomes in rural China, we can conclude that migration and remittances affect rural incomes in multiple ways. Rural-out migration has very complex effects on rural household income outcomes. The loss of labour to migration has a negative effect on cropping income, but the remittances sent home by migrants partially compensates the loss of the agricultural income. However, participating in migration at the household level certainly increases household per capita income.

V. Conclusion

In the post-reform era, China's rapid economic growth has promoted the process of industrialization. Its urbanization, by contrast, has proceeded more slowly over the last two decades due to the restricted labour mobility under the household registration system (the *hukou* system). Internal migration in China has been a response to income disparities and to increased mobility and individual freedom. Embedded in the segregation between urban and rural populations, rural-urban migration has challenged the earlier social order by bringing duality to the cities (Garcia, 2004). The serious negative impacts of under-urbanization have begun to be widely recognized. The key problems in China's current social and economic development, such as inadequate domestic demand, the unduly low income of farmers, and sluggish growth and great pressure on employment, are to a large extent attributable to the lagging urbanization (Liu et al, 2003). Thus, reform of the *hukou* system is necessary because the outflow of rural labourer is irreversible.

The previous sections review the migration decisions made by rural households in China. They explore the major factors determining migration, and examine several economic consequences on rural and urban areas. By comparing returns on labour in the agricultural sector with payments from urban employment, it is conceivable that migration is a rational decision. The economic development literature on migration achieves the consensus regarding disparities in regional economic opportunities, which are essentially that differences in expected wages and the probability of receiving the wages, are the most important determinants of rural-urban migration. Economists, however, disagree as to which characteristics affect these opportunities and to what extent returns to migration differ with different subgroups of migrants. While assessing the determinants of the rural-out-migration, it is assumed that migrant labourers are in a free labour market

without taxation and in the absence of credit markets, but in fact moving costs, labour mobility regulations and rural taxation are undoubtedly important factors contributing to both inter- and intra-provincial migration. When taking these into account, the result might be totally different. Further research can be done to estimate the rural well-being and the true welfare effect of migration on the agriculture, to study the relationship between migration restrictions and agglomeration and productivities, and to examine the impact of rural-urban migration on urban labour markets.

Whether rural-urban migration disrupts agricultural production has become a key migration issue with important policy implications. The Chinese government has realized that active promotion of the urbanization process is extremely important to facilitating Chinese economic restructuring and propelling sustained and rapid economic growth (Liu et al, 2003). Authorities who are in favour of restraining the flow of rural migrants, however, argue that migration will cause large decline in agricultural output, potentially threatening China's security (Zhang & Song, 2003). The Chinese government must balance between the inevitable large rural-urban migration and growing urban unemployment. If the government wishes to slow the flow of migrants out of rural areas, it may need to intervene in credit markets by reforming the formal rural credit system or by encouraging the development of informal credit institutions (de Brauw et al, 2003). The continuing reforms of the household registration system, the *hukou* system, will radically affect the country's structural transformation.

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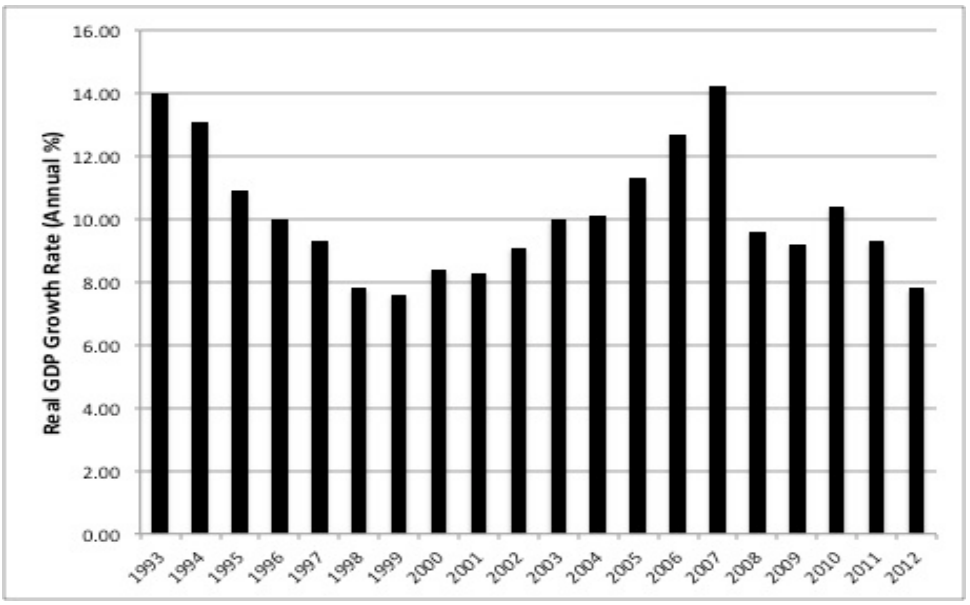
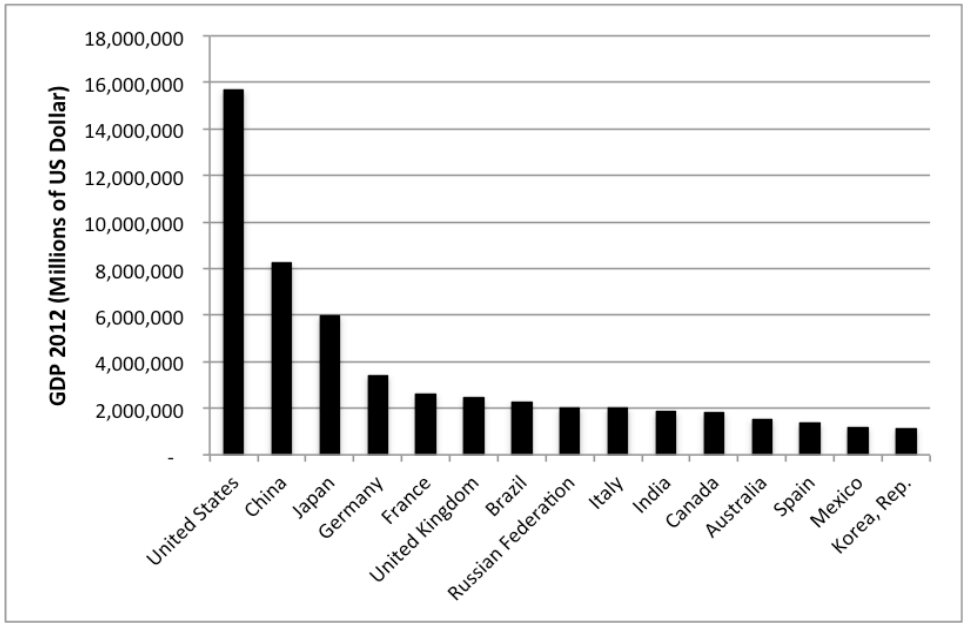
Appendix

Figure 1 China's Real GDP Growth 1993-2012



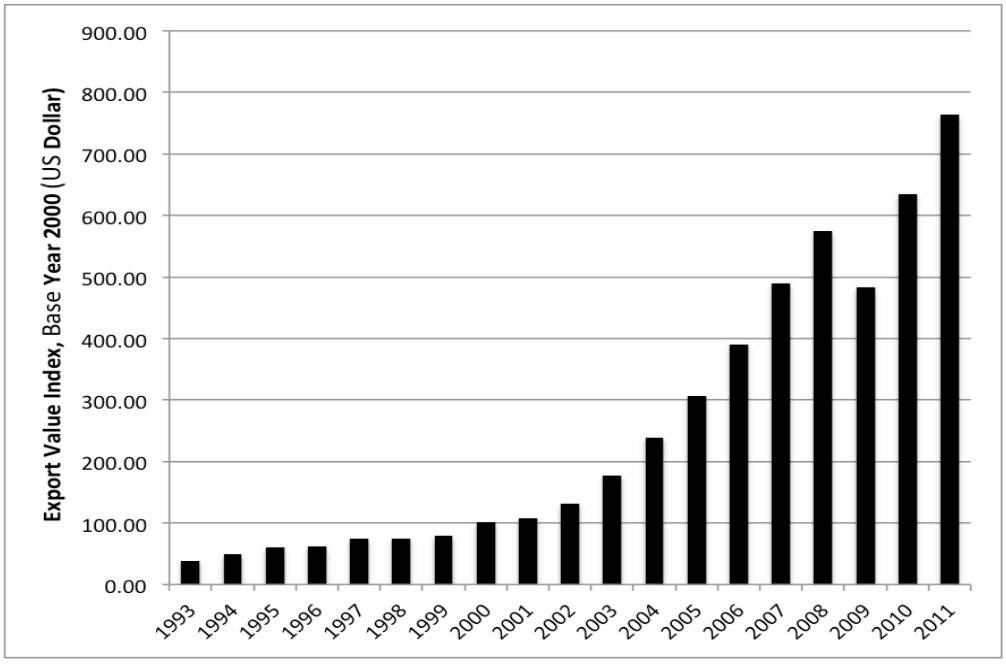
Source: The World Bank

Figure 2 World GDP Ranking 2012



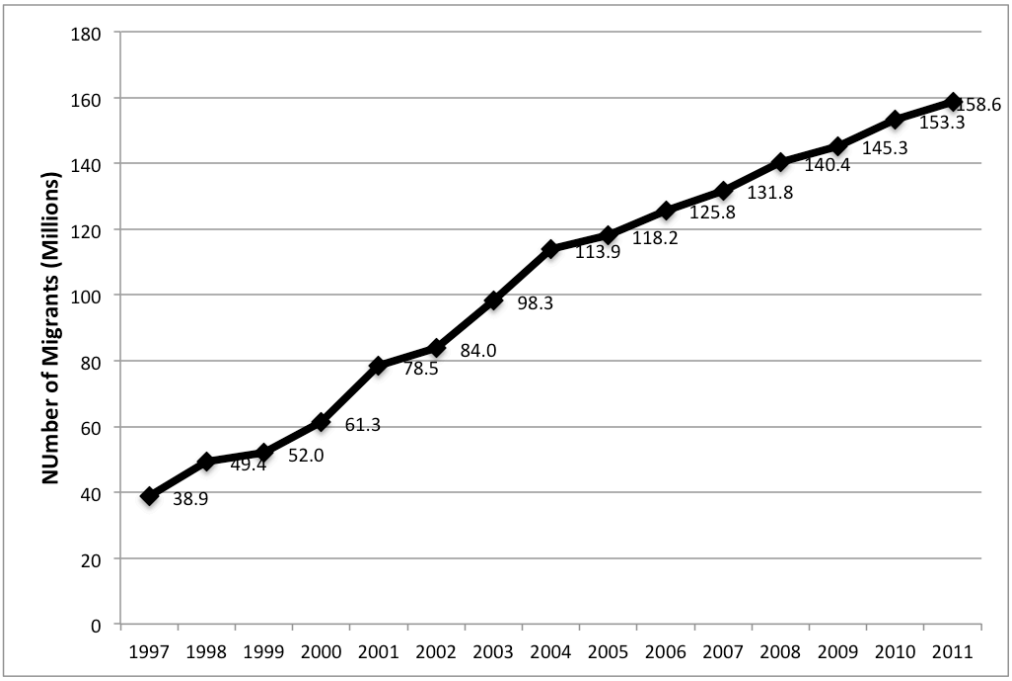
Source: The World Bank

Figure 3 China's Export Index



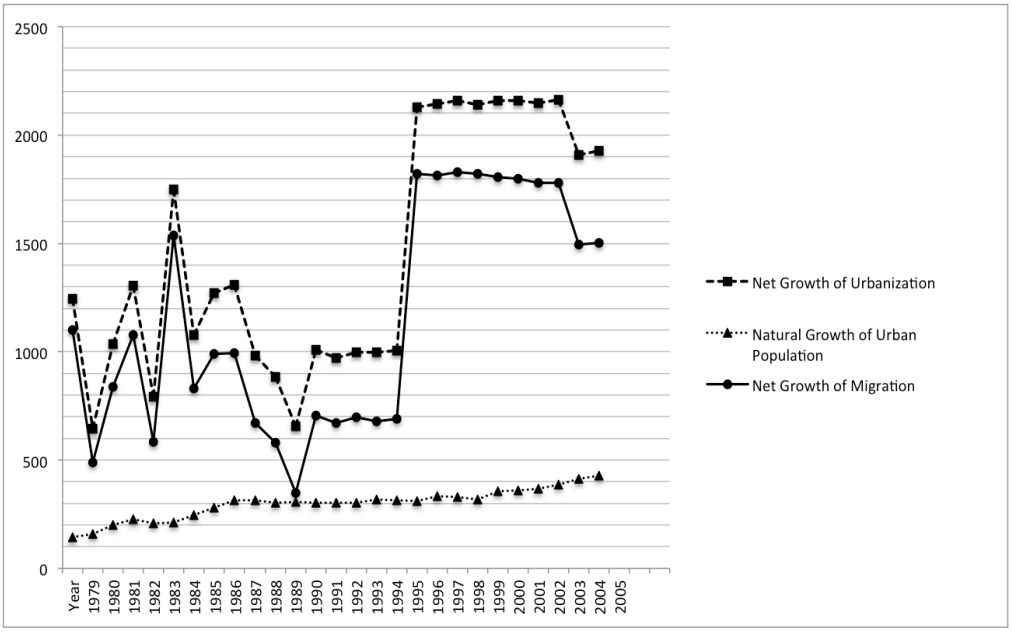
Source: The World Bank

Figure 4 Number of Migrants 1997-2011



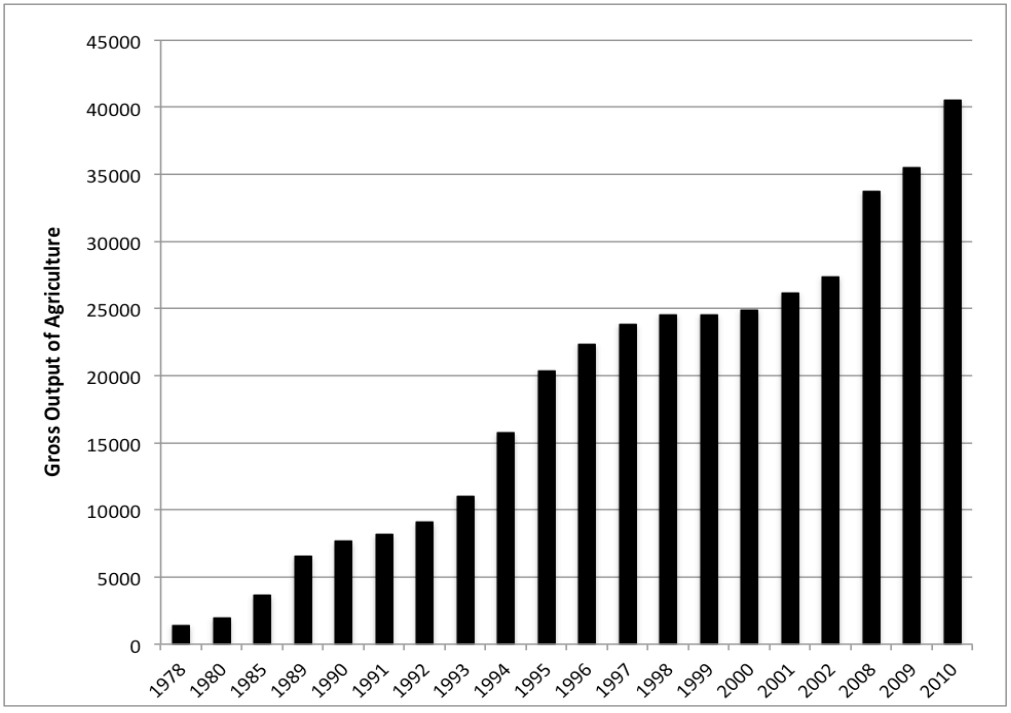
Source: China Yearbook

Figure 5 Growth of Urbanization 1979-2005



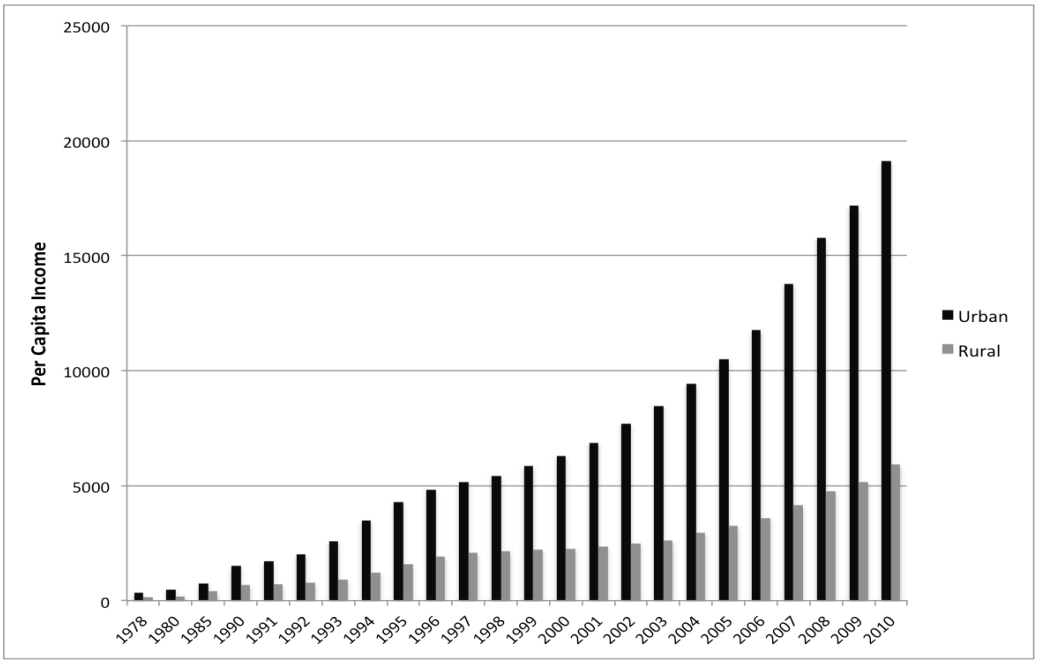
Source: China Yearbook

Figure 6 Gross Output Value of Total Agricultural Products (100 million yuan)



Source: China Yearbook

Figure 7 Annual Per Capital Income of Urban and Rural Residents (Yuan)



Source: China Yearbook

Table 1 Annual Per Capital Income Ratio of Urban and Rural Residents (Yuan)

Year	Urban	Rural	Income Ratio	Year	Urban	Rural	Income Ratio
1978	343.4	133.6	2.570359281	**1999**	5854	2210.3	2.648509252
1980	477.6	191.3	2.496602196	**2000**	6280	2253.4	2.786899796
1985	739.1	397.6	1.858903421	**2001**	6859.6	2366.4	2.898749155
1990	1510.2	686.3	2.20049541	**2002**	7702.8	2475.6	3.111488124
1991	1700.6	708.6	2.399943551	**2003**	8472.2	2622.2	3.23095111
1992	2026.6	784	2.58494898	**2004**	9421.6	2936.4	3.208554693
1993	2577.4	912.6	2.82423844	**2005**	10493	3254.9	3.223754954
1994	3496.2	1221	2.863390663	**2006**	11759.5	3587	3.278366323
1995	4283	1577.7	2.714711289	**2007**	13785.8	4140.4	3.329581683
1996	4838.9	1926.1	2.512278698	**2008**	15780.8	4760.6	3.314876276
1997	5160.3	2090.1	2.468924932	**2009**	17174.7	5153.2	3.332822324
1998	5425.1	2162	2.509296947	**2010**	19109.4	5919	3.228484541

Source: China Yearbook

Table 2 Individual Characteristics by Migration Status

		Migrants	Rural Nonmigrants	Urban Residents
Labour Characteristics				
Age		28.79	36.28	40.11
Male (%)		56.82	51.78	49.51
Married/Remarried/Cohabit (%)		55.99	62.39	95.27
Years of schooling		7.70	7.65	11.27
Education level (%)	Primary and below	14.18	31.84	8.49
	Junior high school	56.33	54.56	27.78
	Senior high school	25.74	11.12	34.59
	3-year college	3.75	1.96	18.11
	University and above	2.72	0.51	40.48
Average annual income (yuan)		18064.87	17547.17	26724.65
Household Characteristics				
Household size		1.64	2.72	2.10
Number of children:		0.79	2.06	1.34
Number of Observations		8,446	22,545	14,682

Table 3 Logistic Model of Migration Determination

	Model I	Model II	Model III
		Male	Female
Married	-.4582* (.0048)	-.2141**(.0071)	-.5115** (.0072)
Male	.6720* (.1552)		
Age	.0225* (.0211)	-.0132*(.0005)	-.0132* (.0049)
Age^2(/100)	-.01698*(.0070)	-.0174**(.0006)	-.0173**(.0056)
Children	-.2329*(.0019)	-.3412**(.0074)	-.3458**(.0074)
Primary School	.1947 (.0283)	.3578 (.0465)	.1550 (.0045)
Junior High School	.3765(.0133)	.4664 (.0841)	.3649 (.0084)
Senior High School	.4697 (.0585)	.0385 (.0136)	.4126 (.0084)
Constant	1.458(.8662)	1.255 (.0109)	1.2734 (.0108)
Adjusted R^2	.6954	.7029	0.7016
Number of Observations	23126	12719	10407

Note: Dependent variable: migrant=1; nonmigrant=0. Coefficients are different from zero at 1%(***), 5%(**), and 10% (*) significant level.

Table 4 Prediction of Logarithmic Income

	Males		**Females**	
	Migrants	Nonmigrants	Migrants	Nonmigrants
Age	.0276**	.0166***	.0296***	.0190***
	(.0019)	(.0016)	(.0019)	(.0016)
Age^2(/100)	-.3929*	-.0271*	-.0409	-.0287**
	(.0024)	(.0019)	(.0024)	(.0019)
Primary school	.0368*	.0221**	.0334**	.0367***
	(.0084)	(.0066)	(.0084)	(.0067)
Junior High School	.0646**	.0465***	.0475	.0656**
	(.0094)	(.0110)	(.0095)	(.0112)
Senior High School	.0648***	.0834**	.0682***	.1003*
	(.0133)	(.0099)	(.0136)	(.0057)
Children	-.0848*	-0011***	-.0324***	-.0069**
	(.0054)	(.0151)	(.0126)	(.0123)
Per capita GDP (/100)	.0376***	.0892***	.0864	.0976**
	(4.934)	(9.232)	(9.102)	(10.14)
Constant	3.674	3.825	3.679	3.834
	(.3105)	(.0279)	(.0316)	(.0284)
R^2	.0985	.0931	.0648	.0579
Number of observations	3795	5610	2884	4590

Note: Dependent variable is logarithmic income. Coefficients are different from zero at 1%(***), 5%(**), and 10%(*) significant level.

Table 5 Probability of Migration

	Reduced form equation		Structural equation	
	Males	**Females**	**Males**	**Females**
Age	.0434** (.0191)	.0239*** (.0015)	.0207*** (.0076)	.1109*** (.0306)
Age^2(/100)	-.0471 ** (.0148)	-.0316** (.0019)	-.0275** (.0223)	-.0362** (.0602)
Primary school	.0471 (.0078)	.0381* (.0355)	.1544 (.0050)	.0293 (.0496)
Junior High School	.4816 (.3155)	.0389 (.1193)	1.156** (.2627)	-.0112 (.0815)
Senior High School	.4971* (.0148)	.2127 (.0668)	1.739*** (.1261)	-.0316 (.0974)
Per capita GDP (/100)	.1632*** (9.265)	.1164*** (8.756)		
Married	-1.012*** (.0445)	-.0646* (.0242)	-1.717** (.0818)	-1.569** (.0855)
Household Size	.0737* (.6781)	.0569 (.3305)	.0713 (1.134)	.1692 (0.782)
Income gap ($\log W_{ri} - \log W_{ui}$)			1.673*** (9.524)	.713*** (8.001)
Constant	-3.966 (.3156)	-3.593 (.0254)	-3.607 (.2937)	-3.143 (.1281)
Log-likelihood	-2329.726	-2334.335	-2224.567	-2134.798
Percentage of correction predictions (%)	86.1	82.4	89.9	84.7
Number of observations	7610	6626	7610	6626

Note: Coefficients are different from zero at 1%(***), 5%(**), and 10%(*) significant level.

Table 6 Contribution of The Transfer of Agricultural Labour GDP Growth

Share of Labour Transfer	1%	5%	10%
Changes in GDP from moving labour out of agriculture	0.7%	3.3%	6.4%
Changes in GDP from moving labour out of rural to urban areas	0.5%	2.5%	5.0%
Central	0.6%	2.9%	5.7%
East	0.3%	1.6%	3.1%
West	0.9%	4.2%	8.2%
Northeast	0.4%	1.8%	3.5%

Source: Cai and Wang (2008) p.257

Table 7 Comparisons of Formal Employment and Informal Employment

Characteristics	**Formal Employment**	**Informal Employment**
Household registration type	Non-agricultural and local	Agricultural and non-local
Urban residency status	Full legal status	Illegal or temporary
Socioeconomic sectors	Mostly state sectors and state-owned enterprises	Small and self-employed enterprises
Occupations	Managerial staff, technicians and skilled worked	Physical labour, self-employed
Employment channel	Determined by planning or formal channels	Based on personal contacts and market information
Work status	Relatively less demanding and stable	Highly demanding and unstable
Entitlement to basic social security and benefits	Full	No or temporary entitlement
Housing	Allocated by work units or self-owned	Low-cost shelters or homeless

Source: Cai and Wang (2008) p.262

Table 8 Descriptive Statistics

	All Households	Nonmigrant Households	Migrant households
Number of Migrants	0.75	-	1.69
Total Income (yuan)	9027.30	8965.40	10109.01
Farm Income (yuan)	4848.14	5848.97	4134.76
Nonfarm Income	3215.95	3116.53	3515.44
Remittances (yuan)	963.32	-	2459.82
Per Capita Income (yuan)	5129.4	4836.6	6564.23
Household Size	1.76	1.98	1.54
Age	29.82	30.67	29.43
Years of Schooling	9.31	7.78	10.21
Number of Children	0.89	1.13	0.78
Land Per Capita	2.67	2.28	3.05
Agricultural Assets	1701.89	1680.03	1736.44
Non-Productive Assets	1877.63	2479.87	1269.45
Number of Observations	15264	10257	5007

Table 9 Effects of Migration and Remittances on Income Sources

	Remittances	Farm Income	Nonfarm Income
Migrants	1090.99*** (126.67)	-2718.85** (421.88)	-1245.61 (470.21)
Remittances	-	1.6433** (0.3216)	1.5577 (0.3678)
Household Size	6.7900 (11.3745)	575.5164 (99.9610)	448.1134** (244.4345)
Age	-20.0001 (2.0484)	-56.8745 (0.7509)	-67.6521 (1.1138)
Years of Schooling	-34.7644 (1.0171)	-45.3099 (1.7460)	32.8006* (1.7860)
Number of Children	-11.35 (40.6748)	-	-
Land per Capita	11.4833** (4.9716)	192.6679*** (10.1715)	-128.6978** (23.9765)
Agricultural Assets	-	0.9133* (1.9832)	-
Non-Productive Assets	-	0.4352* (3.5090)	-
Constant	-3171.4282 (341.0092)	1780.2298 (356.8769)	3045.9934 (764.5341)
Adjusted R^2	0.2500	0.1269	0.1065

Note: Coefficients are different from zero at 1%(***), 5%(**), and 10%(*) significant level.