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THE RURAL TO URBAN MIGRATION DECISION IN CHINA: AN EMPIRICAL INVESTIGATION

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ABSTRACT: *This paper explores the determinants of rural to urban migration decision in China. We use Logit models to examine the effect of a variety of different factors on individual migration choice. The empirical analysis is based on the data of Chinese Household Income Project (1995). We find that males are more likely to migrate. Age has an inverted-U shaped effect on migration. Marriage has a negative significant effect on migration. The rural individuals with professional school and middle professional school educational levels are less likely to migrate. Household head in the family is more likely to migrate. Membership of Communist Party or national ethnic minority has a negative effect on migration decision. Individuals with non-farm working experiences are more likely to migrate. Finally, some policy implications are derived based on the findings.*

KEYWORDS: Migration Decision, Rural, Urban, Individual Characterises, Human Capital Investment

INTRODUCTION

One of the most prominent phenomena in China has been that tens of millions of rural labors migrate to urban areas since the mid-1980s. Unlike some other developing countries, approximately 70 percent of China's labor force is in the agriculture sectors. Recently, in China's largest cities, for instance, Beijing and Shanghai, it is often estimated that at least one out of five people is a migrant who comes from rural areas. Migrants maintain a close connection with their original rural areas by sending back most of the money earned from the urban job. Many of them go back home for marrying, raising their kids or investing in business in the rural areas. International as well as Chinese experience indicates that the temporary migration generated many social, economic and political issues in the country. "Uncontrolled, large scale population movements are a source of concern for a number of reasons, among which are worries about transportation bottlenecks, urban housing, water, and power shortage, rising crime rates, labor disputes" (Hare, 1999). They are regarded as "blind blow" (*mang liu*) because they leave their farm without definite prospects and "most rural workers on blind job-hunting trips find themselves going here and there for nothing. Some of them cannot find any work and have nothing to live on for a long time." (Ministry of Labor, 1997). Moreover, the largest portions of migrants compose of younger and better-educated people. This may affect agricultural productivity. The agricultural production efficiency and the crop income may decline mainly due to the aged and less educated labors working on farm in the villages (Chen, Huffman and Rozelle, 2003). It will further threaten China's food security. In addition, the huge flow of the labor force drives unequal regional development and income distribution disparity in China.

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However, most of researchers provide positive views on rural to urban migration in China from different economic development perspectives. For example, rural to urban migration is important for efficient allocation of labor resources through labor transfers from low to high productivity (Knight and Song, 2003). It is known that rural to urban migration could reduce the amount of labor and human capital allocated to agricultural production, but it may possibly boost rural productivity. This perspective, known as the "new economics of labor migration", suggests that "remittances from migrants allow rural households to overcome credit and risk constraints, enabling them to invest in more productive technologies" (Taylor and Martin, 2001). Because of the large scale of rural to urban migration in China, these remittances have strong potential to achieve a powerful impact on rural income, rural development and social welfare. Rural migration will eventually contribute to the process of China's economy shifting from agriculture to industry and rapid economic expansion (Taylor and Martin, 2001; Hare, 1999). Moreover, the mobility of skilled workers, economies of scale in manufacturing as well as the declined transport cost lead to a core-peripheral equilibrium pattern of regional economic development in China (Krugman, 1991).

Therefore, it is important to realize the determinants of the migration decision for individuals from rural to urban areas. It has impressive implications for the whole economic development and social welfare of the country because more than 0.9 billion people live in rural China (Chen, 2004). A better understanding of temporary rural-to-urban migration in China could help the policy makers to formulate more reasonable and effective policy regarding this phenomenon and its socioeconomic consequences (Li and Zahniser, 2002). In fact, it is complex to make migration decision for rural individuals in that it is closely related to several individual characteristics (e.g. gender, age, marital status, educational level, the relationship to the household head, membership of Communist Party, national ethnic minority and employment before migration). Nevertheless, empirical analysis of determinants of the rural to urban migration in China has been limited "mainly due to lack of data" (Ma, Liaw and Zeng, 1997). Because migration was well controlled by the government so authorities did not include information on migration in the official census until 1990. The "migration" was first introduced in the Chinese population census at that time. However, migration research in China is still at an early stage (Wu and Zhou, 1997). This backwardness is manifested in two ways. One is most researches are not quantitive but remain qualitative. The other is that many migration surveys are made to pursue specific governmental policies instead of being designed for scientific research (Zhu, 2002).

This paper augments the empirical research on the determinants of rural to urban migration decision in China. We focus on the temporary migration of individuals from rural areas who leave their household for at least one month, either to work or to search for work in an urban area. We use a large national data set from the Chinese Household Income Project (CHIP). This data set based on a rural household income survey in 1995, which includes 7998 households and 34,739 individuals covering 19 provinces. It contains information about migration behavior of rural individuals. With these data we estimate an individual-choice logit model to examine the influence of a series of different explanatory variables on the rural to urban migration decision in China. In addition, when we estimate the individual-choice model, we create two other models to examine the determinants of rural to urban migration decision respectively for males and females. The age group in this sample is limited from 16 years old to 45 years old.

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Through empirical analysis we find that males are more likely to participate in migration than females. Age has an inverted-U shaped effect on migration. Marriage reduces the probability of migration; in contrast, when males and females are estimated separately, marriage is insignificant for males mainly due to the "bread earner" positions of males in the rural household. The probability of migration has a negative relationship with educational levels of professional school and middle professional school for all rural individuals. However, only middle professional school has a significant negative effect on female. Household heads are more likely to migrate. But when we separate the males and females, the household head factor has an insignificant effect on migration. Members of Communist Party or the national ethnic minority in the rural areas are less likely to migrate but the membership has little impact on female migration because there are few females who are members of Communist Party or the national ethnic minority in the sample.

The rest of the paper is organized as follows. Section 2 introduces the human capital model of migration. Section 3 contains the characteristics of migration background in China. Section 4 reviews the literature and develops the hypotheses. Section 5 offers a descriptive analysis of the sample. The methodology and an overview of the logit models are provided in section 6. Section 7 presents the empirical results. And the last section summarizes main conclusions and contains a brief discussion of the implications for macro policies.

Theory of Migration as Human Capital Investment

We will introduce the theory of migration as human capital investment according to << Regional Economics and Policy>> (Armstrong and Taylor, 1985). Migration incurs many costs including both pecuniary and distinctly non-pecuniary or psychic cost (Sjaastad, 1962). The pecuniary costs contain expenditure on the non-movable assets such as houses and other necessary property needed in a new place and transporting fees. In addition, the migrants may spend a long time to look for a job in new places so they have to live without any income temporarily. It is known that the separation from families and friends, the difficulties of settling into an unfamiliar place and the discrimination by the local people all result in huge non-pecuniary costs which is essentially strong deterrent to migration. Many people cannot stand the non-pecuniary cost of migration so that they choose to participate in long-distance commuting for every day instead of migration (Jackman and Savouri, 1992b; Cameron and Muellbauer, 1998).

The simple classical model of migration reveals that given perfect information and the lack of cost or other barriers to migration, the movement of labour results from the real wage differential. Labour migration will continue until wage rates are identical in both regions (Armstrong and Taylor, 1985). However, regional wage differences indeed play a role, but it is not so strong a determinant as is often thought (Jackman and Savouri, 1992a; Hughes and McCormick, 1994). Traditionally, people considered the characteristics of the origin and destination regions (e.g. wages, employment opportunities, climate and environment) as the main factors that affect migration decision. More recently, researchers pay much attention to the "institutional framework within which migration takes place" and "the personal and family characteristics of migrants" (Armstrong and Taylor, 1985).

It is important to understand that the institutional framework affects the migration decision, which suggests that labour and other (e.g. housing) markets are imperfectly competitive (Armstrong and Taylor, 1985). Migration decision is greatly influenced by the behaviour of institutions. Recruiting and promotion policies of employers have significant impact on the

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behaviour of large numbers of migrants, especially within-firm job mobility or "autonomous" migrants (Sell, 1990; Salt, 1990). There are also other institutional factors playing a part in migration, for instance, local authorities and financial institutions operating in the housing market; recruitment agencies and government job centres operating in the labour market; and the government itself through its taxation and unemployment benefit policies (Armstrong and Taylor, 1985).

The personal and family characteristics of migrants are also recognized as strongly affecting migration behaviour. The lifecycle effects such as migration at an old age, the effects of marriage or divorce, family ties, the consideration of employment opportunities for one's partner and his or her own are all important factors when people make decisions of migration (Mincer, 1978; Snaith, 1990 and Green, 1997). Migration is also intensively determined by personal characteristics, with younger and better-educated individuals being more likely to leave their home region (Antolin and Bover, 1997). Moreover, the social network plays a role. Migrants tend to follow previous generations of migrants. They can get direct and reliable information from the earlier migrants, in which way the migration cost is reduced at a large scale.

Migration is clearly more complex than is suggested by the classical model. One of the most enduring of the theories is human capital theory (Sjaastad, 1962; Cooke and Bailey, 1996). The human capital model prevails in that the migrant is regarded to respond to higher earnings that can be expected from migration over his remaining working life. It is based on that migrants have a positive time preference. The sooner migrants could benefit from migration, the more attractive will be the migration. "For this reason, the higher earnings which the migrant can expect to enjoy are expressed as a present value, with a discount rate being used to incorporate the influence of a migrant's time preference" (Armstrong and Taylor, 1985).

This can be written as follows,

$$\text{“}R_{ij} = \sum_{t=1}^{T} \frac{y_{jt} - y_{it}}{(1+d)^t}$$

Where

Rij = gross present value of the lifetime increment to earnings expected to result from the migration from region i region j;

T = number of years of working life remaining;

$1/\ (1+d)^t$ = discount factor;

d = discount rate (measures the time preference of migrants);

y_{jt} = expected earnings of the migrant in region j (the destination region) in year t;

y_{it} = expected earnings of the migrant in region i (the origin region) in year t" (Armstrong and Taylor, 1985).

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In addition, the factors such as risk and uncertainty undoubtedly play a crucial role in migration decision. The existence of risk and uncertainty results from poor information about economic and social conditions in other regions and from potential dangers of being unemployed. The greater the risk and uncertainty, the less attractive the migration becomes (Pickles and Rogerson, 1984).

Another advantage of the human capital theory is that it incorporates all the costs and benefits of migration. "Potential migrants are assumed to weigh all the costs and benefits of migration, and the net present value of migration from one region to another is expressed as follows:

PVij= Rij - Cij

Where

PVij = net present value of migrating from region i to region j;

Rij = gross present value of the time stream of expected benefits (pecuniary and non-pecuniary) of migrating from region i to region j.

Cij = gross present value of the expected costs (pecuniary and non-pecuniary) of migrating from region i to region j" (Armstrong and Taylor, 1985).

If PVij is positive, the discounted value of the benefits exceeds the discounted value of costs, thus making migration possible. The benefits of migration consist of higher earnings and non-pecuniary benefits such as better working conditions in the destination region. The costs of migration comprise both money cost and psychic costs (Armstrong and Taylor, 1985).

Background

China is such a large and diverse agricultural country that the endowment of natural resources and economic development among different regions is of great unbalance and inequalities. For example, the eastern coastal urban regions are relatively developed while those western inland rural regions are less developed. Thus these specific characteristics of the Chinese situation provide an environment for labour mobility, which is different from that in both of developed and other developing economies to some extent. Next, we will choose five factors in shaping the rural to urban migration decision to explain as follows.

Persistent Rural to Urban Income Gap

China was famous for its extremely tight control of rural to urban migration for a long time. Because the government aims to guarantee enough labours to produce cheap agriculture products on the farm to prevent food shortage. This was in response to the devastating famine that occurred between 1959 and 1961 which was responsible for at least 30 millions deaths. Also, the government does not want to spend too much on a large increasing number of people living in the urban area. The government either avoided or controlled the flow of funds and resources between the rural and urban sectors through administration, finance and resource distribution. (Knight, Shi and Song, 2004). Further, the government took two ways to achieve these objectives. One way was called *gongfenzhi*. The labours in the rural areas were required to participate in the collective daily farm work assigned by the leader in the village to get earnings for their lives. So it made the opportunity cost for leaving rural areas quite high. The other way for controlling rural to urban migration was called *hukou* system.

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According to the regulations of China, an individual gets the local *hukou* of the same areas where his or her mother is registered when he or she was born. That means if a person was born in the rural area, he or she was kept away from cities because the chance to change the registration locality in his or her entire life is very little. If the individual wants to move to urban areas, he or she has to get permission both from origin place and destination place. Before 1978, one's urban household registration status was closely linked to many benefits such as employment opportunities, food rationing, housing, good education opportunities and other necessities. This system essentially makes it almost impossible for outsiders to live in urban areas. The result of limited rural development and long-time restriction of rural to urban migration is the income gaps between the rural and urban areas persist and increase greatly (Zhu, 2002). "The income gap widens until 1978, declined between 1978 and 1984, and widened again afterwards. The ratio of urban to rural per capita income was 2.57 in 1978, dropping to 1.86 in 1985, and then rising to 2.50 in 1994. From then on, it fluctuated around 2.50" (Department of Comprehensive Statistics of National Bureau of Statistics of China, 1999). The huge income disparity between rural and urban areas provides enormous incentive for the rural individuals to migrate to the urban areas in search of greater economic gains.

Agriculture Market Reform—Household Responsibility System (HRS)

In order to increase peasants' incentives to engage in agricultural production, Chinese government enforced a rural market reform in the late 1970s. It was named as the household responsibility system (HRS), which returns land to individuals under long-term leases in the rural areas and eventually replaces the collective production-team system (Zhu, 2002). At the same time, agricultural procurement prices were increased in order to elicit more farm production. Although the rural market reforms increased rural incomes compared to urban incomes, the rural to urban migration did not seem to decrease with the HRS. Another factor cannot be overlooked. The reforms indeed raised the average income of rural households. However, the reforms decreased the opportunity cost for rural individuals to migrate to urban areas by decreasing the marginal contributions of individual household members to household income (Zhu, 2002). Thus, it makes migration possible. In addition, "the HRS had two far-reaching and unintended effects on the ability of the central government to control migration. First, it made it possible to buy food without urban registration status. The HRS increased the food supply dramatically, which led to the availability of food on the free market in cities and eventually led to the abandonment of food rationing. Second, the HRS returned personal freedom to rural people. Rural labours could freely allocate their time, choose their profession and their mode of production" (Zhu, 2002). The development of HRS in rural areas has led to increases in productivity in rural agriculture and resulted in a large stream of farm labours redundant in the rural areas. Therefore, a large number of peasants have found themselves no longer needed in agricultural work and so have to look for the job in the urban areas (Lin, 1989). Also the higher returns to labour in non-farm sectors made farmers incline to migrate out of farm (Cook, 1999).

However, despite the problem of food shortages has been solved, there are several restriction methods undertaken by the government on rural to urban migration. For instance, the urban government put quotas on the number of migrants that each company can employ and levy fees on the recruitment of migrants. The migrants almost impossibly attain the same living standards including housing, employment opportunities, medical insurance and education opportunities for their children as the local urban people. One reason is that the government does not want to spend more money on the added urban infrastructure (Zhu, 2002). Another

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is the urban unemployment induced by state owned enterprise (SOE) reform became a serious issue (Zhu, 2002). The government was worried about the job security of the residents in the urban areas and prevented tough competition from migrants in the urban areas. So the conflict between official policies and farmers' aspirations has led to two consequences: (a) "growth and prospering of the rural non-agricultural sector, which provides job opportunities for rural surplus labour" (Zhao, 1999b) and (b) "development of an urban informal sector and aggravation of urban labour-market segmentation" (Wang and Zuo, 1999).

Development of Township and Village Enterprises (TVE) in Rural Areas

The gradual abolition of institutional obstacles has been the key for increased labour mobility since 1980s (Cai and Wang, 2003). In the early mid-1980s, in order to provide rural non-agriculture jobs as an alternative way to alleviant large rural to urban migration and address the rural surplus labour problem, the Chinese government admitted, promoted and then sponsored rural non-farm activities (Liang and White, 1997). One of the most systematic and wisely organized strategies was to encourage the establishment of township and village enterprises (TVE) run by rural individuals. A large investment shift to TVEs, with the distribution of employment in rural areas shifting away from primary employment in farming, towards secondary and tertiary employment in villages and towns (Yan, 1990). The government provides not only technical expertise but also tax privileges and loans for these newly established rural enterprises. In addition, the products made in TVEs have promising markets because the labour cost is low. As a result, the TVEs have developed dramatically and become an outstanding phenomenon at that time period. Some scholars have stated that the growth of rural enterprises in China provides enormous opportunities for the employment of peasants (Fei, 1989). "In 1979, there were 1.48 million rural enterprises that employed 29 million rural peasants. By 1993, however, there were 23.2 million rural enterprises that employed about 112.3 million workers." (Statistical Yearbook of China, 1993). The rise of TVEs is partly responsible for the continuous rise of rural household income, which in some ways compensates slower income growth in agriculture during the late 1980s. However, the growth of employment in rural TVEs has declined significantly since the late 1980s. This can be explained by the fact that many TVEs lack experience and expertise, which is necessarily important in a modern market-oriented economy. Although the price of the product made in TVEs is low, the quality and service turn out to be a disadvantage. They faced strong competition from state-owned enterprises, joint ventures, and private enterprises, which have much better reputation and more stable customers. So TVEs faced such a situation: new technologies have to be introduced and the quality of products needs to be improved through investing more capital instead of employing more labour (Cai and Wang, 2003). As a result, TVEs absorbed less rural surplus labour than before, pushing rural labourers to migrate to urban areas.

In 1983, the government started to allow farm labours in the rural areas to sell their products beyond local market places. The Chinese farmers get the legitimate right to engage in business in urban areas outside their rural hometowns responded to the demand for consumer goods for the first time. In 1988, the government further allowed farmers to work in enterprises or run their own business in cities under the condition of self-sufficient staples (Cai and Wang, 2003). Since 1990s, the government has adopted various policies and methods to encourage rural to urban labour mobility by cancelling rationing, expanding urban non-state sectors, and improving the distribution system of housing, employment policies and

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social security system (Cai and Wang, 2003). These reforms with an increase of welfare provide a better environment for rural labour migrants to manage to live in cities.

Emergence of Informal Sector in Urban Areas

The basic characteristics of "informal sector" are described as "low wage", "small and family-based", "freedom of entry", "lack of a stable employer-employee relationship" and "being ignored by the authorities" (Todaro, 1969; Fields, 1975). In the urban areas, the development of the special economic zones, the expansion of the non-state sectors and the loosening of the urban employment policy made rural migrants in a great demand (Meng and Zhang, 2001). With the development strategy from capital-intensive towards more labour-intensive industries, many jobs such as building skyscrapers and other basic infrastructures have been created in cities (Knight, Shi and Song, 2004). Moreover, urban economy grows quickly while the urban labour force grows slowly. It causes a large demand of rural workers in the urban economy. However, "most of rural migrants arrive in cities to take up marginal jobs that are characterized by long hours, poor working conditions, low and unstable pay, and no benefits, such as housing and food subsidies, education for children, medical insurance and other social insurance" (Wang and Zuo, 1999). In fact, there have already been many rural migrants work in such situations in urban areas. Although there are so many major disadvantages, it can be said that the situation of migrants in China's "informal market" is better than that of migrants in many other developing countries (Zhu, 1998).

An Increase in Urban Unemployment

Massive reforms toward market economy were introduced in urban areas. The state-owned firms were strongly competed by the TVEs and private sector development because of over-investment, higher cost and inefficiency of workers. So it caused urban unemployment in almost all cities in China from 1995. According to the Chinese Labor Minister, 8.14 million urban workers lost their jobs in 1996, and 5.62 million in the first 6 months of 1997 (South China Morning Post, 1997a). It is estimated that there are as many as 30 million redundant workers in the state owned enterprises (SOE). Few young people were recruited, many workers of middle age had to retire early, and many employees in the SOE were laid off with hardly any social security such as housing subsidy and medical insurance. The 2000 Census reveals that the real unemployment rate in urban China was over 8 percent (Cai and Wang, 2003). The crucial unemployment in urban areas has greatly decreased the job opportunities in urban formal sectors for rural migrants who are less educated and less socially connected. In response to this problem, the government started a re-employment program, which helps the laid-off urban workers to find a job. At the same time, the city governments implemented strict and rigid control of migrant workers through quota and occupation-specific restrictions (Cai and Wang, 2003). The rural migrants found themselves in direct competition with the urban unemployed workers and in disadvantaged conditions. As a result, it reduced the probability of migration for rural residents.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Many researchers have been interested in examining the factors that determine the rural to urban migration in China. The literature on labour migration within China develops quickly and already includes a large number of studies of the individual's migration behavior. To have a better understanding of the specific characteristics of labour migration behavior in

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China, it is important to realize the motivations for migration and the conditions the migrants face when they choose to do so. For example, several papers address the determinants of migration and some of them have different points of views. Liang and Chen (2004) explore the effect of development of rural industry on migration decision. They focus on the 'push factors' for migration and find that the rural people are reluctant to migrate if they could work in the rural non-farm sectors with high salary. "Push factors reduce income prospects and /or expected utility in the origin areas with little or no change in alternative prospects" (Fearn, 1981). In contrast, Chen (2004) focuses on the 'pull factors' of urban destinations. "Pull factors increase income or net advantages in the destination areas or lower relocation costs with income and other advantages in the origin areas remaining constant" (Fearn, 1981). They find that it is not the high income but the good living standard in urban areas that contributes to rural to urban migration (Small, 2002). In this section we will review the literature on the various individual characteristics that may affect the rural to urban migration decision in China.

Gender

Most studies reveal that gender is one of the most important variables on the migration decision. Zhao (1997a) finds that the probability of migration reduces by 7% for females and Hare (1999) finds that the probability of migration increases by 30% for males. Using the data collected from surveys in Sichuan province, Zhao (1999a) finds females are 55.3% less likely to migrate compared to the average. Male migrants are more likely to move to urban areas than female migrants and are also more likely to transfer from agricultural to nonagricultural jobs. Moreover, male migrants are more likely to work in prestigious occupations. Perhaps the reason is that female migrants face disadvantages in earnings when compared to migrant men and local women. This is concluded by Wang and Shen (1999) based on the 1995 Survey of Floating Population in Shanghai and Huang (2001) using data from the1990 Chinese census. In contrast, using data from Hubei province, Goldstein, Liang, and Goldstein (2000) indicate that migration provided better economic opportunities and a degree of freedom in the urban area for women. The probability of migration for males maybe higher than females in rural areas. The possible reason is that females are mainly responsible for family housework and taking care of children in rural households. It is also well known that there are disadvantaged positions for female migrants compared to local females and male migrants in many big cities. As for the household head position in the rural household, the likelihood for migration increases. Because it is the fact that male is usually the household head in rural areas and the household head is responsible for the family earnings. Thus,

H1: Males are more likely to migrate.

Marital Status

Marital status also has important effect on the decision of migration. Zhao (1997a) and Hare (1999) indicate that marriage reduces the probability of migration respectively by 2.8% and by 10%. Zhao (1999a) claims that married people are 37.6% less likely to migrate compared to the average and the migrants tend to be unmarried. And Zhu (2002) suggests marriage greatly decreases the likelihood to migrate. This finding could be explained by that married people have higher migration cost including both monetary and physic cost. Married individuals may be less likely to be involved in migration in order to spend more time at home with family members. Therefore,

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H2: Marriage decreases the probability of migration.

Age

Hare (1999) finds that people who are older than 16 years old and younger than 35 are most likely to migrate. Zhao (1999a) finds the likelihood of migration decreases as age rises, which can be explained by the higher psychological cost for old people to migrate (Zhao, 1997a). Tuan, Somwaru, and Diao (2000) suggest that the probability for rural young people to engage in non-farm work is higher than old people. Zhao (2001) indicates that single young male is more likely to migrate in rural areas. Zhu (2002) states that age has an inverted U effect on the probability of migration. However, Zhao (1997b) finds age has a positive effect on migration, which results from several restrictions implemented on young people in rural areas. If the money cost including the lodging, transportation fee for both migrants and their belongings and the non-money cost including not only the opportunity cost while searching for and a new job but also the psychic cost are significant for the very young and the very old then they should have less inclination to migrate. Thus, starting from young adult, the probability of migration should increase with age at a decreasing rate. Then after a certain age, the probability of migration should decline. Thus,

H3: Age has an inverted U effect on probability of migration.

Education

Existing literature on rural to urban migration in China reflects different perspectives on the role of human capital on migration decision. Parish, Zhe and Li (1995) indicate that when the rural labor market turns up, the returns to education are modest in rural China. Their study is based on data, collected from a survey of ten counties randomly chosen from all over China in 1993. Zhao did several studies on migration behaviors in rural China and got different results about the effect of education on migration decision. She finds that most educated rural people would like to work in local non-farm sectors rather than to migrate (Zhao, 1997a) and formal education has an insignificant effect on raising the probability of migration but a significant positive effect on shifting from farm work to local non-farm work (Zhao, 1999a). Liang and White (1997) find less educated rural workers are more likely to migrate than better educated who can find jobs in the rural enterprises. In a household level model, Zhao (1999b) indicates that household mean education level of laborers has a significant negative effect on the migration decision according to a survey in Sichuan province in 1995. Rozelle et al. (1999) suggests that the probability to migrate increases for younger and relatively well-educated rural residents with a survey in 200 Chinese villages. Using the data collected in a county of Henan province, Hare (1999) concludes that there was no close relationship between formal education and migration decision. Knight, Song, and Jia (1999) find that the professional training was rather important for migrants while the role of education was not mentioned.

When Tuan, Somwaru, and Diao (2000) study how the structure of the rural labour force affects the possibility to work outside the farm, they conclude that younger and better-educated individuals in the rural areas are more likely to work in non-agriculture sectors because they already had the needed skills learned from secondary school or higher schooling. Roberts (2001) finds that individuals who have finished at least junior middle school were inclined to choose non-farm work while the illiterate ones were more likely to work on farm in the rural area of Shanghai with a 1993 sample of migrants in Shanghai.

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Using data collected from population survey conducted by institute of population studies at Shanghai academy of social sciences in 1995 and 1996, Meng and Zhang (2001) applied multinomial logit model to examine the occupation attainment for rural migrants and urban residents. It was found that for rural migrants, education increases their probability of getting a white-collar job and higher pay.

However, the findings of Zhu (2002) are mixed in that education only plays a positive role for males, but not for females. The possible reason maybe education has a different effect on migration decision for males and females. Zhang, Huang, and Rozelle (2002) indicate that education has a significant positive impact on participating in off-farm work and high-level education increases job opportunities and the possibility for higher income in urban areas.

Based on the different conclusions from previous studies, that is, the individuals with higher levels of education maybe more likely to migrate because it is easier for them to find job in the urban areas. However, it is also possible for the educated to stay in the rural areas. The opportunity for them to have a good job and comfortable life is greater compared with the less educated. Thus,

H4: Education may have a significant effect on migration decision but the sign is not determined.

Rural Non-farm Employment

Using the data of 1990 census, Cai (1996) finds that the percentage of the number of farmers employed in township and village enterprises to that of all residents in the village has a significant positive effect on migration decisions. When Meng (2001) examines job attainment for migrants, he indicates that individuals with higher labor market quality such as more training in the rural areas are more likely to be self-employed in the informal sector. And when Meng (2001) used a Heckman two-step model to analyze the wage differentials among formal sector, wage-earned in informal sector, and self-employed in formal sector, he states that rural non-farm work experience has a significant positive effect on wages of formal sector and wage-earned informal sector. It is easier for individuals who have working experiences in the rural enterprises to find a job in the cities. So individuals maybe more likely to consider migration if they were employed in non-farm workplace in the rural area. Thus,

H5: Individuals with rural non-farm working experiences are more likely to migrate.

Ethnic Minority and Membership of Communist Party

Being a member of national ethnic minority the probability of migration may declines. China is a large country with many minorities and most minorities live in different certain regions. They are familiar with the culture of the region where their families have resided for a long time. So the physic cost for them to migrate is relatively high. Being a member in Communist Party means to have more authority, higher position and better economic opportunities in the local area. Thus, the likelihood of migration may decrease.

H6: Being a member of national ethnic minority decreases the probability to migrate.

H7: Membership of Communist Party decreases the probability to migrate.

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DATA AND METHODOLOGY

Chinese Household Income Project-1995

The empirical analysis is based on a detailed and representative national rural household survey conducted in 1995 named the Chinese Household Income Project (CHIP), which is a major socioeconomic study of households in China. The purpose of this project is to measure and estimate the distribution of personal income in both rural and urban China (ICPSR, CHIP-1995). This large project is a joint research sponsored by the Institute of Economics, Chinese Academy of Sciences, the Asian Development Bank, and the Ford Foundation and other agencies including the East Asian Institute and Columbia University (ICPSR, CHIP-1995). This survey data was collected at both household and individual levels from a sample of respondents, generally through structured interviews or self-administered questionnaires covering 7998 households and 34,739 individuals in 19 provinces. The data collection consists of two distinct samples of the urban and rural populations of China, which were selected from significantly larger samples (approximately 65,000 rural households and 35,000 urban households) drawn by China's State Statistical Bureau (ICPSR, CHIP-1995). CHIP- 1995 contains detailed information about migratory behaviour of individuals and households in China. Because this study concentrates on the rural to urban migration, so we choose the dataset of rural individual data to examine the effect of the individual characteristics on rural to urban migration decisions in China.

Individual rural respondents reported on their gender, age, relationship to household head, employment status, level of education, Communist Party membership, type of employer (e.g., public, private, or foreign), type of economic sector in which they were employed, occupation, whether they held a second job, retirement status, monthly pension, monthly wage, and other sources of income (ICPSR, CHIP-1995).

Summary Statistics

The data set we use is a part of CHIP-1995 survey. In order to analyze the influence of individual characteristics on migration decision, a sample of rural individuals was constructed using the following criteria: (1) between 16 and 45 years old because individuals who are older than 16 years old have the right to work according to the labor law in China and most people in this survey are under 45 years old; (2) having valid personal data available (age, gender, relationship to household head, membership of Communist Party, national ethnic minority, education level and occupation category). The above selection criteria yielded 7038 observations on individuals, of which 869 were migrants and the remaining 6169 were non-migrants.

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Table 1. Individual characteristics of migrants and non-migrants (N=7038, Age 16-45)

Variable	Migrants (N=869)		Non-migrants (N=6169)	
	Mean	Std. Dev.	Mean	Std. Dev.
Gender (male=1)	0.728	0.445	0.460	0.498
Household head (head=1)	0.270	0.444	0.268	0.443
Age (years)	26.199	7.697	31.280	8.835
Marital status(married=1)	0.457	0.498	0.721	0.448
Education level (1-8level)	5.145	0.799	5.385	1.062
Communist Party Membership (member=1)	0.024	0.154	0.047	0.213
Ethnic minority membership (member=1)	0.012	0.107	0.030	0.171
Employment (farmer=1)	0.311	0.463	0.748	0.434

Table 1 presents individual mean characteristics of migrants and non-migrants. Among the variables, gender, relationship to household head, marital status, membership of Communist Party, membership of ethnic minority and employment are all dummy variables while age and educational level are continuous variables. According to the summary statistics, among all individuals who are between 16 and 45 years old, only 12% are migrants. Compared with non-migrants, migrants are predominantly male, younger and unmarried. Migrants are 5 years younger than non-migrants on average. Marriage seems a distinctive deterrent to migration. Most married people stay in the rural areas. The individuals who are not members of Communist Party or ethnic minority are likely to migrate. Education levels are measured in eight different values. Level 1 corresponds to college or above, level 2 corresponds to professional school, level 3 corresponds to middle level professional, technical or vocational school, level 4 corresponds to upper middle school, level 5 corresponds to lower middle school, level 6 corresponds to four or more years of elementary school, level 7 corresponds to one to three years of elementary school and level 8 corresponds to illiterate or semi-illiterate. It is noted that in this sample the higher the education level, the less schooling individuals have, which is opposite to our intuition. The means of education level of migrants and non-migrants are respectively 5.145 and 5.385, somewhere between 4 or more years of elementary school and lower middle school. Migrants receive more schooling than non-migrants. According to China's First National Agricultural Census, 42 percent of the people in agricultural households had obtained a middle-school education without continuing further studies (National Agricultural Census Office of China, 1998, Table 4.6). Difference in whether or not farm-employed is remarkable. Farm labors are more likely to be non-migrants. The individuals with non-farm employment, for example, ordinary worker, skilled, professional or technical workers, owner or manager of enterprise, village cadre, official of party or government office or institution, ordinary cadre in an enterprise, temporary or short-term contract worker, non-farm individual enterprise (such as retailer, driver, etc) in the rural household have larger probability to migrate.

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METHODOLOGY

Researchers used different econometric models to study migration behavior. Based on the method used in the analysis of the determinants of migration in China by Li and Zahniser (2002), in this paper we estimate Logit models to predict the probability that an individual will be a migrant from rural to urban China. In this study, the unobservable variables can be thought of as the difference in expected utility from staying in the rural area and migration to an urban area. The actual migration decision depends on a series of explanatory variables of individual characteristics. The dependent variable in the model is binary, which is defined as one if the individual left the household for at least one month in 1995, either to work or to look for work in an urban area. Otherwise, the dependent variable equals zero. The potential determinants of migration decision were individual characteristics such as gender, age, marriage status, relationship to household head, membership of Communist Party, membership of national ethnic minority, education level and occupation category.

We use dummy variables to estimate the influence of gender and household head on migration decision. We take both age and age squared as explanatory variables in order to examine whether there is an inverted U-shaped relationship between age and migration. We use a dummy variable to estimate the effect of marital status on the migration decision. To estimate the influence of education on the migration decision, the models contain a series of discrete dummies of 8 educational levels, in which the level of illiterate or semi-illiterate is the reference group. We also include a dummy variable to predict the impact of membership of national ethnic minority and membership of Communist Party on migration decision. To examine the effect of employment before migration on the migration decision, we use a dummy variable to indicate whether individuals work on farm.

The basic Binary logit model we use is Y= 1 if individual chooses to migrate; Y=0 otherwise.

The logistic distribution is,

$$Prob(Y=1)=\Lambda(X\beta)=\exp(X\beta)/[1+\exp(X\beta)]$$

A set of factors that determine migration decision gathered in a vector, X. The set of parameters β reflects the impact of changes in X. We use the notation Λ(.) to indicate the logistic cumulative distribution function (Greene, 1990, pp.664).

The individual-choice model is

Migration = β0 + β1(Male) + β2 (Age) + β3 (Age squared) + β4(Married) +β5 (College) + β6 (Profsch) + β7 (Midprof) + β8 (Uppmsch) + β9 (Lowmsch) + β10 (Elemsch) + β11 (Lowesch) + β12 (Household head) + β13 (Member of Communist Party) +β14 (National ethnic minority) + β15 (Farm employment) +ε, where

Male = a dummy variable that equals 1 if the individual is a male and 0 if the individual is a female

Age = age number

Married = a dummy variable that equals 1if the individual is married and 0 otherwise

Education level includes 7 dummy variables (illiterate or semi-illiterate as reference group)

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College = a dummy variable equals 1 if the educational level of an individual is college or above and 0 otherwise

Profsch = a dummy variable equals 1 if the educational level of an individual is professional school and 0 otherwise

Midprof = a dummy variable equals 1 if the educational level of an individual is middle level professional, technical or vocational school and 0 otherwise

Uppmsch = a dummy variable equals 1 if the educational level of an individual is upper middle school and 0 otherwise

Lowmsch = a dummy variable equals 1 if the educational level of an individual is lower middle school and 0 otherwise

Elemsch = a dummy variable equals 1 if the educational level of an individual is 4 or more years of elementary school and 0 otherwise

Lowesch = a dummy variable equals 1 if the educational level of an individual is 1-3 years of elementary school and 0 otherwise

Household head = a dummy variable that equals 1 if the individual is a household head in the family and 0 otherwise

Member of Communist Party = a dummy variable that equals 1 if the individual is a member of Communist Party and 0 otherwise

National ethnic minority = a dummy variable that equals 1 if the individual is a national ethnic minority and 0 otherwise

Farm employment = a dummy variable that equals 1 if the individual works on the farm in the village and 0 otherwise

Moreover, because gender is a significant independent variable that affects the migration decision, we will use the above model to examine the effect of various factors on the probability of rural to urban migration for both male and female respectively.

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RESULTS AND DISCUSSION

Table 2. Model 1.1 Logit model of migration choice for all rural individuals (N=7038) (Dependent variable: migrant=1; non-migrant=0)

Variable	Coefficient	S.E.	Marginal Effect
Constant	(***)-2.597	0.731	-0.174
Male	(***) 0.920	0.097	0.063
Age	(***) 0.128	0.048	0.009
Age squared	(***)-0.003	0.0008	-0.0002
Married	(***)-0.640	0.138	-0.048
Professional school	(*)-2.057	1.078	-0.063
Middle professional school	(*)-0.749	0.441	-0.037
Household head	(***) 0.588	0.134	0.044
Member of Communist Party	(***)-1.001	0.248	-0.046
Ethnic minority	(***)-0.966	0.348	-0.044
Farm employment	(***)-1.728	0.084	-0.161
Loglikelihood	-2118.548		
LR chi-squared (degrees of freedom)	1024.332 (15)		
Pseudo R squared	0.19		

(*** denotes significant at 1% level; * denotes significant at 10% level; for educational level variables, the reference group is illiterate and semi-illiterate)

The results from logit model for all rural individuals are shown in Table 3. In previous analysis we also used the probit model. The result of the probit model, which is revealed in the appendix, is similar to that of logit model. Then we will discuss the effect of different factors on the rural to urban migration decision.

Gender Effect

From the result of regression, we see that the estimated coefficient for male is statistically significant at 1% level. Gender has a significant effect on rural to urban migration decision. Males are more likely to migrate than females. Because females are less educated and have to stay at home if the household is short of labor. This can be explained further by particular background in rural China.

First, female migration is constrained by the culture and customs. In the rural areas especially vast poor places, all decisions are made by the household head who is normally the elder male in the family. Females are required to do housework including cooking, looking after children and old household members. So the chance for them to go far away to work is really little.

Second, the land plot assigned to each household bases on the total number of household residents. Even if rural people can get higher income from migratory work, they would not give up land, from which they can be self-sufficient on food supply. Moreover, they are not

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so confident in the sustainability of non-farm earnings. Thus, the household leaves the female laborers to look after the plot.

Third, there may exists the gender-specific job factor that deters female migration. Most migrants work in dirty and dangerous conditions and mainly engage in construction, building and transportation jobs. Some of them even live in big halls and train stations because they could not afford to the high housing rent in the big cities. Such working and living circumstances in the urban areas are not appropriate for females.

Age Effect

The result from the logit model shows a significant positive coefficient for age and also a significant negative coefficient for age squared. Age has an inverted U-shaped effect on migration decision. For all the rural individuals, the probability of migration increases with age and then after a certain age, it gradually declines. It can be estimated that most migrants in our sample is from age group 25-30. Because young people in this age have a higher return to migration in the long run while the older people have fewer years to reap the benefits of migration. From the labour supply perspective, people of this age are more active and more adventurous so they have higher propensity to migrate. From the labour demand perspective, many jobs need strong and young labours in big cities.

Education Effect

Table 2 indicates that when educational level is measured as discrete form, the educational levels of professional school and middle professional school have significant effects on migration for all rural individuals. The individuals, who are in these two higher educational levels, are less likely to migrate. The other category of educational levels has an insignificant effect on migration decision so the results are not reported in the table. These findings may contradict some literatures. It may results from that low skill labors are in large demand in the urban areas while rural development highly needs skilled labors. Rural enterprises recruit better-educated people to take charge of management, administration and decision-makings. So the most qualified and educated individuals may have good jobs with respect and privilege in the rural areas. Thus they do not like to participate in migration.

Household Head and Marriage Effect

According to the result of model 1.1, household head effect is statistically significant and positive in migration decision. The finding is consistent with our prediction. In rural China, male is normally the household head. Also the household head is mainly responsible for earning money to support the family. So they incline to migrate. And marriage strongly reduces the probability of migration: setting up a family and bringing up children increase the opportunity cost of migration. The attractiveness of urban jobs is greatly reduced if married people have to separate from family.

Membership of Communist Party and Ethnic Minorities Effect

Table 2 indicates that ethnic minority has a significant and negative effect on migration decision. The physic cost of migration, which may include uncertainties in the destination cities and discrimination by others, for them is higher compared to majorities. Membership in the Communist Party also has a significant and negative effect. Members of Communist Party have better economic and social positions in the rural areas so they are less likely to migrate.

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Rural Non-farm Work Effect

From the estimation result, we find that rural farm work has a significant and negative effect on migration. Those with rural non-agricultural working experience are more likely to migrate because it is easier for them to obtain a job in the urban area. They own some specific skills which were learned from being employed in the rural enterprises or being cadres in the rural areas. So it is an advantage to work and get higher pay in cities compared with the farm labors.

To examine the effect of various factors that determine rural to urban migration decision for both males and females, we create other two logit models of similar independent variables as model 1.1.

Table 3 presents the results from logit models respectively for male and female. We will briefly discuss the findings. Age has a significant and inverted-U shaped effect for male while it has an insignificant effect for female on migration decision. Marriage strongly reduces the probability of migration for female but it does not have a significant impact for male. This results from the fact male is the main "bread earner" in a family. Educational level of middle professional school has a significant and negative effect on female migration. However, it has an insignificant impact on male migration. Because females with higher education level may have a better job in the rural areas than in the urban areas. So they are less likely to migrate. Membership of Communist Party and national minorities has a significant negative effect on migration for male. But it has an insignificant impact for female. This is partly because the members of female Communist Party or minorities are too few in our sample. Similar to the result in Table 2, farm employment has a significant negative effect on both male and female migration. Nevertheless, in contrast to the result in Table 2, the household head and educational level of professional school have an insignificant effect on migration respectively for males and females.

Table 3. Model 1.2-1.3 Logit models of migration choice for males and females (Dependent variable: migrant=1; non-migrant=0)

	Male (N=3470)			Female (N=3568)		
Variable	Coefficient	S.E.	M.E.	Coefficient	S.E.	M.E.
Constant	-3.419 (***)	0.986	-0.436	-1.306	1.313	-0.017
Age	0.195 (***)	0.057	0.025	0.138	0.096	0.002
Age squared	-0.004 (***)	0.0009	-0.00005	-0.358 (**)	0.002	----
Married	-0.222	0.161	-0.029	-1.217 (***)	0.274	-0.021
Middle professional School	-0.509	0.680	-0.055	-1.538 (**)	0.637	-0.010
Member of Communist Party	-0.956(***)	0.248	-0.092	----	----	----
Ethnic minority	-0.961(**)	0.386	-0.089	-0.748	0.776	-0.007
Farm employment	-1.321(***)	0.097	-0.189	-2.676 (***)	0.189	-0.087
Loglikelihood			-1477.211			-581.256
LRchi-			342.387			575.441

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squared (degrees of freedom)	(14)	(14)
Pseudo R squared	0.11	0.33

(*** denotes significant at 1% level; ** denotes significant at 5% level; for educational level variables, the reference group is illiterate and semi-illiterate)

CONCLUSION AND FUTURE RESEARCH

This study examines the individual rural to urban migration decision in China. The dataset we use comes from CHIP-1995. About 12 percent of rural individuals who are between 16 years old and 45 years old left their household for at least one month in order to work or to search for work in urban areas in 1995. We constructed Logit models to examine the effect of individual characteristics on individual migration choice. Moreover, we analyze the distinction of determinants of migration between the males and females.

The main findings of this paper are summarized as follows. Males are more likely to participate in migration than females. The very young and very old people in the rural areas have a smaller likelihood to migrate. Marriage has a negative effect on migration decision for all rural individuals but it does not have a significant impact on male. Educational levels of professional school and middle professional school have negative and significant effects for all rural individuals on temporary migration. However, only middle professional school has a significant negative effect on female migration. Household heads are more likely to migrate. But when we separate the males and females, the household head factor has an insignificant effect on migration. Being the members of Communist Party or the national ethnic minority in the rural areas, individuals are less likely to migrate but the membership has little impact on female migration due to the few female members in this sample. And non-farm employment has a significant positive effect on migration for all rural individuals.

Since the Chinese government faces a serious problem of urban unemployment in big cities, it is likely that the restrictive policy to control rural to urban migration will continues. They will adopt a rural urbanization strategy and improve the development of small and medium cities. From this study on rural to urban migration decision, the following policy implications can be derived. First, development of rural enterprises must be given some priority. They should be planned to establish in small and medium cites to accommodate rural labor surplus. This is helpful for family or permanent migration. It will reduce the cost of transportation, road construction and perhaps pollution in the long run. Second, social facility provision should be taken into account. This is necessary to sustain the rural migration. Government-provided facilities and services such as boarding schools, social security payments, subsidized public transport, and medical services should be available in the rural areas. This will improve resource allocation particularly human resource between rural and urban areas, thus decreasing the rural and urban income gap. Third, land property rights should be clearly defined in the rural areas. It will promote agriculture productivity and farming scales, which leads to scale economies and increases of income level from farming for rural labors. However, the control of migration will make some economic efficiency loss, reduce the productivity of labour and then lead to a prominent loss of social resources.

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Because we use a binary logit model to examine the determinants of rural to urban migration and many issues such as the dynamics of migration, impacts of migration in China and determinants of job choice by rural labor migrants in the destination cities cannot be fully studied. These topics need methods beyond probit or logit models. Moreover, due to limited data availability some possible explanatory factors for migration decision such as social networks and some village characteristics cannot be examined. Further research can be done about more issues about rural to urban migration in China.

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APPENDIX

Table 4. Probit model of migration choice for all rural individuals (N=7038) (Dependent variable: migrant=1; non-migrant=0)

Variable	Coefficient	S.E.	Marginal Effect
Constant	(***)-1.316	0.395	-0.189
Male	(***) 0.532	0.053	0.078
Age	(**) 0.060	0.026	0.009
Age squared	(***)-0.001	0.0004	-0.0002
Married	(***)-0.357	0.076	-0.057
Professional school	(**)-0.993	0.456	-0.069
Middle professional school	(**)-0.443	0.219	-0.046
Household head	(***) 0.312	0.072	0.050
Member of Communist Party	(***)-0.495	0.120	-0.051
Ethnic minority	(***)-0.491	0.177	-0.050
Farm employment	(***)-0.926	0.045	-0.172
Loglikelihood	-2117.064		
LR chi-squared (degrees of freedom)	1027.301 (15)		
Pseudo R squared	0.20		

(*** denotes significant at 1% level; ** denotes significant at 5% level; for educational level variables, the reference group is illiterate and semi-illiterate)

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