Skill, Health and Selectivity Disparity across Migration Types and Life Course: The Case of Internal Migration in China

Yuying Tong
Department of Sociology
The Chinese University of Hong Kong,
Shatin, Hong Kong
yytong@cuhk.edu.hk

Martin Piotrowski
Department of Sociology
University of Oklahoma
piotrow@ou.edu

Paper prepared for submission to PAA, 2011, Washington D.C. corresponding should be directed to Yuying Tong, Department of Sociology, Room 431, 4th Floor Sino Building, The Chinese University of Hong Kong, Shatin, Hong Kong

Abstract

Using data from the China Health and Nutrition Study, this study uses a large sample (*N* = 28,529) of cases to examine factors affecting migration selection. We examine how health, education, and age have differing effects on migration compared to each other, across the life span, and in different migration streams (i.e., temporary vs. permanent and rural- vs. urban-origin). We find that healthy people are more likely to migrate, but the effect is different across rural and urban migration origins, and is moderated by age among temporary migrants. We also find that skills selectivity, as measured by education, is different between permanent and temporary migrations, although there is no difference in this form of selectivity between rural and urban areas. Our results provide a caution to researchers who assume that migrants are always positively selected without considering the risks and rewards to skills and health inherent in different migration streams.

Introduction

Perhaps the closest thing to an ironclad "law" of migration is that it is selective by its very nature (Tobler 1995, Lee 1966). Many studies confirm that migration is selective on a number of dimensions, such as skill level, age, gender, life cycle, health status, and so on (Taylor and Martin 2001). However, what often remains unappreciated is that selective factors do not necessarily operate in the consistent manner either relative to one other, across the life course, or in different migration streams. For instance, while economic factors may be associated with either positive selection or negative selection, depending on disparities in socio-economic development between sending and receiving areas (Borjas 1987), other factors, such as health, are frequently believed to be positive for all types of migration (Lu 2008). Moreover, there is a lack of research on the role that selective factors play across the life course, particularly at ages when migration becomes less common. In addition, few studies examine these factors in different types of migration streams (e.g., temporary vs. permanent migrations, or rural-to-urban vs. urban-to-urban, and so on).

In order to understand how migration selection factors differ from one another, and how they manifest themselves across the life course and in varied migration streams, longitudinal data are needed that collects several measures of potential migration selection factors and includes sufficient coverage to capture different migration streams. In our study we analyze such a data set. We use migration origin data from the China Health and Nutrition Study, an on-going panel study that has collected information over several decades and is representative of nearly a third of China's population.

The Chinese setting is an interesting and important one for studying migration. Internal migration in China represents a massive population movement thought to involve as many as 200

million people (Blue Book of China's Society 2008). The country has experienced dramatic socioeconomic changes in the last three decades, and has witnessed burgeoning migration rates following an easing of institutional barriers and an upsurge in economic opportunities, particularly in cities. The flow of migration is affected by many factors in complicated ways, and by examining different streams (e.g., temporary vs. permanent migration, rural vs. urban origin streams) we aim to determine how selection factors have differential effects on migration behavior throughout the country.

Review of the Literature

Many studies of migration selectivity come from economics, and focus on skills selectivity (Constant and Massey 2002; Thomas 2008). Neoclassical economic theory views migration as a part of a cost-benefit analysis in which prospective migrants calculate their potential earnings against the costs of migrating (Sjastaad 1962; Todaro 1969). According to this perspective, migrants are more skilled, advantaged, and able, and are therefore positively selected with respect to attributes that improve their ability to maximize lifetime earnings should they choose to move. These characteristics include such things as education, work experience and age (Taylor and Martin 2001).

It is also frequently believed that migrants are positively selected for health status compared to non-migrants who are left-behind (Palloni and Morenoff 2001). Migration involves an adjustment to a new lifestyle which often brings with it a new set of health risks. Thus, individuals in poor health are unlikely to be able to endure the rigors of the journey (Hildebrandt and McKenzie 2005), let alone the challenges of adjusting to a new place of destination. However, until recently, little empirical work has examined this idea, which we hereby refer to

as the “healthy people migrate hypothesis.” An exception is Lu’s work in Indonesia (2008), which showed that young migrants are positively selected with respect to health, but older migrants are negatively selected. This finding implies an interactive effect of age and health. Other research findings make it unclear whether migrants will tend to be negatively or positively selected, on average, compared with non-immigrants (Hildebrandt and McKenzie 2005). For example, Borjas (1987), in a study of Mexican migration to U.S, argues that migrants usually come from the lower-middle ranges of the socioeconomic scale, leaving open the possibility that their health conditions could be worse than those of non-migrants.

Migration Selectivity Differences across Migration Streams

Going beyond the simple view that migrants are either positively or negatively selected with respect to skill level, Borjas (1987) further showed that migration selection differs across migration streams due to factors such as differences in wage distributions both within and across sending and receiving areas. In particular, positive selection occurs when migrants earn wages at the upper end of the distribution in sending and receiving areas, and negative selection occurs when migrants earn wages at the bottom end of the distribution in sending and receiving areas.

Borjas’ findings are echoed by other researchers. For example, in the context of international migration from Mexico to the U.S., low skill workers are believed to be negatively selected in places of origin. However, this idea does not necessarily hold when studied in specific contexts. For instance, Chiswick (1999) argues that larger out-of-pocket costs of migration lead to a lower propensity to migrate, a lower return migration rate, and a greater propensity for favorable selectivity into migration. These findings suggest that greater economic costs and uncertain benefits might trigger skill selectivity. Furthermore, the economic model

mentioned above assumes that workers remain in the destination for a long period of time and it implicitly assumes away location-specific human capital. Thus, if a short duration of migration is expected, or if migration involves uncertain risks - such as deportation and high possibility of unemployment - skill selectivity may not be as pronounced as it is for those migrants who expect to stay long term. It is therefore necessary to study skill selectivity within particular migration streams. Although it is generally believed that more educated people are more likely to migrate, since they have a better chance to find employment, this could be affected by labor market segregation, which drives migrants into different migration journeys. For example, if migrants tend to take the low end jobs in destinations, the selection is not necessarily related to the migrants' skills.

Migration selectivity related to health could also be contingent on the contextual features inherent in different migration streams. Findley (1988) argues that the steepness of the health-migration relation varies with individual characteristics. Judging by the contradictory empirical evidence showing how health affects the migration decisions of the elderly, the literature would seem to support Findley's view. On the one hand, the elderly who are in good health are more likely to migrate because of the ease of movement. On the other hand, elderly people experiencing declining health may be more likely to move to seek better health facilities and health care system (Patrick 1980).

What these studies often do not take into account is that the migration and health nexus could also vary by the relative disparity and risks involved in a particular migration stream, even for younger migrants. Our presumption is that the greater risk involved in migration, the greater the level of stress, and thus, the more potential for selection of health. If a move involves less risk, it would not cause vast stress, and, in such a case, health probably does not impose a great

constraint on migration. Thus, the health-migration relation may depend on features of particular migration streams. For example, rural migrants seeking labor opportunities in cities may experience great stress at the prospect of being unemployed or more directly from working in difficult and dangerous working conditions. Urban migrants may be professionals seeking to change their career path, which engenders fewer risks than those experienced by rural migrants. Rural labor migrants, especially, might be more positively selected on health than other kinds of migrants (e.g., marriage migrants or those migrating for family reunion) who are may be facing a more certain set of outcomes, and thus are less exposed to stress.

Based on the above discussion, it is likely that the skill and health selectivity pattern described in previous literatures is not applicable to all types of migration. Actual selectivity is more complicated and diversified than suggested by the literature. To better appreciate how selection factors may operate differently in the Chinese context, we now describe some aspects of the setting that differentiate various migration streams. We focus mostly on the distinction between rural versus urban origins and temporary versus relatively more permanent migration.

Setting

Previous studies of Chinese migration are mostly destination-based studies, which usually compare migrants and non-migrants in migration receiving areas. For example, existing studies have examined the informal urbanization process (Shen, 2000; Shen et al. 2002); social status in urban areas (Chan, 1996; Solinger, 1999); living conditions (Shen and Huang 2003); and patterns of settlement (Li, 2006). Given that they are based on destination samples, these studies give little insight into selective factors that differentiate migrants from those who never move. Most often, they are case studies conducted in small areas. Few studies use large scale and longitudinal

survey data. Additionally, most studies have focused on the rural-to-urban temporary migrants, largely ignoring the fast-growing incidence of permanent migration and urban-based temporary migrants.

There is comparatively little research on "urban-to-urban" migration in China. What is known about such migration probably comes from studies of permanent migration, although these two are not necessarily the same. According to Fan (2005), among intercounty migrants, 54.1 percent were permanent migrants in 1990 and this percentage dropped to 25.6 percent in 2000. Also, the number of permanent migrants hovered near 20 million, but the number of temporary migrants increased from 16.2 million to 58.8 million. Urban-to-urban migrants probably move for many of the same reasons as rural-to-urban migrants (i.e., for labor, marriage, retirement, etc); however, coming from an urban area may bring with it many of the advantages of growing up in China's more prosperous and economically developed urban centers. Another important distinction for these types of migration streams is that, to a greater extent than rural-to-urban migration, urban-to-urban migration often entails a state-sanctioned permanent move involving a formal change in *hukou* status.

Migration in China, especially from rural-to-urban areas, cannot be fully appreciated without some knowledge of the Household Registration System (or *hukou*), a vestige of the state-controlled economy. This system was established in 1958, and it effectively tied citizens to a specific location within China through residency permits (Chan and Buckingham, 2008). The *hukou* outlines an individual's rights to entitlements. For example, in an agricultural area, the *hukou* entitles the holder to farmland, while a *hukou* in an urban area grants the holder access to jobs, housing, food, and other public services such as medical care, children's schooling, and low income allowance, etc.

Since China's economic reforms in 1978, huge economic and societal changes have taken place which resulted in a large supply of surplus labor, especially in rural areas, but also to a lesser extent in urban areas, especially when the government launched large-scale state-owned enterprise reforms since the 1990s, which laid off millions of urban workers in large factories. With more formal and informal job opportunities available in the urban sector, and a relaxation of the constraints on population movement related to an easing of *hukou* restrictions, migration became one of the most significant phenomena in the last few decades. However, except for a proportion of college graduates who have located a permanent job in an urban area or, in some instances, migrants moving for marriage, few migrants are able to change their *hukou* status to a destination area. This restriction affects the vast majority of rural-to-urban migrants as well as some urban-to-urban migrants, who, without changing *hukou* status, are not fully entitled to social benefits in the migration destination areas. Thus, they are officially considered temporary migrants, or what is known as the 'floating population.'

As a consequence, the number of temporary migrants in China is huge. According to the 1% national population sampling survey, the total number was 70 million in 1993 and amounted to 150 million in 2005. More recently, it has been estimated that the size of the floating population has increased to 200 million (Blue Book of China's Society 2008). Most of these migrants come from rural areas, and about 60% nationally are males. The proportion male is even higher in large cities (Wu 2002). It is important to understand the distinction between temporary migration and permanent migration, since these two types of migration may have different selection processes. For example, temporary migration is more likely to be work-related and could involve many stress-inducing risks, while permanent migration could involve movement for work, marriage, family reunion, and many other factors. Consequently, it is likely

that temporary migration is more selective on dimensions such as health, especially if it originates in rural areas. It is also less likely to be selective on skills, since migrants temporary migrant lacking the proper *hukou* status are likely to be funneled into low-end jobs in the informal sector that lack form educational requirements.

Statement of the Problem

Few studies have empirically examined the selectivity process of migration in China. Among those that have, factors such as education and health have been presumed to be positively selective, although results are mostly based on destination samples. Using the China Health and Nutrition Survey (CHNS) longitudinal data, this study examines the determinants of migration using pre-migration education, health and other characteristics in an effort to understand how the migration selection process operates within places of origin or during the migration decision making process. Our research design improves on existing studies by examining pre-migration conditions with a prospective design that "follows" a group of people, who are age 16 or older, for the course of nine years. The person-wave observations from different survey panels are pooled together to conduct the analysis. The specific design is described below.

Based on the foregoing theoretical and contextual background, we posit the following hypotheses.

Hypothesis A: the degree of selection for skills and health in migration is greater for temporary migrants than for permanent migrants.

Hypothesis B: rural origin migrants are more selected in terms of health than urban origin migrants due to the difference of risk profiles differentiating these two types of migration.

Hypothesis C: rural origin migrants are less selected on skill than urban origin migrants due to labor market segregation caused by the *hukou* system in China.

Hypothesis D: skill and health selection are more prominent for younger ages than older ages.

Data and Methods

Data

In this study, we use a longitudinal dataset, the China Health and Nutrition Survey (CHNS), to examine how pre-migration education and health affect migration status. The CHNS collected seven waves of the survey data over time (in 1989, 1991, 1993, 1997, 2001, 2004, and 2006). Since the distinction between temporary and permanent migration was only specified since 1997, we do not use the 1989 and 1991 waves.

Geographically, the CHNS initially covered eight provinces in China: Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Liaoning and Shandong. In 1997, Liaoning province was replaced by Heilongjiang, a province similar to Liaoning in geographic and other characteristics. In 2001, Liaoning was included in the survey again and Heilongjiang was also kept. We keep all of these provinces in our analysis. The provinces included in the CHNS sample vary substantially in both geographical location and economic development. Together, the sample covers a third of China's population. The characteristics of the households in the sample are comparable to the national averages (Chen 2005).

The CHNS applied a multistage cluster design, with the initial primary sampling units being urban neighborhoods, township neighborhoods, suburban villages and rural villages. The CHNS consists of a household survey, a nutrition survey, a community survey, an ever-married

women survey, and a physical examination. This paper mainly utilizes data from the household and the physical examination surveys.

The prospective design

We use a prospective longitudinal research design to examine the impact of education and health as well as other individual and household characteristics in a given survey wave as predictors of migration status in a subsequent survey wave (i.e., we use a time lag between dependent and independent variables). Data come from five waves of the survey: 1997, 2001, 2004, and 2006. We measure the dependent variable from the data wave following the independent and control variables, so each individual ends up having up to four entries in the analytic dataset. We conduct the migration selectivity analysis based on a comparison between migrants and non-migrants in places of origin. Once someone has experienced the event (i.e., migration) that person does stops contributing records to our analysis sample. We limit our sample to only those aged 16 or older, since this is the legal working age in China. Using such an age limit is reasonable, since children younger than 16 have a completely different migration decision-making process than adults, and they are frequently secondary migrants accompanying their parents.

Measures

Based on family members' proxy reports, we determine whether migration occurring between waves. Our definition of migration takes into account both change in residence and change in household affiliation (or *hukou* status). We distinguish between permanent migration and temporary on the following basis. If a household member claimed that a family member

present in a previous wave has moved out during the interval between the two survey waves, and this individual transferred *hukou* status to a new place in the current wave, then we defined him/her as a 'permanent migrant.' In contrast, if a person has moved, but still claims *hukou* status with the same household, we consider that person a 'temporary migrant.' Thus, in this analysis, we divided migrants into three migration status categories: permanent migrants, temporary migrants, and non-migrants. These three types of migration are mutually exclusive.

Although it would be ideal to obtain information on the purpose of migration for permanent migrants, the data set does not include this specific information. We also recognize the possibility that an individual migrated and moved back and forth between place of origin and place of destination during two adjacent survey waves. Because we do not have data on movement occurring between waves, we are undoubtedly underestimating the incidence of temporary migration (but not permanent migration) in our sample. Unfortunately, we cannot capture this information with our dataset, and we acknowledge this as a drawback. We discuss the implications of these shortcomings in more detail in our conclusion section.

Independent Variables:

Education: We use education as a proxy for human capital or skills a person possesses. Human capital achievements have a significant influence on job market competency, since they are the cognitive basis of labor market activities (Coleman 1990). To better capture educational selectivity, we used years of education, instead of the more conventional measure of highest degree earned. This is a reasonable choice, since the education levels tend to be low in China, especially in rural areas. Thus, using degree would not catch much of the variation among rural residents.

Health: We use pre-migration health status to predict migration status. The CHNS collects extensive information on health. In this study we use both self-rated health status and more objective measures. In the CHNS, the survey asks respondents to subjectively evaluate their health with the following item: "how would you describe your health compared to that of other people your age?" The responses ranged from 1-4, indicating excellent to poor health. Self-reported health perception has been found to strongly predict death, and is generally regarded as a valid indicator of health (Farmer and Ferro 1997; Hays, Schoenfeld, and Blazer 1996; Johnson and Wolinsky 1993). It is also a potent predictor of survival and mortality and has also been found to be strongly correlated with objective measures of health based on physical examinations and medical records (Idler and Angel 1990; Idler and Benyamini 1997). However, some researchers have argued that self-rated health reflects subjective perceptions and thus cannot be consistently applied across individuals (Lu 2010). They advocate instead the use of physical health measures such as problems with activities of daily living (ADLs) and morbidity. In this study, we use principle component analysis to create a health index that incorporates both self-rated health and actual physical health status. The measures we used include self-rated health, ADLs, high blood pressure. The newly formed health index is consistent with self-rated health and explained about 60% of variation in the four measures we used to construct it. We adjusted our measure so its minimum is equal to zero, which gave it a maximum of just under five.

Age: Migration has also been shown to depend on the individual's position in the life cycle (Clark and Hunter 1992). Older people are less likely to migrate since they have less time to pay back investments for the migration, and the opportunity for them to find a job is relatively rare comparing to young adults. Besides, they are socially more oriented in places of origins and it is more difficult from them to learn the culture and customs of new places. Thus, after

excluding children, age is expected to have a negative impact upon migration. However, age could also modify the impact of health and skill on migration, thus, the interaction term of age and health as well as age and skill will be tested. As we did not find evidence of an age-skills interaction, we did not include it in our final model.

Gender: there are significant gender differences in the likelihood of migration (Presser, 1999; Kanaiaupuni, 2000; Curran et al. 2006). In the Chinese context, males are more likely to migrate to seek economic opportunities, while females frequently are more involved in marriage migration (Fan and Li 2002). However, in more recent decades, women have also tended to migrate to seek paid labor (Liang and Chen 2004). Our measure is a dummy variable for gender equal to '1' for males and '0' for females.

Marital Status: Family responsibilities play a significant role in the migration decision-making process. Married people are less likely to migrate (Ruggles 1992) since migration interrupts family life. We operationalized marital status using dummy variables for the following categories: never married, married, post-married (i.e., divorced/separated and widowed). Never-married people are expected to be more likely to migrate than those who are currently married, because they have the fewest family obligations. Since marital status might impact men and women's migration differently, we include an interaction between gender and marital status.

Familial Attachment Variables: Other family attachments could also intervene in the process of the migration decision. If family size is large, then a person probably would have less responsibility to stay home to take care of elderly parents or very young children (Kulu & Milewski 2007). To fully incorporate family responsibility impacts on migration, we included variables measuring features of intergenerational co-residence. Among these, we measure whether the parents (i.e., oldest generation of family members) of potential migrants (i.e., the

middle generation of family members) reside in the origin household. We distinguish between whether both parents, neither parent, and only one parent resides in the household. We also control for whether any children (i.e., the youngest generation family members) younger than age 12 reside in the household to indicate the potential psychological cost of leaving young children behind. Another variable we include to show family attachment is whether a spouse (of the middle generation) is living at home.

Household Economy: We use household income per capita to indicate household socioeconomic status (Pham and Hill 2008). Household income per capita is expressed in constant terms using monetary values converted to their value in the year 2006. We use constant monetary values across all waves because China experienced tremendously economic growth since the reform era. Comparing income at different waves would not catch their real purchasing power since inflation rates were high during the economic expanding period, and purchasing power was not constant. We use the log form of household income to normalize the variable's skewness.

Region: migration selectivity may also vary across regions, due to different stages of socioeconomic development. As CNHS includes quite a wide range of regions in different development stages, there is a significant socioeconomic gap among the studying areas. Due to the wage gap among these areas, some of these regions are more likely to be migrant sending areas than others. Thus, we divided the sample into four groups: 1) the coastal area of Shandong and Jiangsu provinces which are more economically developed; 2) the northeast areas of Liaoning and Heilongjiang in the middle spectrum of development; 3) the inland areas of Henan, Hubei and Hunan in middle less developed areas, and 4) the southwest mountain area of Guangxi and Guizhou which are far less developed in China. The division of regions may not be able to

fully capture the socioeconomic development of migration since the development gap within provinces could also be large. Thus, this variable is at best a proxy indicating development as well as cultural factors.

Data Wave: We also use a measure that controls for survey wave, to account for the impact of period-specific factors. Migration streams have changed largely in terms of size, composition, and flow in recent decades (Fan 2005). Over time, as migration becomes prevalent, it becomes increasingly easier for anyone who desires to migrate to do so. This is because social network ties connecting former and prospective migrants become established that increase the benefits to migration while lowering the risks involved (Curran et al. 2005; Krissman 2005; Massey et al. 1987; Massey et al. 1993; Palloni et al. 2001). Thus, among other things, these measures could be a proxy for the development of migrant networks, although they also capture changes in such things as economic development level.

Analytical Approach

We use a competing risk event history analysis model as our analytical approach. We estimate coefficients associated with temporary and permanent migration in reference to non-migration using a multinomial probit specification. Robust standard errors are used to account for the clustering of individual within households, because individuals in the same household tend to be affected by similar unobserved household socioeconomic status and family need. They are also more likely to be genetically connected and have similar socialization in their life experiences. To assess the magnitude of the effects of select variables, we compute micro-simulated predicted probabilities. These probabilities use coefficient estimates from our model, in conjunction with the actual values of the underlying data. We vary the values of a particular variable in order to determine how doing so changes the probability of migration. As past research usually examines

rural and urban areas separately, because of the sharp rural-urban divide in China, we also conduct our analysis separately for rural and urban areas. Furthermore, we estimate a pooled model that uses the entire analytical sample.

[Table 1 about here]

Results

Descriptive statistics

Table 1 lists the distribution of migration status by origin type for respondents included in the study. The majority of people (almost 88%) did not meet our definition of migration. The large incidence of non-migration is an expected and common phenomenon. A little over 12 percent of respondents moved out from the original households across two adjacent waves. Among them, about half moved permanently. Notably, there are more temporary out-migrants in rural areas than in urban areas, which emphasizes the fact that urban migration is more likely to be state-sanctioned. The percentage of migrants has largely increased in more recent waves (*not shown in the table*).

[Table 2 about here]

Table 2 shows means or percentages and standard deviations of the independent variables in the analysis for the full sample and for the rural and urban subsamples. About 73 percent of the entire sample lives in rural areas, which is the approximate proportion of rural residents over the whole of China in the 1990s. Recently the urbanization process has become more rapid and rural residents have been reduced to about 64 percent (Zhou and Ma 2003). With regard to their health status, the average health status index is 3.56 for overall sample, and 3.58 vs. 3.51 for rural and urban samples, respectively. These numbers are all close to the middle of the distribution for this measure. The slight difference across rural and urban areas is probably due to the difference in

the population age structure of the regions. The average age for the sample is 44.05, and urban people are slightly older, on average, than rural people. The proportion of males and females is about the same. China has high marriage rate and very low divorce rate, thus nearly 78% of respondents who are age 16 or older are married, in both rural and urban areas.

For family attachment variables, about 17% have both parents in the origin households, 5% have only one parent in household, and the majority (78%) does not have any parents residing in the origin households. The absence of parents could be due to death or migration. About 70% of cases had a spouse living at home before they were at risk of migrating, and about 26% of them had young children less than 12 years old living at home, which shows their family attachment to home before migration could be significant, but is mainly limited to direct family members. The average household size is around four people, with only slight variation in rural and urban subsamples. Household income per capita expressed in 2006-adjusted currency is, on average, 2,878 Chinese Yuan for rural residents and 4,963 for urban residents (7.90 and 8.22 in logged values respectively), which is about the average at the national level.

At the macro-level, there is also no obvious rural-urban disparity in terms of sample distribution across regions, since the sample is relatively equally distributed across coastal, northeast, inland and southern mountain areas, as is the distribution across waves**.**

[Table 3 about here]

Multinomial Probit Model Results

Table 3 displays results of the multinomial probit regression of migration on the health index, years of education, and other individual, household, and macro level variables for the aggregate

sample, and rural and urban subsamples. We will first discuss the results for the full sample, and then by rural and urban subsamples.

[Table 4 about here]

Health has a positive effect on migration for both permanent and temporary moves. Thus, there is support for the "healthy people migrate" hypothesis. For permanent migration, the main effect of age is not significant, in contrast to the main effects of health and the interactive effect of health and age. Because of the lack of significance of the main effect of age, we do not interpret the interactive effect of age and health. Instead, we only interpret the main effect of health. Predicted probabilities, shown in Table 4, indicate that the probability of permanent migration increases from about 2 percent for someone with the minimum health (i.e., an index score of zero) to 4 percent for someone with approximately median health (i.e., an index score of 3), to 7 percent for someone with approximately the highest health status (i.e., an index score of 5).

For temporary migration, the main effects of health and age are statistically significant, as is the interaction effect of the two. While health has a positive impact, the main effect of age and the interaction effect of age and health have negative effects, suggesting that the positive health effect diminishes with age. In calculating predicted probabilities, we varied both the effect of age and health. For health, we chose the same values as before (i.e., 0, 3, 5) while for age, we examined the ages 16, 25, 35, 45, and 55. Predicted probabilities show that the likelihood of temporary migration generally increases within each age range as health status increases, except at the highest age range. Within each health status, the probability of migration decreases with age. Considering the consequences of increasing both age and health status, the overall pattern is one of decreasing migration propensity.

In terms of education selectivity, permanent migration is quite different from temporary migration. As hypothesized, migrants are positively selected for education, but only for permanent migration. We examined the probability of permanent migration across the range of education, evaluating the probability at roughly the minimum (i.e., 0), first quartile (i.e., 4), median (i.e., 7), third quartile (i.e., 9) and maximum (i.e., 18). According to predicted probabilities in Table 4, when the years of education are 0 or 4 years, the chance of migration is about 4 percent. When years of education increases to 7, the chance of permanent migration increases 5 percent, and it reaches a high of 8 percent at the maximum, 18 years of education. The fact that education does not impact temporary migration in this study probably reflects China's segregated labor market. Temporary migrants are more likely to seek informal employment, which has lower requirements on education, while permanent migration frequently involves high human capital investment.

Turning to control variables, we find significant effects of marriage and gender, which we include as an interaction in our model. The reference category for the main effects of marital status and gender, as well as their interactive effects, is never-married women. Because of the interaction, the main effect of gender (i.e., 'male' in our model) can be interpreted as the effect for never-married men, while the main effects of marital status (i.e., 'currently married' and 'divorced or widowed') are for women in these categories. Results shows that never-married men are significantly less likely to migrate (both permanently and temporarily) compared to never-married women. Currently married women are also less likely to engage in either kind of migration. Divorce women are less likely to migrate temporarily. Married males are more likely to migrate (both permanently and temporarily) compared to never-married women. Results probably reflect men's role as a 'breadwinner' who seeks employment opportunities through

migration in order to support the family of procreation following marriage. Women's higher likelihood of migrating before getting married probably reflects the 'home-maker' role of married women.

Among family attachment variables, having children younger than 12 years old in the household does not seem to affect either permanent or temporary migration in the full sample. This may imply that intergenerational support from grandparents helping to take care of grandchildren in the parents' absence is still common in China. Another possibility is that a spouse remaining at home takes care of the child, although we find the effect of spouse has a negative effect on every form of migration. When we examine the residence of the parents of potential migrants (i.e., the grandparents of these young children), we find that compared to having both parents residing at home, people having only one parent at home, or having no parents at home, are less likely to migrate permanently. Having neither parent at home makes people less likely to migrate permanently. Thus, it seems that parents are not a barrier to migration. Rather, having both parents at home promotes migration.

Household size has a positive impact on both permanent and temporary out-migration. Also, as expected, a better economic status (as indicated by household income) lowers the probability to migrate, but it only does so for temporary migration. In the Chinese context, this makes sense, because the majority of temporary migration is aimed at improving the family financial situation instead of developing the work career of movers. The full sample model also includes a dummy variable distinguishing whether the household originates from a rural or urban area. It shows that urban households are more likely to have permanent migrants, while rural households are more likely to have temporary migrants. This is to be expected, because of the difficulty of changing *hukuo* status for China's largely rural population.

At the macro level, northeast people are less likely to out-migrate compared to the coastal area, but inland and southwest mountain area people are more likely to migrate temporarily. This is not the case for permanent migration. Across waves, for permanent migration, in the more recent two wave intervals, people are more likely to migrate than in the first wave. For temporary migration, all the later periods have much higher migration rates compared to the first wave.

Table 3 also provides results for rural and urban sample separately. It shows that rural out-migration and urban-out migration have different patterns of migration selectivity with regard to health, as well as age. Age has a negative impact on rural temporary migration, but it is not significant for any other migration stream. Education does not show any differences across rural and urban origins. Its effect is similar to the full sample, in which only permanent migration is selected by years of education.

In the rural sample, gender and marital status have a similar impact on migration compared to the full sample model, but some of the statistically significant impacts disappear for temporary migration for the urban sample. Having children younger than 12 years of age is a barrier for rural people migrating temporarily, but this is not the case for permanent migration and temporary migration in the urban context. Having a spouse resident in the origin household lowers the probability of migration in both rural and urban origins. Having parents at home has no impact on rural temporary migration, but it does impact permanent migration in an opposite direction as we expected. Among three types of family attachment variables, the connection to spouse seems to be the most important family tie impacting migration. Household income and household size do not show any disparities across rural and urban areas. At the macro level, the region variable does not show a clear pattern on migration selectivity. The effect of wave is similar to the full sample.

Conclusion

This paper utilizes a longitudinal dataset to examine pre-migration selection factors, including education, health, and age in the context of internal migration in China. The preceding analysis yields four major findings. First, although the "healthy people migrate hypothesis" is supported in the full sample analysis, further exploration revealed that the "healthy people migrate" hypothesis only applies in the rural setting, but not the urban context. Secondly, we also found that health selectivity on migration is moderated by age, at least for temporary migrants. In this stream, the health advantage diminishes with age. Passed middle age (around 45 years old), health-selective migration almost disappears. Third, although skill selectivity does not present a rural-urban disparity, it indeed is different between permanent and temporary migration. In this study, only permanent migration is selected by skill, not temporary migration. Fourth, family responsibilities seem not to form a great barrier to out-migration. In some situations, they even encourage migration.

The first key finding sheds new light on "health-migration" studies. It is been long assumed in many of previous studies that "healthy people migrate" (Palloni and Morenoff 2001), but very few studies empirically examined this idea except Lu (2008). This study shows that it is a wrong perception to assume migrants are positively selected in terms of their health. Studies should pay more attention to the types of migration streams in which migration is observed before making inferences about selectivity. In this study, rural out-migration has more potential to be selective based on health, which probably indicates that rural out-migration involves more stress or risks related to health. For example, potential work and settlement conditions in destination areas could be very stressful, involving slum housing and dangerous working

conditions. In addition, the lack of monetary support and benefits of medical service in destinations present great barriers for those migrating.

In contrast, urban out-migration usually involves much less stress and risk, and is therefore much less selective on health status. Often, urban migrants take less labor intensive jobs and have living environments that are much better compared to rural migrants. Thus, the risk profile involved in migration is an important factor affecting the health-migration relationship. Our study also finds that health selectivity disappeared for those older than 45 years, probably because potential migrants are less likely to migrate to seek lower-end positions after they passed through middle age. The potential migration is not as risky as it is for those who are migrating at younger ages.

Although education has been largely examined in previous migration studies, very few studies have made a distinction among different types of migrations when studying skill selectivity. This paper shows that positive skill selectivity only exists for permanent migration. This is consistent with China's economic and political contexts. Permanent migrants are more likely to enter the formal employment sector, while temporary migrants are more likely to pursue informal sector work, like labor intensive positions, which require lower skills and education in a dual labor market economy. This raises an important warning to researchers who frequently assume migrants are positively selected without considering the type of migration and the potential risk involved in the migration process.

This study may have some limitations which could jeopardize our ability to generalize of the study findings. First, although it is a longitudinal data with decent national coverage, it does not have detailed information on the timing, and duration, and circumstances of movements. Thus, we cannot know where migrants have been and what kinds of jobs or opportunities they

have been taking, which may further confound the migration selection process. Second, some people probably migrated in a circular fashion (perhaps seasonally) during two adjacent waves, but we cannot capture this information in our data, and we treat them as non-migrants. This may bias results by understating the incidence of temporary migration. Furthermore, with China's unique sociopolitical orientation and *hukou* system, the conclusions drawn from this study may not be easily generalized to other settings.

Future research should endeavor to collect longitudinal event data on migration to overcome some of the shortcomings of our study. It should also collect more detailed information on migration networks, community structure, and economic changes, which our model only captures using crude proxy measures. Despite its shortcomings, our study adds valuable insights into migration selectivity and studies of internal migration in China. Although migration in China constitutes perhaps the largest flow in the world, few studies of this context have examined flows from a migration-sending region perspective, and not many studies of migration selectivity from other settings examine selectivity in as detailed a fashion.

References:

Blue Book of Chinese Society, 2009. Society of China: Analysis and Forecast In: X. Ru, X. L., & P.L. Lin, Ed. Social Science Academic Press, Beijing, China.

Borjas, G., 1987. Self-selection and the earnings of immigrants. *American Economic Review* 77**,** 531-553.

Chan, K.W., 1996. Post-Mao China: A Two-Class Society in the Making. *International Journal of Urban and Regional Research* 20**,** 134-150.

Chan, K.W., and Will Buckingham, 2008. Is China Abolishing the Hukou System? *The China Quarterly* 195**,** 582-606.

Chen, F., 2005. Residential Patterns of Parents and Their Married Children in Contemporary China: A Life Course Approach. *Population Research and Policy Review* 24**,** 125-148.

Chiswick, B., 1999. Are immigrants favorably self-selected? *American Economic Review* 89**,** 181-185.

Clark, D.E., and W.J. Hunter, 1992. The impact of economic opportunity, amenities, and fiscal factors in age-specific migration rates. *Journal of Regional Science* 32**,** 349-365.

Coleman, J., 1990. *Foundations of Social Theory*. Belknap.
Constant, A., and Douglas S. Massey, 2002. Return Migration by German Guestworkers: Neoclassical versus New Economic Theories. *International Migration* 40**,** 5-36.
Curran, S.R., Filiz Garip, Chang Y. Chung, and Kanchana Tangchonlatip, 2005. Gendered Migrant Social Capital: Evidence from Thailand. *Social Forces* 84**,** 227-256.
Curran, S.R., S. Shafer, K.M. Donato, and F. Garip, 2006. Mapping Gender and Migration in Sociological Scholarship: Is it Segregation or Integration? *International Migration Review* 40**,** 199-223.
Fan, C.C., and Ling Li, 2002. Marriage and Migration in Transitional China: A Field Study of Gaozhou, Western Guangdong. *Environment and Planning A* 34**,** 619-638.
Fan, C.C., 2005. Migration, Hukou, and the City, *China Urbanizes: Consequences, Strategies, and Policies*
Farmer, M.M., and Ferraro Kenneth, 1997. Distress and Perceived Health: Mechanisms of Health Decline. *Journal of Health and Social Behavior* 38**,** 298-311.
Findley, S.E., 1988. The Directionality and Age Selectivity of the Health-Migration Relation: Evidence from Sequences of Disability and Mobility in the United States. *International Migration Review* 22**,** 4-29.
Hays, J.C., Schoenfeld David E., Blazer Dan G, 1996. Determinants of Poor Self-Rated Health in Late Life. *American Journal of Geriatric Psychiatry* 4**,** 188-196.
Hildebrandt, N.M., David J. & World Bank, 2005. *The effects of migration on child health in Mexico*. Washington, D.C.
Idler, E.L., and Benyamini Yael., 1997. Self-Rated Health and Mortality: A Review of Twenty-Seven Community Studies. *Journal of Health and Social Behavior* 38**,** 21-37.
Idler, E.L., and Angel Ronald J., Age, Chronic Pain, and Subjective Assessments of Health. 1990. *Advances in Medical Sociology* 1**,** 131-152.
Johnson, R.J., and Wolinsky Fredric D., 1993. The Structure of Health Status among Older Adults: Disease, Disability, Functional Limitation and Perceived Health. *Journal of Health and Social Behavior* 34**,** 105-121.
Kanaiaupuni, S.M., 2000. Reframing the Migration Question: An Analysis of Men, Women, and Gender in Mexico. *Social Forces* 78**,** 1311-1347.
Krissman, F., 2005. Sin Coyote Ni Patrón: why the "migrant network" fails to explain international migration. *International Migration Review* 39**,** 4-44.
Kulu, H., and Nadja Milewski, 2007. Family change and migration in the life course: An introduction. *Demographic Research* 17**,** 567-590.
Lee, E., 1966. A theory of migration. *Demography* 3**,** 47-57.
Li, B., 2006. Floating Population or Urban Citizens? Status, Social Provision and Circumstances of Rural–Urban Migrants in China. *Social Policy and Administration* 40**,** 174-195.
Liang, Z., and Yiu Por Chen, 2004. Migration and Gender in China: An Origin-Destination Linked Approach. *Economic Development and Cultural Change* 52**,** 423-443.
Lu, Y., 2008. Test of "Healthy Migrant Hypothesis': A Longitudinal Analysis of Health Selectivity of Internal Migration in Indonesia. *Social Science and Medicine* 67**,** 1331-1339.
Lu, Y., 2010. Rural-urban Migration and Health. *Social Science and Medicine* Forthcoming.
Massey, D.S., R. Alarcón, J. Durand, H. González, 1987. *Return to Aztlan: The Social Process of International Migration from Western Mexico*. University of California Press, Berkeley, CA.

Massey, D.S.A., G. Hugo, A. Kouaouci, A. Pellegrino, and J.E. Taylor, 1993. Theories of International Migration: A Review and Appraisal. *Population and Development Review* 19**,** 431-446.

Palloni, A., and Morenoff J.D. , 2001. Interpreting the paradoxical in the hispanic paradox: demographic and epidemiologic approaches. *Annals of the New York Academy of Sciences* 954**,** 140-174.

Patrick, C.H., 1980. Health and Migration of the Elderly. *Research on Aging* 6**,** 233-241.

Pessar, P.R., 1999. Engendering Migration Studies: The Case of New Immigrants in the United States. *American Behavioral Scientist* 42**,** 577-600.

Pham, B.N., and Peter S. Hill, 2008. The Role OF Temporary Migration in Rural Household Eeconomic Strategy in a Transitional Period For The Economy of Vietnam. *Asian Population Studies* 4**,** 57-75.

Ruggles, 1992. Migration, Marriage and Mortality: Correcting Sources of Bias in English Family Reconstitutions. *Population Studies* 46**,** 507-522.

Shen, J. 2000. "Chinese urbanization and urban policy." in *China Review 2000*, edited by C.M. Lau, and J Shen. Hong Kong: Chinese University Press.

Shen, J., K. Wong and Z. Feng 2002. State-sponsored and spontaneous urbanization in the Pearl River Delta of South China, 1980–1998. *Urban Geography* 23**,** 674-699.

Shen, J., and Yefang Huang, 2003. The working and living space of the the "Floating population" in China. *Asia PaciÞc Viewpoint* 44**,** 51-62.

Sjastaad, L.A., 1962. The Costs and Returns of Human Migration. *Journal of Political Economy* 70S**,** 80-93.

Solinger, D.J., 1999. China's Floating Population: Implications for State and Society. In: Goldman, R. M. a. M., (Ed., *The Paradox of China's Post-Mao Reforms*. Harvard University Press, Cambridge.

Taylor, E.J., and Philip Martin, 2001. Human Capital: Migration and Rural Population Change. In: Gardner, B. L. a. G. C. R., (Ed., *Handbook of Agricultural Economics*. New York, NY, Elseveir.

Taylor J.E. and Martin, P., 2001. *Human Capital: Migration and Rural Population Change, Handbook for Agricultural Economics*. Elsevier Science New York.

Thomas, K.J., 2008. Return Migration in Africa and the Relationship between Educational Attainment and Labor Market Success: Evidence from Uganda. *International Migration Review* 42**,** 652-674.

Tobler, W., 1995. Migration: Ravenstein, Thorntwaite, and Beyond. *Urban Geography* 16**,** 327-343

Todaro, M.P., 1969. A Model of Migration and Urban Unemployment in Less-Developed Countries. *The American Economic Review* 59**,** 138-148.

Wu, W., 2002. Migrants Housing in Urban China: Choices and Constraints. *Urban Affair Review* 39**,** 90-119.

Zhou, Y., and Laurence J. C. Ma 2003. China's Urbanization Levels: Reconstructing a Baseline from the Fifth Population Census. *The China Quarterly* 173**,** 176-196.

Table 1. Percentage Distribution of Migration, by Origin Type

	Full Sample	Rural	Urban
Migration Type			
Permanent	6.13	5.96	6.57
Temporary	6.04	6.92	3.65
Non-Migrant	87.84	87.12	89.77
Number of Cases	28,529	20,813	7,716

Table 2. Descriptive Statistics for Independent and Control Variables

	Full Sample		Rural Sample		Urban Sample	
Variable	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Selectivity Variables						
Health Index	3.56	0.79	3.58	0.75	3.51	0.88
Education (years)	6.58	4.11	6.01	3.83	8.10	4.42
Age	44.05	15.86	43.03	15.42	46.82	16.69
Individual-Level Demographic						
Male	0.49	0.50	0.49	0.50	0.48	0.50
Marital Status						
Never Married	0.15	0.36	0.16	0.36	0.14	0.35
Currently Married	0.78	0.42	0.78	0.41	0.77	0.42
Divorced or Widowed	0.07	0.25	0.06	0.24	0.09	0.28
Household-Level (Origin Household)						
Have any children (age 12 or younger)	0.26	0.44	0.27	0.44	0.22	0.41
Spouse is Resident	0.70	0.46	0.70	0.46	0.71	0.46
Parents' Residence						
Both Parents in Household	0.17	0.37	0.17	0.37	0.14	0.35
Only One Parent in Household	0.05	0.22	0.05	0.22	0.06	0.24
Neither Parent in Household	0.78	0.41	0.78	0.41	0.80	0.40
Household Income[a]	7.99	0.97	7.90	0.96	8.22	0.98
Household Size	4.07	1.50	4.23	1.49	3.64	1.42
Rural Household	0.73	0.44	--	--	--	--
Macro-Level						
Region						
Coastal	0.24	0.43	0.25	0.43	0.22	0.41
Northeast	0.13	0.33	0.13	0.34	0.12	0.33
Inland	0.36	0.48	0.35	0.48	0.40	0.49
Southern Mountain	0.27	0.45	0.28	0.45	0.26	0.44
Data Wave						
1993-1997 Wave	0.20	0.40	0.20	0.40	0.20	0.40
1997-2000 Wave	0.29	0.45	0.29	0.45	0.30	0.46
2000-2004 Wave	0.22	0.41	0.23	0.42	0.21	0.40
2004-2006 Wave	0.28	0.45	0.28	0.45	0.29	0.45
N	28,529		20,813		7,716	

Table 3. Multinomial Probit Estimates of Migration Against Selectivity Variables and Controls

	Full Sample				Rural Sample				Urban Sample			
	Permant vs. Non-Migration		Temporary vs. Non-Migration		Permant vs. Non-Migration		Temporary vs. Non-Migration		Permant vs. Non-Migration		Temporary vs. Non-Migration	
	Coeff	Std Err	Coeff	Std Err	Coeff	Std Err	Coeff	Std Err	Coeff	Std Err	Coeff	Std Err
Intercept	-1.045**	-0.357	-1.612***	-0.359	-1.091**	-0.42	-0.818*	-0.396	-1.244	-0.654	-2.365**	-0.762
Selectivity Variables												
Health Index	0.258***	-0.0758	0.273***	-0.0767	0.287**	-0.0889	0.223*	-0.0895	0.2	-0.146	0.25	-0.156
Education (years)	0.0384***	-0.00719	0.00977	-0.00664	0.0396***	-0.0087	0.00468	-0.00741	0.0276*	-0.0129	0.0169	-0.0134
Age	-0.00514	-0.00636	-0.0160*	-0.00633	-0.00246	-0.00767	-0.0316***	-0.00779	-0.0114	-0.0118	0.00684	-0.0108
Individual-Level Demographic												
Male	-0.914***	-0.061	-0.231***	-0.0691	-1.034***	-0.0708	-0.302***	-0.0787	-0.599***	-0.121	-0.0282	-0.153
Marital Status												
Never Married	--	--	--	--	--	--	--	--	--	--	--	--
Currently Married	-0.825***	-0.103	-0.648***	-0.0976	-0.965***	-0.128	-0.793***	-0.112	-0.444*	-0.177	-0.284	-0.202
Divorced or Widowed	-0.166	-0.147	-0.297*	-0.141	-0.0967	-0.192	-0.138	-0.167	-0.159	-0.224	-0.618*	-0.267
Household-Level (Origin Household)												
Have any children (age 12 or younger)	-0.0204	-0.0593	-0.094	-0.0506	-0.0905	-0.0727	-0.140*	-0.0567	0.147	-0.104	-0.00881	-0.116
Spouse is Resident	-0.452***	-0.0719	-0.477***	-0.0635	-0.412***	-0.0889	-0.444***	-0.0719	-0.549***	-0.125	-0.539***	-0.139
Parents' Residence												
Both Parents in Household	--	--	--	--	--	--	--	--	--	--	--	--
Only One Parent in Household	-0.403***	-0.0799	-0.0944	-0.0775	-0.295**	-0.0969	0.03	-0.0902	-0.526***	-0.14	-0.335*	-0.159
Neither Parent in Household	-1.279***	-0.0802	-0.325***	-0.0736	-1.265***	-0.0981	-0.164	-0.0859	-1.286***	-0.142	-0.705***	-0.146
Household Income[a]	-0.034	-0.0225	-0.0684***	-0.0204	-0.0452	-0.0275	-0.0620**	-0.0229	-0.0205	-0.0393	-0.118**	-0.0428
Household Size	0.160***	-0.0159	0.0801***	-0.0147	0.169***	-0.0189	0.0889***	-0.0171	0.144***	-0.0301	0.0741*	-0.0303
Rural Household	-0.172***	-0.0499	0.282***	-0.0489	--	--	--	--	--	--	--	--
Macro-Level												
Region												
Coastal	--	--	--	--	--	--	--	--	--	--	--	--
Northeast	0.0417	-0.0723	-0.300***	-0.073	-0.0568	-0.087	-0.438***	-0.0837	0.304*	-0.134	0.206	-0.157
Inland	0.0273	-0.054	0.117*	-0.0518	-0.0192	-0.0648	0.0416	-0.0592	0.175	-0.102	0.462***	-0.12
Southern Mountain	-0.02	-0.0576	0.117*	-0.0561	-0.12	-0.0679	0.0129	-0.064	0.234*	-0.112	0.510***	-0.13
Data Wave												
1993-1997 Wave	--	--	--	--	--	--	--	--	--	--	--	--
1997-2000 Wave	-0.139*	-0.0583	0.415***	-0.0563	-0.0514	-0.07	0.447***	-0.063	-0.309**	-0.108	0.384**	-0.133
2000-2004 Wave	0.314***	-0.0623	0.764***	-0.0625	0.450***	-0.0744	0.797***	-0.0708	0.0705	-0.116	0.807***	-0.141
2004-2006 Wave	0.289***	-0.0655	0.984***	-0.0626	0.376***	-0.0802	1.059***	-0.0709	0.201	-0.115	0.929***	-0.14
Interactions												
Male × Married	0.634***	-0.0871	0.734***	-0.0861	0.706***	-0.105	0.905***	-0.0982	0.410*	-0.16	0.245	-0.185
Male × Divorced or Widowed	0.223	-0.231	-0.0785	-0.221	0.196	-0.293	-0.0434	-0.251	0.171	-0.385	-0.264	-0.5
Health Index × Age	-0.00544**	-0.00173	-0.00491**	-0.00174	-0.00722***	-0.00207	-0.00364	-0.00217	-0.00259	-0.00321	-0.00411	-0.00286
N	28529				20813				7716			
-2LL	19,194.76				14,329.48				4,708.85			

* p<0.05, **p<0.01, *** p<0.001

[a] Income is inflation adjusted and appears in logged form

Table 4. Predicted Probability of Migration for Education and Health at Different Ages (Full Sample)

Permanent Migration

Education Level	Probability	Health Score	Probability
0	0.04	0	0.02
4	0.04	3	0.04
7	0.05	5	0.07
9	0.06		
18	0.08		

Temporary Migration

Probability		Health Score	
Age	0	3	5
16	0.03	0.09	0.15
25	0.02	0.05	0.09
35	0.02	0.03	0.05
45	0.01	0.02	0.02
55	0.01	0.01	0.01