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Residential mobility of skilled migrants in Nanjing, China

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Abstract. Economic restructuring and the dramatic expansion of higher education have generated large migration flows of skilled employees to Chinese cities. The residential mobility of skilled migrants has a large impact on the operation of housing and labour markets and the (re)production of social inequities. In this paper we examine the effects of life-course trajectories and institutional factors on the residential mobility of skilled migrants, in comparison with local skilled workers in Nanjing, using a retrospective survey conducted in 2012. Results show that skilled migrants have a higher level of residential mobility than their local counterparts, and that this difference arises from the locals' early entry into homeownership. Yet, migrants and locals also share similarities: market factors that are closely related to household, labour, and housing careers are decisive in explaining the residential mobility of skilled workers, indicating that life-course theories are also applicable in the Chinese context. The impacts of traditional institutional factors, such as *hukou*, employer type, and Chinese Communist Party membership, are of a much smaller magnitude, indicating that markets have become dominant institutions in China.

Keywords: residential mobility, skilled migrants, Nanjing

Introduction

In the socialist era, migration was strictly controlled by Chinese governments mainly by means of the hukou (household registration) system, which functioned as an internal passport and was linked to the allocation of food, housing, health care, and educational benefits (Chan et al, 1999). Owing to the launch of economic and hukou reforms in the 1980s and 1990s, hukou regulations have been relaxed, bringing massive waves of internal migrants. Rural migrants moved from the countryside to the cities as a result of the income disparities between urban and rural areas (Wu, 2004b). In recent years China has been experiencing radical economic restructuring and industrial upgrading (Wei and Liefner, 2012). Hence, the employment structure in Chinese cities is gradually shifting away from basic manufacturing towards a more diverse range of positions. Economic progress has raised the demand for skilled labour. Meanwhile, on the supply side, the dramatic expansion of higher education across the country starting from 1999 resulted in a tremendous increase in the number of graduates from 1.07 million in 2000 to 6.99 million in 2013, which has substantially enlarged the skilled labour pool for knowledge-intensive industries (Liu and Shen, 2014). Consequently, a large population of skilled migrants has entered the labour market in cities in recent years.

The increasing level of labour mobility has brought challenges to the provision of housing in urban China. Unlike the 'floating population', many of whom aim to go back to their home town eventually, skilled migrants have a stronger tendency to settle down permanently and to realize their dream of homeownership in destination cities (Wang, 2010; Yue et al, 2010). Therefore, they need to be viewed as prospective citizens. However, the primary difficulty

faced by these 'prospective citizens' is the tight housing market in cities. Given the shortage in supply of affordable housing, many new college graduates have no choice but to settle for substandard housing at the beginning. 'Ant tribe' is a recently invented term, referring to the immense numbers of young skilled migrants who are underemployed and gather in cheap and overcrowded lodgings in peripheral areas, urban villages, or even basements (Li, 2012; Lian, 2009). The poor living conditions faced by the so-called emerging 'middle class' in urban China have attracted a great deal of attention from media, government, and scholars (Gu et al, 2013).

However, very little is known about what happens in their later housing career, how frequently they make residential moves, and what drives those moves. Residential mobility, which is a housing-adjustment process, has a tendency to covary with socioeconomic mobility (Wu, 2006). Better understanding of their residential mobility is essential for the study of adaptation of migrants and has implications for housing-related policies (Wu, 2006). The existing literature addressing Chinese housing issues focuses mainly on rural migrants and fails to differentiate skilled migrants, who may show a different mobility pattern. As prospective citizens, skilled migrants' residential mobility has considerable impacts on the operation of housing and labour markets and the (re)production of social inequities (Coulter et al, 2013).

The most recent research on residential mobility has been set in the life-course framework, which focuses on sequences of life events, the probability of their occurrence, and the linkages between these life events (Clark and Huang, 2003). Adopting the life-course approach and using a retrospective survey collected in 2012–13, this paper aims to reveal how the likelihood of moving is influenced by life-course trajectories and institutional factors, and to identify the factors that are capable of explaining the differences in residential mobility between skilled migrants—'prospective citizens'—and their local counterparts—'established citizens'. Among the six occupational categories used in the Chinese Population Census, professional/technical and administrative/managerial occupations are classified as skilled jobs in this paper; the other four categories are agricultural occupations, production occupations, sales and service occupations, and clerical occupations.

Theoretical framework

Residential mobility is seen as a spatial equilibrating process that aims to close the gap between a household's desired level of housing consumption and actual consumption (Rossi, 1980). Since the 1990s the life-course approach has proved to be a powerful instrument in developing a theoretical framework encompassing both 'microlevel' and 'macrolevel' factors pertaining to residential relocation (Mulder and Hooimeijer, 1999). An individual's life history is seen as a meaningful succession of life events (Elder et al, 2003). These events do not necessarily proceed in a given sequence, which is distinct from uniform life-cycle stages. Life events belonging to the same domain of life are grouped into a career, such as the household career, the education career, the housing career, and the labour career, which run parallel to each other (Willekens, 1999). The progression in one parallel life-course trajectory is usually accompanied by changes in the need for housing and thereby triggers a residential move, but not always simultaneously; lead and lag effects are observed (Feijten and Mulder, 2005). Parallel careers not only trigger, but also condition, actual relocation through their effects on the choice set that people have (Mulder and Hooimeijer, 1999).

The life-course approach allows for the analysis of more than one process at a time, so the household, education, labour, and housing careers can be linked in an interactive manner (Clark, 2012). There are widely recognized relations between the household career and moving behaviour: a change in household composition which is linked to the need for space compels a household to reassess the suitability of their current dwelling (Mulder, 2007).

In particular, a change in marital status and the birth of a child act as triggers for a residential move (Li, 2004).

Some empirical studies show that attainment in the educational trajectory is positively related to the level of residential mobility (Clark and Huang, 2003; Vlist et al, 2002). There is also a clear relation between residential moves and the labour career. Occupational changes and the timing of these changes also influence their demand for housing and their ability to meet housing costs (Clark, 2012). People often need to move if they accept a job located beyond commuting distance (Van Ham, 2002).

The housing trajectory is shown to be of great importance to residential mobility. Homeownership is known to have an impeding effect on moving, because the desire to buy a home is likely to arise only among people who do not foresee themselves moving again soon (Mulder and Wagner, 1998). Renting households are more likely to be in the initial stage of their housing career, to be setting up families, and to have no assets to finance a home. More established households are probably owner-occupiers (Clark, 2012). The space of a dwelling also matters for the relocation decision. Households in smaller dwellings suffer from 'room stress' and thus are more likely to make a residential move (Clark and Huang, 2003; Dieleman, 2001).

The life-course perspective is not only capable of specifying the effect of the role of life-course trajectories on residential relocation, but also leads to an increasing awareness of the role of context in shaping individuals' housing behaviour (Huang and Deng, 2006; Vlist et al, 2002). Mulder and Hooimeijer (1999) emphasized the importance of incorporating factors both at the microlevel of the household and at the macrolevel of structures of provision that underlie residential mobility. The macrofactors in Western contexts refer mainly to housing-market aspects (Hooimeijer and Oskamp, 2000), while in China, the macrocontext is more complex. Besides housing-market aspects, other institutional aspects are found to be pivotal in shaping individuals' housing consumption and behaviour (Huang and Deng, 2006; Li, 2003, 2004; Li and Siu, 2001).

In socialist China, residential mobility was very low because of the housing-allocation system (Huang and Deng, 2006; Wang and Murie, 1999). A person's housing status was determined largely by his or her position in the Chinese Communist Party (CCP) hierarchy and in the work unit. Since the launch of housing reforms, the privatization of public housing and the promotion of commodity housing have allowed households to freely choose their preferred dwellings. Consequently, residential mobility has gradually increased. Empirical studies show that on the one hand the importance of life cycles and the consequent adjustment of housing demand become more observable in the emerging real estate market, yet on the other hand institutional factors including hukou status, CCP membership, and work-unit type remain vital to individuals' housing access and consumption, which reflects the transitional nature of the Chinese housing system (Bian and Logan, 1996; Huang and Deng, 2006; Li, 2003; Liu and Chai, 2013; Wu, 2004a). Local hukou entitles people to access to public rental housing and to the purchase of economical housing (a type of owner-occupied housing highly subsidized by governments), although some relaxations have been implemented in some cities.[(1)] Employees in the public sector generally enjoy more housing benefits, because work

[(1)] The requirements of access to public housing vary between cities, and the relevant policies keep changing. The qualifications for applying for public rental housing have been relaxed since 2012. For instance, in Beijing, Shanghai, and Nanjing, migrants who do not have local hukou can also apply for public rental housing, but it is still a requirement that migrants possess a temporary residence certificate and have paid taxes, social welfare contributions, and housing provident fund installments for a few years (the exact number varies between different cities and districts). Economical housing is currently open only to local hukou holders.

units in the public sector may either collectively build dwellings and allocate them to the employees at subsidized prices or set up a higher 'housing provident fund'.

In recent years researchers have become increasingly interested in the residential mobility of minorities and migrants (Bolt and Van Kempen, 2010; Özüekren and Van Kempen, 2002). In general, the housing career of immigrants differs from that of the native population. Immigrants tend to start their housing career at the lowest end of the housing market, from where they move on to housing with better conditions. Early arrivals often lack capital resources and knowledge about the local housing market; therefore they are more often found in rental housing. It takes some time for them to build up resources. Over time, their progress in housing conditions can be observed, and possibly some of them have become homeowners (Abramsson et al, 2002). Bonvalet et al (1995) found that immigrants who came to Paris experienced a higher level of residential mobility than the native French. Studies in Latin American cities suggested that migrants initially living in the central city were likely to move (Turner, 1968). These findings about international migration are relevant to the research on internal migration within China. As argued by several scholars, with the hukou system acting as an 'internal passport', China's huge geographical extent, institutional barriers, and cultural and linguistic diversities make internal migration resemble international migration to a certain extent (Chan et al, 1999; Sun and Fan, 2011).

Articles addressing the residential mobility in Chinese cities often take migrants as a homogenous group or focus mainly on rural–urban migrants (Huang et al, 2013; Wu, 2006). It has been found that rural migrants are excluded from the mainstream housing-distribution system and have to endure much worse housing conditions. With substantially higher mobility rates than local residents, they experience much more residential instability (Wu, 2006). Wu (2004b) argued that the general disadvantage experienced by rural migrants has much of its root in the institutional constraints associated with the hukou system.

However, for skilled migrants, it would be a different story. For a start, skilled migrants have more chances to obtain local hukou.[2] The first way is to obtain collective hukou[3] through employment if they could find jobs in hi-tech enterprises or in the public sector such as government, public institutions, and state-owned enterprises (SOEs). The second way is through recruitment agencies (*rencai shichang* in Chinese), which provide intermediary services to personnel and employers. The purchase of a dwelling would be a third channel to obtain local hukou. Yet, even having easier access to local hukou and possessing equivalent human capital, they still belong to the migrant population, who face difficulties especially in the initial phase due to the lack of information on the local housing market and due to the lack of initial capital to build up their housing career. Those prospective citizens may exhibit different patterns of residential behaviour.

In the migration literature, skilled migrants' labour-market performance has been intensively studied (Ai Ariss et al, 2012; Salt, 1988). However, little is known about their performance in the housing market. In this paper the residential mobility of skilled migrants will be investigated in a comparison with their local counterparts. Based on the literature

[2] The variation among cities needs to be noted. The three mentioned channels are usually applicable in second-tier cities, such as Nanjing. Hukou policies in first-tier cities, such as Beijing and Shanghai where local hukou are highly valued and controlled, are particularly strict. In Beijing, since 2009, local hukou can only be granted by employers, and only hi-tech enterprises, institutions, and state-owned enterprises have limited numbers of collective hukou that can be allocated to their employees. In Shanghai a scoring system was introduced in 2012, in which university graduates are evaluated by their major, the university ranking, and the quality of their employment. Only those achieving a certain score are eligible to be granted Shanghai hukou.

[3] Different from independent hukou which are issued to family members, collective hukou are usually managed by employers and are issued to the employees. The temporary hukou provided by recruitment agencies are also a type of collective hukou.

review, the following hypotheses will be tested: (1) Skilled migrants experience higher residential mobility, because it may take more time and steps for them to climb up the housing ladder. (2) Changes in household composition which are linked to changes in the need for housing are likely to trigger a residential move. (3) Educational attainment is positively related to residential mobility. (4) Occupational changes are often associated with residential relocation. (5) Homeownership hampers mobility. (6) The effects of household, education, labour, and housing careers are more important than institutional factors, including hukou status, CCP membership, and work-unit type.

Research design

Data

The empirical analysis is based on a survey of skilled migrants and locals in Nanjing, which was conducted between December 2012 and February 2013. During the research design stage, we conducted online interviews with a few skilled workers in Nanjing and had discussions with a couple of experienced researchers to come up with a sampling strategy and specific survey questions. Subsequently, the trial questionnaire was tested on a few potential respondents. Based on the feedback, the survey questionnaire has been revised and finalized. As we focus on skilled migrants, respondents were recruited on the basis of their employment, meaning that the primary sampling unit was the enterprise or institution. We adopted multistage cluster sampling combined with snowball sampling. Firstly, around twenty enterprises/institutions in skilled-labour-intensive industries were chosen.[4] In each enterprise/institution respondents were chosen with consideration given to the gender balance and the variety of places of origin. Later, the respondents were asked to spread the survey to other skilled-labour-intensive enterprises/institutions through their alumni networks or personal connections. During this process, we kept controlling to ensure that each respondent met the criteria (skilled worker, living and working in Nanjing). Ultimately, the respondents were recruited from over 200 enterprises/institutions, which covered a wide range of industry types in Nanjing, including health, research, finance, education, information technology, culture, construction, telecommunications and manufacturing (the distribution of the respondents is presented in table A1 in the online appendix [http://dx.doi.org/10.1068/a140079p] in comparison with the distribution of all employees in Nanjing, which shows that the respondents are concentrated in skill-intensive industries). As we are foremost interested in the difference between migrants and locals, the samples need to include some skilled locals serving as the reference category. Locals and migrants are differentiated by 'their home town', which is loosely defined as the place where people grew up. A distinction is made between intraprovincial and interprovincial migrants, because policies such as social welfare and mortgage regulations work differently for intraprovincial and interprovincial migrants[5] (Huang et al, 2014). In addition, interprovincial migration involves longer distances and higher costs, so the features of interprovincial migrants may differ systematically from those of intraprovincial migrants (Poncet, 2006). We do not intend to claim statistical representativeness for the skilled workers in Nanjing based on this sampling; rather, our aim here is to capture the difference between locals, intraprovincial migrants and interprovincial migrants. After discarding invalid and incomplete questionnaires, the survey generated 788 questionnaires,[6] including 159 locals, 330 intraprovincial migrants and 299 interprovincial migrants.

[4] The initial list of enterprises/institutions was compiled by selecting the most common enterprises/institutions where university graduates with different disciplines are enrolled.

[5] Intraprovincial migrants can still enjoy provincial social welfare amenities in Nanjing; while interprovincial migrants enjoy hardly any social welfare amenities in Nanjing.

[6] The response rate was 57%.

As no suitable panel data are available,[7] a retrospective survey was conducted to collect the information about (changes in) respondents' socioeconomic status, household composition, and job and housing histories in Nanjing after graduation (job and residential histories in other cities were not recorded). Although recall errors are inevitable in retrospective surveys, it would not be a problem in our case, as the average length of respondents' residential history is six years, and the timing of important life events is usually well remembered (Goldstein, 2010). In order to examine the quality of the completed questionnaires, we have designed several overlapping questions. The questionnaire in which the answers to these questions do not match were excluded. Furthermore, dozens of questionnaires were selected for an additional telephone examination.

The surveyed skilled workers are on average no more than 30 years old, and almost 43% of them have not formed a family. Even in the case of married respondents, our research targets—skilled workers—are probably the head of a household or at least share the role of breadwinner. To take cohabitation into account, which may trigger residential moves as marriage does, 'spouse/partner' was provided as one of the options to the question 'who you are living with?' Many Chinese young couples cohabitate before marriage, but they are hesitant to reveal their cohabitation status because of the negative opinions about deviating from traditional social norms. As we focus on independent residential histories, the respondents staying in parental housing were dropped from the dataset.

Methodology

For modelling the time aspects of housing careers, the life-course approach provides a very suitable theoretical framework (Feijten, 2005). The methodological translation of the life-course perspective is event-history analysis, which is widely used in social science to study the underlying causal mechanisms behind event occurrences (eg, job change, marriage, migration) owing to its capability of handling censored data and including time-varying covariates (Allison, 2014). As a key factor in the event-history analysis, time can be regarded as continuous or discrete, corresponding to two analytic approaches: the Cox proportional hazards model and the discrete-time logistic model. In this case, states and events in respondents' life history were recorded in discrete-time units (year); therefore, it is suitable to structure the dataset into a person-year format and then implement discrete-time logistic models.

Discrete-time logistic models were employed using the standard logistic regression procedure after converting the dataset into person-years. After the conversion, each respondent i contributes T_i (the number of years residing in Nanjing after graduation) rows. Clustered standard errors were used, because each individual contributes a bunch of observations. The first person-year is the year when the respondent started his or her residential career in Nanjing after the highest education. The last person-year is the year of the interview. The discrete-time logistic model takes the form of equation (1), in which P_{it} refers to the probability of respondent i making a residential move at discrete time t, $a(t)$ is a time-specific intercept term that applies to all individuals at time t, and B_j $(j = 1, 2, ..., J)$ is the regression parameter for the jth covariate X_j. The covariates, which are derived from household, education, and job and housing careers together with institutional factors, are reorganized into five sets (table 1). The effects of the covariates are assumed to be constant. Time is indicated as a set of duration-interval-specific dummies $d_1, d_2, ..., d_i$ in the

[7] In recent years quite a few surveys have become accessible. However, they are not suitable for this study. For instance, CFPS (China Family Panel Studies) so far covers only two time periods, 2010 and 2012, not long enough to study the housing and labour careers. CGSS (China General Social Survey) does not record intracity movements; whereas regional movements are recorded.

Table 1. Independent variables in the discrete-time logit model.

Set	Variable	Definition or coding	Time-varying by person-year	Time-varying by residence/job episode
Demographic variables, household career, and education career	Age for first residence	Age at the beginning of housing career in Nanjing		
	Male	Female (reference)		
	Education (in years)	Counting from primary school		
	Household income	Current household annual income (100 000 yuan)		
	Childbirth	Childbirth	✓	
	Childbirth lead	Lead variable of childbirth	✓	
	Childbirth lag	Lag variable of childbirth	✓	
	Cohabitation/marriage	Family size change from 1 to 2		✓
	Family size increase	Other kinds of increase in family size		✓
	Family size decrease	Family size decrease		✓
Institutional variables	NJ urban hukou	Whether or not possess Nanjing urban hukou	✓	
	CCP membership	Whether or not a member of the Chinese Community Party	✓	
Job career	Job change	Whether or not changing a job	✓	
	Job change lag	Lag variable of job change	✓	
	Employer type	Government/institution/state-owned enterprise (reference) Private/foreign/joint enterprise Other kinds of employer type or missing		✓
	Housing provident fund	Unit: 100 yuan per month		✓
Housing career	First house tenure	Private renting (reference) Ownership Dormitory		
	First house area	Unit: 10 m^2		
Duration of residence	d1_2, d3_4, d5_6, …	d1_2 (reference)		

discrete-time logistic model.

$$\ln\left(\frac{P_{it}}{1-P_{it}}\right) = \alpha(t) + \beta_j X_j(t)\,. \tag{1}$$

Besides the variables derived from household and education careers, the first set also includes demographic variables, such as age and gender. Instead of the age at the time of the interview, the age at the beginning of the housing career is used, since this pinpoints the difference at the start of the housing career. Household income is used, because it is a better indicator of a person's financial recourses for housing than individual income. The change in family size, which is associated with shifts in households' demand for space, is the most widely accepted explanation for intraurban moving (Dieleman, 2001). The change in family size from 1 to 2 is used to approximate the event of cohabitation/marriage. Childbirth and other kinds of changes in family size are separate categories, with 'no change' as the

reference category. Institutional factors such as hukou status and CCP membership will also be tested, because it has been demonstrated that they are closely related to housing access and consumption in transitional urban China.

Among the variables in the labour career, job change is often associated with a residential move because a job change is likely to bring about changes in income and status as well as a change in workplace. Regarding the type of employer, there are three main categories: public (government, public institutions, and SOEs), private (private, foreign, and joint enterprises), and others (eg, self-employed). Before housing reforms, employers in the public sector were able to allocate housing to their employees. In the transitional period, a lingering dependency between households and employers in the public sectors was observed (Huang and Clark, 2002). In this paper, after two decades of housing reforms, the effect of employer type on residential mobility will be examined. The housing provident fund, contributed to by both employees and employers, combines a savings and retirement account with subsidized mortgage rates to enable an employee to save for, and eventually complete, a housing purchase (Buttimer et al, 2004).

As shown by previous research, the initial residence may lead to a varying range of mobility behaviour. The tenure type of the initial housing is used in this paper as a variable which is assumed to have an impact on the propensity for moving. Three types of housing tenure have been identified: dormitory, private renting, and ownership. Dormitories are rental accommodations provided by employers at a subsidized price. Given the relative high proportion of people living in dormitories, this category is separated from renting.

The value of time-varying variables, as indicated in table 1, may change during the observation period. The fact that institutional features (hukou, CCP membership, and employer type) are changing was neglected in previous studies. In this empirical analysis, time-varying institutional factors are taken into account by applying the discrete-time logistic model on person-years. It has to be noted that three variables do not provide real person-year data but the actual episode information. Family size is collected for each residential period, and job-related information (employer type, housing provident fund) is collected for each job period. Although changes in family size and the amount of the housing provident fund could happen within one observation period, unfortunately we cannot catch them. Caution is needed when interpreting the corresponding coefficients.

The events that trigger a residential move do not necessarily synchronize with the occurrence of this residential move; lead as well as lag effects have been observed (Feijten, 2005). Using discrete-time models makes it easy to identify lead/lag effects of these life events. In the analysis, lead and lag variables of childbirth, as well as a lag variable of job change, have been created. People may adjust their living space by moving in the year before or after the childbirth. A job change may cause a residential move in the following year, because it takes some time to make the decision to move, find a desirable residence, and eventually arrange the move.

Results

Descriptive results

A distinction is made among the respondents on the basis of their home town: Nanjing skilled locals, intraprovincial skilled migrants, and interprovincial skilled migrants. Among these three categories, evident differences can be observed in their socioeconomic and institutional characteristics, which would have implications for the development of their job and housing careers. As shown by table 2, both locals and migrants are well educated, with sixteen years of education equivalent to the bachelor level. The slightly higher level of educational achievement among migrants may lead to the higher proportion of CCP membership, as CCP membership is normally obtained in colleges/universities. Due to the larger family size of locals, their household annual income surpasses that of migrants.

Table 2. Characteristics of respondents by categories of home town.

	Local (159)	Intraprovincial migrants (330)	Interprovincial migrants (299)
Age (years)	29.71	28.95	28.60
Sex ratio[a]	1.013	1.357	1.282
Family size	2.63	2.05	1.87
Having child (%)	41.5	28.5	19.1
Education in years	16.53	16.63	17.69
Membership of Chinese Communist Party (%)	33.3	40.9	49.5
Household annual income[b] (unit: 100 000 yuan)	1.09	1.05	0.97
Hukou at the beginning of housing career (%)			
Nanjing urban hukou	68.6	47.3	62.5
Hukou at the time of the interview (%)			
Nanjing urban hukou	74.2	61.2	72.2
Job mobility (% per annum)	8.33	7.47	5.36
Current employer type (%)			
Government/institution/state-owned enterprise	54.7	51.8	59.5
Foreign/joint/private company	42.1	44.6	36.7
Other	3.1	3.6	3.7
Age at the beginning of housing career	23.7	24.3	25.1
Residential mobility (% per annum)	10.57	13.96	16.40
Duration of residence (years)	7.97	5.69	4.55
Initial housing type (%)			
Private renting	31.4	62.1	55.2
Dormitory	27.7	23.9	33.4
Ownership	36.5	13.9	11.4
Current housing type (%)			
Renting	22.0	44.8	42.5
Dormitory	17.6	13.9	24.4
Ownership	60.4	41.2	33.1

[a] Sex ratio: the ratio of males to females.
[b] The household annual income only by the time of the questionnaire was collected; 699 samples reported their household annual income.

The respondents who see Nanjing as their home town did not necessarily possess Nanjing urban hukou at the beginning of their housing career, because some of them had Nanjing rural hukou (from rural areas: Lishui and Gaochun counties), and there can also be a separation between registered and actual residences. Nevertheless, 68.6% of locals did have Nanjing urban hukou initially, while the proportions for intraprovincial and interprovincial migrants are 47.3% and 62.5%, respectively. The starting year in the housing career is, in most cases, also the starting year in the job career. When migrants find a job in government, public institutions, SOEs, or hi-tech enterprises, they are usually provided with a collective Nanjing urban hukou attached to the employer. If employers are not able to provide hukou attachment, skilled migrants could resort to recruitment agencies for a temporary (usually before marriage) Nanjing urban hukou attachment. That is why a large number of migrants already hold Nanjing urban hukou at the beginning of their housing career; and the higher share of interprovincial migrants possessing local hukou can be explained by their higher qualification in terms of their education and employment level than intraprovincial migrants. As observed, more migrants have obtained Nanjing urban hukou at the time of the interview

owing to their higher socioeconomic status as well as the relatively lower hukou requirements (compared with Beijing and Shanghai). In general, Nanjing hukou does not act as a barrier, but is a choice for skilled migrants. Whether they would like to change to Nanjing hukou is mostly tied to their intention of settling down in Nanjing or the preference of their original hukou.

Migrants exhibit lower job mobility than locals, which might be associated with the enrolment in more stable employment, as indicated by the higher proportion of migrants in government, public institutions, and SOEs. The migrant population is often a selective group of people (Feliciano, 2005). Those who cannot find a stable job might choose to go back to their home town or smaller cities for a more secure job. In other words, skilled migrants who still stay in Nanjing are the 'surviving' ones who are more qualified. This selection bias means that caution is needed when interpreting the results. Besides, due to the lack of a local social network, job searching costs and the risk of losing a job are higher for migrants, consequently constraining them from changing job frequently (Zhang, 2010).

Among the 788 respondents 365 have made at least one residential move. A total of 535 moves were made by all respondents, on average 0.68 moves per person. The residential mobility rate for skilled locals is the lowest (10.57% per annum). The rate for intraprovincial migrants is 13.96% per annum. Interprovincial migrants are the most mobile category, with a residential mobility rate of 16.40% per annum. This finding supports the first hypothesis that skilled migrants tend to experience higher residential mobility.

A plot of smoothed hazard estimates (figure 1) is drawn to show the mobility patterns of these three categories. The peak of these three curves appears around the fourth or fifth year in their housing career, when life-course events such as family formation and childbirth are likely to happen. This is in accordance with previous findings that young adults are the most mobile segment of the population (Long, 1988). The different patterns of these three curves also show that skilled locals are generally less likely to move, especially in the later phase of their housing career. In contrast, migrants, particularly interprovincial migrants, experience higher residential mobility. Hence a question arises: why do migrants move more often than locals? To reveal the determinants of differential residential mobility of these three

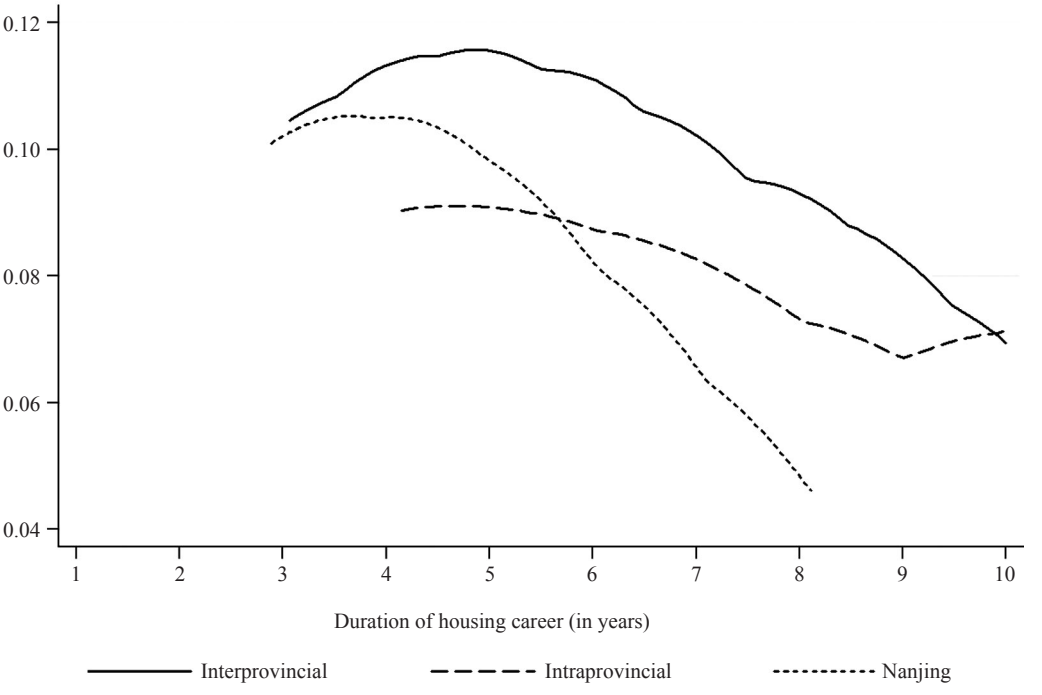

Figure 1. Smoothed hazard estimates.

categories, discrete-time logistic models are employed and the results are presented in the following subsection.

Modelling residential mobility

We begin with a base model in which only home town and duration dummies are included as independent variables to show the difference between local, intraprovincial skilled migrants, and interprovincial skilled workers, and the changes of residential mobility along with the duration of residence. The parameters of the duration dummies are listed in table A2 in the online appendix. The results of the base model (table 3) again confirm that both intraprovincial and interprovincial migrants are more likely to make a residential move than skilled locals.

The independent variables presented in table 1, which are hypothesized to affect the likelihood of moving, will be introduced stepwise to provide insights into the role of these variables in explaining the difference in residential mobility between locals, intraprovincial and interprovincial migrants. We are foremost interested in the factors in their labour and housing careers, which may lead to the difference. Therefore, the job-related variables are introduced first in model 1, and then the housing career variables are added in model 2. Afterwards, demographic, household, educational, and institutional variables are included in model 3. Lastly, interactions between independent variables are checked in model 4. Although the coefficients cannot be compared directly across models (Mood, 2010) the existence of the difference between locals and migrants can be observed from each of these models.

In model 1, the job-related variables include job change, employer type, and housing provident fund. The results of model 1 show that a residential move is most likely to occur in the same year as well as the following year of a job change, as indicated by the positive and significant coefficients of job change and its lagged variable. A job change usually involves changes in income, resources, and the location of the workplace, which would force or enable people to make a move. It is also possible that a residential move may trigger a job change. This finding is consistent with the fourth hypothesis that occupational changes are often associated with residential relocation. The insignificant coefficients of employer type (foreign, private, joint enterprise) suggest that there is no difference in residential mobility whether a person is employed in the public sector (government, institutions, and SOEs) or the private sector (foreign and private enterprise). However, those falling into the category of other employer types (for instance, self-employed or temporarily unemployed) are much less likely to make residential moves. As they do not have a fixed workplace, there is no need to move for job-related reasons. Also, their weak labour-market position may constrain them to be residentially mobile. Seen from the model results, the housing provident fund does not play a role in residential mobility, because it can only be retrieved at the moment of a home purchase or retirement. The amount of the housing provident fund would have an impact on the size and the location of a dwelling that a household can afford, but has no apparent influence on residential mobility. It should be noted that, after adding job-related variables in model 1, there is still a significant difference between locals and migrants, which means job-related variables are not responsible for this difference.

In model 2, once the variations in initial housing status have been controlled for, there is no more significant difference in residential mobility between locals, intraprovincial migrants, and interprovincial migrants. In other words, initial housing status accounts for the difference. It can also be confirmed by looking back to table 2: the homeownership rate of the first residence among locals is 36.5% but on average no more than 13% among both intraprovincial and interprovincial migrants. This means that locals' higher homeownership rate hampers their further mobility, which is in line with the fifth hypothesis. The reason could be that the decision to buy a home is usually made when people do not foresee forthcoming movements. Detailed data show that 24.1% of the homeownership of the first residence among locals is

Table 3. Discrete-time logistic models (coefficients reported, with clustered robust standard errors in parentheses).

Independent variable	Base model	Model 1	Model 2	Model 3	Model 4
Home town (Jiangsu, reference: Nanjing)	0.326* (0.141)	0.334* (0.144)	−0.013 (0.138)	0.104 (0.158)	0.339 (0.355)
Home town (Other provinces, reference: Nanjing)	0.261 (0.153)	0.331* (0.157)	−0.003 (0.149)	0.250 (0.180)	0.369 (0.401)
Job					
Job change		1.492*** (0.163)	1.490***(0.168)	1.485***(0.202)	1.360***(0.231)
Job change lag		0.533** (0.185)	0.472*(0.187)	0.262 (0.225)	0.260 (0.227)
Employer type (reference: government, public institutions, state-owned enterprises)					
Employer type (foreign private, joint enterprise)		0.025 (0.122)	−0.072 (0.119)	−0.030 (0.146)	−0.091 (0.149)
Employer type (others)		−0.688* (0.273)	−0.600*(0.268)	−0.890** (0.294)	−0.912** (0.303)
Housing provident fund		−0.005 (0.015)	0.001 (0.015)	−0.013 (0.018)	−0.014 (0.019)
Residence					
First house tenure (owner, reference: private renter)			−1.247***(0.199)	−1.461***(0.205)	−1.263***(0.213)
First house tenure (dormitory, reference: private renter)			−0.365***(0.115)	−0.466***(0.144)	−0.629***(0.152)
First house area (unit 10 m^2)			−0.077*(0.038)	−0.062 (0.040)	−0.066 (0.039)
Household education demographic, and institutional					
Age at first residence				−0.035 (0.021)	−0.033 (0.022)
Male (reference female)				−0.139 (0.118)	−0.827** (0.266)
Education (in years)				−0.053 (0.042)	−0.065 (0.044)
Household income (unit 100 000 yuan)				0.405***(0.101)	0.410***(0.101)
Childbirth				1.067***(0.254)	1.072***(0.257)
Cohabitation/marriage				3.810***(0.363)	3.818***(0.367)
Family size increase				4.123***(0.366)	4.172***(0.367)
Family size decrease				4.289***(0.554)	4.472***(0.589)
Membership of Chinese Community Party				−0.053 (0.135)	−0.012 (0.135)
Nanjing (NJ) urban hukou				0.261 (0.142)	0.851** (0.332)

Table 3 (continued).

Independent variable	Base model	Model 1	Model 2	Model 3	Model 4
Interaction terms					
Male × hometown (Jiangsu)					0.859**(0.315)
Male × hometown (other provinces)					0.866*(0.349)
NJ urban hukou × home town (Jiangsu)					−0.786*(0.370)
NJ urban hukou × home town (other provinces)					−0.598 (0.406)
Job change × first house tenure (owner)					−1.765***(0.512)
Job change × first house tenure (dormitory)					1.284**(0.500)
Constant	−4.110***(0.688)	−4.078***(0.703)	−2.907***(0.733)	−2.222* (0.960)	−2.292* (1.026)
Number of observations	4238	4238	4238	4238	4238
Deviance	2784.2456	2670.0616	2590.6624	2068.127	2040.0386
Wald χ^2	120.60	233.87	271.23	448.60	467.36
McFadden's R^2	0.0491	0.0881	0.1152	0.2937	0.3033
Aikake information criterion	2832.246	2730.062	2658.775	2158.127	2166.039

Significance levels: *< 0.05, **< 0.01, ***< 0.001

acquired fully through intergenerational transfers. The lower proportion of homeownership of the first residence among migrants is due to the limited intergenerational transfer of wealth and their limited financial ability, and might also be related to their hesitation to settle down in Nanjing. Particularly for the first residence, migrants are reluctant to be homeowners when they are not sure whether they will move to another city. According to the survey, 14.2% of intraprovincial and 18.4% of interprovincial migrants but only 4% of locals are not sure whether they will settle down in Nanjing. Consistent with previous findings, room space of the first residence is negatively related to the likelihood of moving. The model results also show that people living in dormitories are less likely to make a move than private renters. Although dormitory accommodation is not as common as before, we do find that employers, especially those in the public sector (government, public institutions, and SOE), still provide employees with a bachelor dormitory, which is much cheaper than the market price and usually close to the workplace. However, unlike the dormitories for rural migrants which are usually a temporary shelter with poor conditions, the dormitories for skilled workers are more similar to the traditional work-unit house and are good quality. Therefore, dormitories, a kind of employment benefit, are more desirable than private rental housing. People would rather not move out until they get married or are ready to buy a home.

After adding demographic, household, educational, and institutional variables, the explanatory power of model 3 improves considerably, with a pseudo-R^2 of 0.2924. The difference between local, intraprovincial migrants, and interprovincial migrants is still statistically insignificant. Age at the beginning of the housing career does not exert any influence, because the life-course effects suggested by age are already reflected by the changes in family size. No gender difference is observed. Contrary to the third hypothesis, educational attainment does not have significant influence on mobility rates of skilled workers, probably because they are relatively homogenous in terms of educational attainment. Household income, as an important financial resource for housing expenditures, is positively and significantly associated with a higher likelihood of moving. As explained earlier in the methodology section, a change in family size from 1 to 2 is used to approximate the occurrence of cohabitation or marriage. The results confirm the second hypothesis that changes in family size including childbirth, cohabitation/marriage, and other types of increase and decrease are likely to trigger a residential move. Other types of increase and decrease in family size may happen when, for instance, parents move in and out. The lead and lag variables of childbirth have been tested but are insignificant, and thus are not included in the final models. As hypothesized (the sixth hypothesis), CCP membership has lost its impact on skilled workers' residential behaviour; hukou status is also not significant for skilled workers in terms of their mobility. In this paper institutional attributes are collected for respondents only. The institutional characteristics of respondents' parents may affect respondents through intergenerational transfer of wealth, which is unfortunately not measured here.

As the presence of interactions between independent variables can have important implications for the interpretation of the models, interaction terms have been tested, and only the significant ones are presented in model 4. Our primary concern is whether job, housing, demographic, and institutional variables work differently for locals, intraprovincial migrants, and interprovincial migrants. The test shows that only gender and hukou status work differently for locals and migrants. Local males are less likely to make a residential move than their female counterparts, while there is no notable gender difference among intraprovincial and interprovincial migrants. A possible explanation is that local males are better able to prepare a home before marriage, so when cohabitation/marriage happens they do not need to move out but their female partner moves in. With regard to migrants, it is more common that male and female partners both move to a new joint home. Hukou

status also interacts with home town variables. Possessing a Nanjing urban hukou is positively related to the likelihood of residential relocation for locals, but its effect almost disappears for intraprovincial migrants and is less strong for interprovincial migrants. The varied effects of hukou on locals, intraprovincial migrants, and interprovincial migrants are actually due to the different timing of obtaining Nanjing urban hukou. As shown in table 2, 68.55% of locals hold Nanjing urban hukou at the beginning of their housing career, and only 47.27% of intraprovincial migrants possess Nanjing urban hukou, and this proportion for interprovincial migrants is 64.72%. The lower proportion for intraprovincial migrants implies that many residential moves are made before obtaining local hukou, resulting in the weakest impact of hukou on intraprovincial migrants' residential mobility. We also examined the interactions between other independent variables. It shows that job change interacts with first house tenure: homeowners are less likely than private renters to move for the reason of a job change. With regard to the skilled workers living in dormitories, they have to move out from the dormitory provided by their previous employer if they change to a new employer.

Conclusions

With the deepening of economic transformation and the increasing number of higher education graduates, skilled migrants constitute an increasing and significant part of the internal migrant population and of urban society. With the aim of settling down permanently in cities, skilled migrants need to be seen as 'prospective citizens', whose residential behaviour differs systematically from that of skilled locals. Residential mobility, which can be conceptualized as an outcome of a choice process exercised under complex institutional and personal constraints, is closely tied to the functioning of the housing market and has important implications for labour mobility, the efficient allocation of resources, and urban spatial structure (Li and Siu, 2001; Sánchez and Andrews, 2011). Our empirical study contributes to the research on residential mobility by shedding light on skilled migrants, an emerging but neglected group. Using a survey conducted in Nanjing in 2012, the determinants of skilled migrants' residential mobility were examined in comparison with their local counterparts.

The empirical results show that both intraprovincial and interprovincial skilled migrants tend to experience a higher level of residential mobility than their local counterparts, and the difference can be attributed to the head start of their housing trajectories. Some caution is needed in interpreting this outcome, as we did not observe migrants who went back to their home town after graduation and the ones who stayed might be a selective group. Yet, the outcome that there is no difference between locals and migrants once homeownership has been controlled for, is very plausible. Locals have insider knowledge about the local housing market; more importantly, they can easily make use of the resources accumulated by their parents, thereby entering owner-occupied housing earlier. Among migrants, even the skilled ones, it would take a few years for them to become familiar with the local labour and housing markets and to accumulate financial and nonfinancial resources in the destination city. In addition, it may also take some time for them to make a decision about whether to settle down in Nanjing, considering job prospects and housing affordability. Consequently, skilled migrants are likely to become homeowners at a later moment in their housing careers, compared with locals. As indicated by the increasing number of owner-occupiers among migrants, upward housing mobility is observed, mainly owing to their promising job careers, which facilitate their ability to build up resources for their housing careers. The higher residential mobility of skilled migrants suggests that they are given multiple opportunities to move up the housing ladder, reflecting a more open housing market in Nanjing after two decades of housing reforms.

The forces underlying the residential relocation of skilled persons in Nanjing are becoming more similar to those in market economies in the sense that life-course trajectories play a more

decisive role in explaining the likelihood of making a residential move. The events in the household trajectory, such as cohabitation/marriage and childbirth, exert the strongest impact. The labour career—specifically a change in job—is often associated with residential mobility; yet the influence of the labour career is less important for homeowners. The housing trajectory—especially the tenure type—is of great importance to residential mobility. An unexpectedly large number of skilled workers are living in dormitories. They are less likely to make a move, as the dormitory is affordable and of good quality and should be seen as an employment benefit. There is an interesting finding about the gender difference that local males are less likely to move than their female counterparts, which is inconsistent with most existing findings. In Chinese traditions, men are supposed to provide a home. Local males are better able to get a home ready before marriage, so their early transition into homeownership results in their lower residential mobility. Summing up, it is fair to conclude that life-course factors in interaction with the housing and labour market have become pertinent to understanding the residential mobility of skilled workers in China in ways similar to Western countries.

There is a debate about the effects of market factors in the life course versus the effects of institutional factors on residential behaviour in China. Previous studies using data from the early 2000s conclude that, in transitional China, both market mechanisms and the institutional legacy play a vital role in residents' housing behaviour (Huang and Deng, 2006; Li, 2003; Liu and Chai, 2013). Our study contributes to this debate by showing an up-to-date picture based on data obtained in 2012, when commodity housing has emerged as a major pathway to homeownership in urban China (Liang, 2013). The empirical results demonstrate that institutional factors, such as hukou, employer type, and CCP membership, no longer exert a direct impact on the residential mobility of skilled migrants in Nanjing. This finding supports the hypothesis from market transition theory that the effects of market forces increase, whereas the effects of institutional factors gradually decline (Nee, 1989). However, it should be noted that this finding cannot be generalized to Beijing or Shanghai where skilled workers are more constrained by institutions and hukou policies are less liberal than in Nanjing.

This research has been carried out at the microlevel, reflecting how skilled migrants interact with the circumstances in the housing market in Nanjing. Better understanding of their mobility behaviour helps to establish a well-functioning housing market. Despite a considerable improvement in housing conditions in the later phase of their housing career, skilled migrants face severe difficulties at the beginning due to shortages in the supply of affordable housing. Currently, the public housing system has reacted to the housing problems of low-income migrants, but skilled migrants have not yet been taken into consideration. Policies such as providing a certain type of public rental housing for new college graduates or encouraging employers to provide temporary and affordable accommodations to their migrant employees would help them to survive through the difficult beginning. Preferential policies on loans can be devised to help young skilled migrants establish their job and housing careers. Regional differences might be observed with regard to the housing behaviour of skilled migrants due to the variation in tenure structures, housing prices, housing policies, migrant-related policies, as well as hukou policies. Continuing insights and empirical studies are essential to shed light on the changing pattern of residential mobility in other cities and in the future.

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