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Settlement Intention of Migrants in the Yangtze River Delta, China: The Importance of City-scale Contextual Effects

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Abstract

Millions of Chinese migrants have moved from the countryside to cities to seek job opportunities and a better life. Under the policy shift from 'land‐based urbanisation' to 'people‐oriented urbanisation', it is important to understand what determines migrants' settlement intentions. Although previous studies have primarily focused on socio-demographic impacts on settlement intention, the role of city‐level contexts is understudied. Drawing upon data, the 2015 Migrant Dynamic Monitoring Survey in the Yangtze River Delta, this paper addresses this gap by examining the impact of contextual features in host cities, including population size, employment structure, wage levels and house prices on migrants' settlement intentions. We find that house prices are negatively associated with migrants' decision to settle, and wage levels have a positive effect on migrants with tertiary education. Cities with over 10 million residents or high administrative status are particularly attractive to migrants wishing to

settle in urban environments.

Key words: settlement intention, migrants, China, multilevel, contextual effects

1. Introduction

There were over 245 million migrants in Chinese cities in 2016; this accounted for over a third of the urban population (National Health and Family Planning Commission, 2017). Similar to experiences elsewhere, migrants have made enormous contributions to economic prosperity in cities. However, Chinese migrants differ from their counterparts in many developing countries in that they usually stay in the city temporarily and ultimately return home, with their average duration in the city being seven years (Meng, 2012). In order to maintain the overall positive effects of migration, the Chinese government has recently transformed its urbanization policy from 'land-based urbanization' to 'people-oriented urbanization'. The new initiative, as declared in the National Plan for New Urbanization issued in 2014 (CPC Central Committee and State Council, 2014), aims to facilitate migrants to settle in cities and become full-fledged urban citizens by eliminating discrimination against them and improving their quality of life. It is therefore important to investigate the determinants of migrants' settlement intention, defined as willingness to stay in a place on a long-term basis. Such studies can enhance our understanding of the motivations of potential settlers, which can inform the implementation of the new urbanization initiative.

Previous studies have examined the settlement intention of Chinese migrants, in particular, rural-to-urban migrants, in cities as opposed to returning to their hometown from the perspectives of individual, household and institutional factors (e.g. Chen & Liu, 2016). Institutional barriers, especially the household registration (hukou) system, are criticized to be the major obstacles to settlement (Fan, 2011; Liu et al., 2017).

Scholars have also paid due attention to the impacts of both human and social capitals on migrants' settlement intention (Zhu, 2007). However, previous studies have primarily focused on individual-level factors, whilst the impacts of city-level contexts, such as employment structure, wage level and consumption costs in the host city, are largely neglected. Yet these factors influence migrants' job opportunities, income and savings, which have been proved to be crucial for their intention to settle (Hoehn et al., 1987).

This paper fills in the above gap by examining the impacts on migrants' settlement intention of city-level contextual features while controlling for individual demographic and socio-economic characteristics. In particular, we answer the following questions: to what extent do contextual factors in the host city, including economic (dis)incentives and population size, influence migrants' settlement intention? to what extent do these effects vary among migrants with different characteristics, in particular educational qualifications? Drawing on data from the Migrant Dynamic Monitoring Survey in the Yangtze River Delta in 2015, we employ binomial multilevel models to disentangle the effects of individual and city-level covariates. We then examine the interaction effects between individual and city-level variables. Multilevel models have been recognized as a reliable approach to decompose the variations of settlement intention to multiple scales and to produce correct statistical inferences on model parameters (Snijder & Bosker, 2012).

The rest of the paper is organized as follows. Section 2 reviews the theoretical and empirical studies on migrants' settlement intention. Section 3 provides specific context

by discussing urban economic (dis-)incentives and migrants' settlement choices in Chinese cities. Section 4 introduces the research area, methods and the data. Empirical findings are reported in Section 5. The paper concludes with a brief summary and policy implications.

2. Previous studies on migrants' settlement intention

Settlement intention is regarded as a comprehensive assessment of the quality of life in a place. Economists in Western countries have traditionally regarded migration as individuals' behaviour of utility maximisation, especially expanding economic prospects. For example, Berger and Blomquist (1992) examines migration using a function of earnings and concludes that quality of life, wages, and housing prices are important in migration decision-making. Hoehn et al. (1987) develops a conceptual framework highlighting the important role of urban economic incentives, such as wage level, rent and consumption, behind migrants' settlement decision. Other theory based on human capital depicts migrants' settlement as a process to maximise the value of their human capital (Constant & Massey, 2003).

Migrants' settlement intention is also influenced by amenities at destination and social factors beyond economic prospects. Individuals make a choice between the host city and other places that offer location specific characteristics or amenities that suit their preferences. Amenities in this context include both natural environment (e.g. climate and scenery) and social services and facilities (e.g. health care, schools and shopping malls). In case the total utility they get from the host city, based on both

economic and non-economic factors, is consistent with their expectation, they might decide to settle down. Faggian et al. (2011) states the two key determinants of migrants' settlement as local natural amenities and per capita income. Tiebout's (1956) theory of 'voting with their feet' points out that people select where they live by considering public services in relation to taxes they pay; when they are not satisfied with the level of services they receive in a particular location they may leave.

Numerous factors at the individual level influence migrants' decision to settle or not. Human capital, especially educational attainment, has been demonstrated to play important roles in the decisions to migrate from the original place and to settle down at destination. Migrants with high educational levels tend to move to places with good economic prospects, where they are more likely to secure jobs with higher income (Todaro, 1969). Global cities are particularly attractive to skilled migrants with the development of the knowledge-based economy (Findlay et al., 2002). It is possible that skilled migrants also tilt towards metropolis with good services, consumer goods and amenities, as suggested by the 'consumer city' hypothesis (Glaeser & Gottlieb, 2006). However, the role of urban amenities, both in terms of physical environment and service availability, is found to be less important than economic opportunities in influencing the migration decision-making of skilled migrants (Chen & Rosenthal, 2008). A study on China confirms that interregional wage differentials play a dominant role in attracting skilled migrants, and that the impact of amenities is small and less important (Liu & Shen, 2014).

Besides education, demographic and social factors matter. For instance, younger

migrants are more likely to settle at destination than the elderly (Massey & Espinosa, 1997). Married female migrants who work with their husbands tend to settle at destination (Connelly et al., 2011). Wealthier migrants have more resources to settle in the host city. Meanwhile, it is also possible for them to return and become entrepreneurs in hometown (Murphy, 2002). Stronger social attachment and social networks in the host city enhance migrants' settlement intention, but social links with the place of origin encourage people to return (Reyes, 2001). Such attachments include having family members, especially children, at the locality, or developing a wide network of social ties (Bonifazi & Paparusso, 2019).

Studies on migrants' settlement intension in China have long been focused on the barriers resulting from the hukou system that leads to discrimination against migrants (Tao et al., 2015). The hukou system, implemented during the central-planning period, defines an individual's entitlement to social benefits and services. Hukou status, either agricultural or non-agricultural at a particular place, is inherited from parents, and cannot be automatically changed after an individual migrates from one place to the other. Without local hukou status, a migrant is denied access to many local benefits and services, such as subsidized housing, minimum living allowance and children's education at state schools. Such discrimination reduces migrants' settlement intention (Chen & Liu, 2016). With the relaxation of the hukou system over years, the role of hukou has decreased. For example, initial policies in the 1980s made it legal for people to move to and stay in cities without local hukou status. Hukou policies have been decentralized, with local governments making their own policies aiming at promoting

local development by limiting or attracting migrants. Hukou transfer from one place to the other has been made easier, especially when the destination is a small or median-sized city. Despite various changes, hukou status continues to be linked with individuals' entitlements to local social services. In small cities where local benefits and services are limited, some migrants refuse to transfer their hukou status even when provided with such opportunities (Chen & Fan, 2016). It is therefore important to explore other factors influencing settlement decisions beyond hukou. Liu et al. (2017) indicates that both economic opportunities and social attachment are crucial for migrants' decisions to settle.

Cohort difference has been a recent focus of studies on migrants' settlement in China. New-generation migrants, defined as migrants born after 1980, are featured with better education and higher career aspirations than previous migrants. They have limited experience of agricultural work and stronger desire of career development in a non-agricultural sector. Therefore, the new generation is expected to be more likely to settle in host cities (Chen & Liu, 2016). However, empirical studies have reached inconsistent findings. Some studies suggest that the generational difference per se plays insignificant roles in determining migrants' prospects in cities, and there is little difference in settlement intension between the two generations (Zhu & Lin, 2014).

In brief, few studies have examined the determinants of migrants' settlement intention from the perspective of city-level contexts. This study will extend the literature by investigating the effects of economic (dis)incentives and contextual factors in the host city, while controlling for individual-level demographic and socio-economic

factors which are shown to be related to settlement intension in previous studies. It further explores how individual-level factors, education in particular, interact with city-level contexts and influence migrants' settlement intension.

3. Urban economic (dis)incentives, education and migrants' settlement in China

City-level economic prospects are important to migrants when they make settlement decisions. We focus on the following three (dis)incentives. The first one concerns the employment structure of the host city. One major force that drives migrants to leave their hometown is job opportunities in the city (Liu & Shen, 2014; Thomas, 2019). Job opportunities are also crucial for their decision-making of settlement. If migrants are confident that they can find jobs, the probability of settling down in the city is greater than that of leaving. The assessment of job opportunities might be related with urban employment structure. For example, to a migrant who hopes to work in the catering sector, he/she is more likely to find a job in a city with more food service industries. Even if migrants know little about the employment structure of the city, they can still inquire about the job market from their fellow-villagers, friends and recruitment agents. Therefore, our first hypothesis is as follows.

Hypothesis 1: migrants' settlement intention varies significantly among cities with different employment structures after accounting for variations of individual characteristics.

The second economic incentive that might influence migrants' settlement decision is the wage level in a city. Similar to job opportunities, higher income is another key

driver of migration. Migrants' settlement intension is likely to be dependent on their income potential in the city. They are more likely to get higher salary in a city with a higher average wage. According to China City Statistical Yearbook in 2016, huge disparities in average wage exist among different cities. The average annual wage of an employee in a first-tier city could be twice that in a third-tier city. We assume that the wage level of a host city influences migrants' settlement intention.

Hypothesis 2: migrants' settlement intention varies significantly among cities with different wage levels. Cities with higher average wages are expected to be more attractive to migrants.

The third economic factor influencing migrants' settlement decision concerns the consumption level. If the destination city provides job opportunities and income but with high consumption costs, it would still be difficult for migrants to settle. Thus, the total economic utility they get from the job in the host city may be too weak to support their urban life (Zhu, 2007). Housing expenses account for the most important part of the consumption costs. This is partly because migrants are new-comers and have to rent or purchase properties in order to stay in the city. Moreover, it is still the custom in China that homeownership is important to settlement, because it provides stable living environment beneficial for social and psychological integration (Cui et al., 2016). Therefore we use housing price to indicate consumption costs relevant to migrants' decision to settle. On one hand, high housing price will prevent migrants from settlement because of high living expenses. Such negative effects have been shown especially in East China where house prices have increased rapidly in recent years

(Zang et al., 2015). On the other hand, high housing price may raise people's expectations of continued price increase. For those who purchased properties, they are more likely to settle with expectations of wealth growth from existing properties. However, since most migrants conduct low-skilled jobs with low levels of pay, they cannot afford commercial properties. They are also excluded from subsidised housing schemes without local hukou status. Previous studies show that very few migrants are home-owners at destination cities (Liu et al., 2013). Therefore, the wealth effects of housing price in facilitating settlement may be less applicable in this context.

Hypothesis 3: migrants' settlement intention is influenced by housing price in the city. They are more likely to settle down in cities with lower housing price.

Besides economic (dis)incentives, institutional factors, especially, population control policies through the hukou system at the city level, might influence migrants' life prospects and settlement intension, despite the decreasing role of hukou status. Without local hukou status, migrants are denied access to certain local social services discussed in the previous section. Since the implementation of the hukou system is decentralized, different policies exist in cities of different population sizes. The regulation is much more relaxed in small and medium sized cities where individuals can get local hukou status if they have stable jobs and housing. In contrast, strict hukou regulations exist in mega cities as the local governments want to control the population size to prevent problems such as over-crowdedness and slum settlements. Along the urban hierarchy from small cities to mega-cities, hukou regulations become stricter. In the meantime, resources such as quality schools and hospitals are concentrated in large

cities up the urban hierarchy, which might attract migrants to settle. Therefore, city size is likely to be related to migrants' settlement intension.

Hypothesis 4: migrants' settlement intention varies significantly among cities of different population size after accounting for individual characteristics.

Migrants are a heterogeneous group with different educational attainment which may have significant impacts on their settlement intension in cities of different sizes. Consistent with previous studies on Chinese migrants (Chan, 2010; Liu and Shen, 2017), skilled migrants refer to those with a tertiary educational qualification, and less-skilled migrants are those whose highest level of education is senior high school or below. As discussed above, average wage levels in large first-tier cities tend to be higher than those in smaller ones. Skilled migrants are likely to be attracted to and settle down in large cities for two reasons. First, skilled migrants are capable of securing well-paid jobs which facilitate settlement, and this is especially true in larger cities where more economic opportunities exist (Liu & Shen, 2014). Second, the ability to learn and adopt local culture and customs is higher for skilled migrants, and they benefit more in metropolis where city tolerance and openness is higher (Qian, 2010). Using China's 2005 one percent population sample survey, Liu and Shen (2017) compares the location choices of skilled and less-skilled inter-provincial migrants, and finds that migrants with bachelor's degree are more responsive to wage levels, and less responsive to distance or unemployment rate, than less-skilled migrants. Based on the same data, Liu et al. (2017) examines the migration patterns of university entrants and graduates, and concludes that university graduates tend to choose to live in cities with high wage levels.

Therefore we develop the following hypothesis.

Hypothesis 5: settlement decision is significantly different for migrants with different educational attainment. In addition, skilled migrants are more likely to settle in larger cities with higher average wages.

4. Research design

4.1 Study area

The Yangtze River Delta (YRD, thereafter), covering the Shanghai Metropolis, the neighbouring Zhejiang and Jiangsu Provinces, and part of Anhui Province in East China, is selected as our study area (Fig. 1). The total population and land area are 150 million and 211,700 km^2 in 2010, accounting for about 11% and 2.2% of China's total population and land area, respectively (Chinese City Statistic Yearbook, 2016). We choose the YRD as our study area for three reasons. First, as one of the major economic growth engines of China, YRD has witnessed massive urbanization in the past four decades. It has been a major migration destination, accommodating about 40 million migrants from all over the country according to the Sixth Census in 2010 (State Council, 2010). The number has continued growing in recent years. Second, cities in this area vary greatly in terms of population size, regulations on local hukou status, average wage level and housing price. Finally, cities in the region share similar geographic characteristics which might influence settlement intention, e.g. climate and custom. By analyzing both individual and city-level characteristics, this study provides insights to the complexity of migrants' settlement decision-making. It also provides revenues for

future research on other urban clusters in China.

[Figure 1 about here]

4.2 Statistical model

Due to the two-level structure of our survey data (i.e., migrants nested into cities) and the binomial nature of the outcome variable—settlement intention, the following multilevel binomial response model is employed (Goldstein, 2010),

$$y_{jk} \sim Binomial\left(1, \pi_{jk}\right); \quad j = 1, 2, \ldots, n_k; k = 1, 2, \ldots, K \tag{1}$$

$$\log \frac{\pi_{jk}}{1-\pi_{jk}} = \beta_0 + \sum_{l=1}^{L} \beta_l x_{l,jk} + \sum_{p=1}^{P} \gamma_p z_{p,k} + v_k; \quad v_k \sim N(0, \sigma_v^2) \tag{2}$$

where y_{jk} is the settlement intention variable following a binomial distribution with probability of π_{jk}, and j and k are individual- and city-level indicators, respectively. In Equations (2), the *logit* link function is used to relate the probability of settlement to a range of individual-level predictors (x_{jk}), city-level variables (z_{pk}), as well as the unobservable city effect (v_k). v_k is assumed to follow a Normal distribution with the mean of 0 and the variance of σ_v^2, $N(0, \sigma_v^2)$. The variance partition coefficient (VPC, Snijder & Bosker, 2012; Jones et al., 2015), expressed in Equation (3), is used to measure the decomposition of variances of settlement intention (on the logit scale) between scales, and to quantify the magnitude of unobservable city-level effects on settlement intention.

$$\sigma_v^2 / (\sigma_v^2 + \pi^2/3) \tag{3}$$

The multilevel binomial response model is implemented by using the Bayesian Markov chain Monte Carlo (MCMC) approach, because likelihood-based or quasi-likelihood-based estimation methods tend to be associated with convergence issues and biased estimates of random-effect variances (Browne & Draper, 2001). Following Gelman et al. (2014), improper flat prior distributions are specified for regression coefficients and an Inverse Gamma distribution for σ_v^2. The model is implemented by using the MLwiN software package (Rasbash et al., 2012). Statistical inferences are based on two MCMC chains, each of which consists of 100,000 iterations with a burn-in period of 50,000. We further retain every tenth sample to reduce autocorrelation in each MCMC chain.

4.3 Data and Variables

Our data come from the 2015 Migrant Dynamic Monitoring Survey (MDMS), conducted by the National Health and Family Planning Commission of China. The interviewees are migrants who had lived in the host city for over a month but without local hukou status, and were at the age of 15 or above as of May 2015. The PPS (Probability Proportionate to Size) sampling method is used to select migrants (see Chen and Wang (2018) for details on the implementation of MDMS). The survey collects detailed information including demographic attributes, employment, housing and household composition. In the YRD, there are 39,000 samples collected in 26 cities. As our primary research interest is to explore migrants' settlement intention in the host city, trans-national and intra-city migrant observations are removed. We further remove

migrants who moved to cities because of marriage, attending schools/universities, training and army enrolling, as their settlement intension is influenced by special factors related to their reasons for migration. The final sample size is 26,729.

Settlement intention is measured by the survey question: 'Do you plan to live here on a long-term basis (more than five years)?'. Respondents were asked to choose from three alternatives: yes, no and undecided. Note the question is about migrants' 'stated' intension to live, rather than their actual outcomes of settlement. About 55.9% of the respondents plan to stay in the host city for a long term.

The independent variables are measured at both the individual and city levels. At the individual level, migrants' socio-demographic characteristics, including gender, age, education, marital status and hukou status are included in the model, as these factors are shown to be correlated with settlement intension in previous studies (e.g. Chen & Liu, 2016). Labor market outcomes such as occupation, industry, and income are important factors influencing migrants' economic prospects. In addition, the ratio of household expenses to revenues, calculated as the total household expenditure divided by the total household income recorded in the survey, is used to examine whether migrants are more likely to settle if they could save a larger chunk of income they earn.

Lastly, five indicators reflecting migrants' attachment with the host city are extracted, including the numbers of children in the host city and hometown; access to medical insurance in the city; duration in the city; and spatial proximity of the city to hometown. Having children and access to social insurance in the city are likely to enhance settlement intension. Similarly, longer duration in the city may enable migrants

to develop a wider social network enhancing social attachment. A shorter distance between hometown and the host city may indicate fewer differences in terms of language, culture and customs, which facilitate settlement. Previous studies have shown that intra-provincial migrants are more likely to settle in host cities (Liu & Shen, 2014).

At the city scale, four sets of predictors are included: population size, employment structure, average wage and housing price. Guided by the city size classification provided by the State Council in 2014 and the urban hierarchy, we categorise the 26 cities in YRD into four types: *CityI* with more than 10 million people or provincial capital cities, *CityII* with a population between 5 and 10 million, *CityIII* with a population between 3 and 5 million, *and CityIV* with a population between 1 and 3 million. Points-based hukou system are generally enforced in the YRD that relates the approval of local hukou status to educational qualification, work experience, social insurance payment, tax payment, innovation and entrepreneurship. Larger cities require a higher number of points in order for migrants to get local hukou status. CityI represents mega-cities where the strictest population controls exist. Although there are no cities with fewer than 1 million residents in the sample, hukou controls in the last two categories are less tight. In terms of employment structure, there is a high (almost perfect) correlation between the proportions of employees in the secondary and tertiary industries[1] (with a Pearson correlation coefficient of 0.998), due to a very small agricultural sector in the selected cities. We then use the percentage of employees in the tertiary industry to measure employment structure. Average wage of employees and

[1] The secondary industry refers to manufacturing and construction industries, while the tertiary industry refers to the service sector.

property sale price per square meter are used to measure differences in wage level and housing price. These city-level variables are extracted from the 2016 Chinese City Statistic Yearbook. To facilitate the interpretation and comparability of regression coefficients, all continuous variables are first mean-centred, then scaled by dividing by twice their standard deviations (Gelman, 2008). Table 1 provides summary statistics for variables used in the study.

[Table 1 about here]

Migrants tend to be young people, with about 70.9% of the respondents below 40 years old. More than 88% hold rural hukou status. Among those originating from outside of the YRD, about half are residents of bordering provinces such as Henan and Shandong. This is in line with previous studies showing that people tend to migrate to a region close to their hometown (Zhu, 2007). Migrants are largely excluded from local social welfare systems as less than one third of the respondents have access to medical insurance. The highest educational qualification of most respondents is junior-high school, and only a few had been to colleges or universities. The majority of the respondents are employed in the service (48.2%) and manufacturing (42.2%) sectors. Most of them conduct low-skilled work, being production line workers and service staff such as housekeepers, catering personnel, security guards and decoration workers.

Migrants with tertiary educational qualifications tend to report the strongest intention to settle in the host city (70.5%), followed by those with senior high-school qualification (56.24%) and junior high-school or below (53.25%). It seems that the difference in settlement intention between those with junior high-school or below and

senior high-school is less obvious, however, the difference is significant between migrants with and without tertiary education.

[Figure 2 about here]

5 Empirical results

Three models with increasing complexity are estimated. The baseline model (Model I) includes individual-level covariates only. City-level variables are incorporated in Model II to examine the impacts of contextual factors on migrants' settlement intention. Lastly, two sets of interaction terms between education and city-level variables (cross-level interaction effects) are incorporated in Model III. Table 2 displays the results of these models.

[Table 2 about here]

According to Model I, age appears to have a non-linear association with settlement intention: younger and older people tend to report lower probabilities of settlement intention than middle-aged adults, *ceteris paribus*. Females are more likely to report intention to settle than males. Marital status also matters, with single and divorced migrants reporting lower odds of long-term stay in host cities than married couples. Consistent with the above descriptive summaries, higher educational qualification is associated with higher odds of reporting long-term stay, everything else held equal. Professionals and business owners are more likely to settle than production or transportation or construction workers, although the differences are statistically insignificant at the 5% significance level. Compared with migrants working in the

service industries, those in the manufacturing and construction industries report statistically significantly lower probabilities of settlement intension, holding other variables constant. Income appears to be a significant correlate; a change in income from one standard deviation below the mean to one standard deviation above the mean is associated with an increase in the odds of settling down in host city by about 61%, *ceteris paribus*. To our surprise, the expenses-revenues ratio is positively related with settlement intention. One possible explanation concerns migrants' economic links with hometown. For those with a low expenses-revenues ratio, they may cut down spending in the host city in order to save and remit money to support family members or to invest in hometown (Zhu, 2007). Such links with hometown weaken migrants' intention to settle in the host city. Conversely, migrants with a high expenses-revenues ratio spend most of their income on urban life, such as improvement of residential housing or children's education. They may stay in the city in the long term. Urban hukou has a positive impact on settlement intention, indicating migrants from urban area are more willing to live in the host city on a long-term basis than those from the countryside.

Most variables on social attachment are significantly related to settlement intention. A larger number of children in the host city is associated with higher odds of intension to settle, whilst the number of children in hometown has an insignificant effect. Migrants with access to medical insurance in the host city report higher probabilities of settlement intension. Duration in the city exerts substantive influences on settlement intention, i.e. a change in standardized duration is associated with an increase in the odds of settling down in the host city by about 139%, *ceteris paribus*. A clear pattern is

revealed as to how geographical proximity is associated with migrants' settlement intention. Whilst intra- and inter-provincial migrants originated within YRD do not differ significantly in their settlement intension, migrants who come from bordering provinces of YRD and those provinces farther away are associated with significantly lower odds of staying in YRD on a long-term basis than the intra-provincial migrants in YRD do. This means that distances matter in settlement patterns, as people tend to settle in cities close to their hometown.

After city-level variables are added into Model II, the coefficients of individual-level predicators are similar to those in Model I, implying robust relationships between these predictors and settlement intention. The percentage of employees in the tertiary industry is positively related with settlement intention, *ceteris paribus*, although it is statistically insignificant. The result does not support Hypotheses 1, suggesting that employment structures in host cities may not influence migrants' decisions to settle in YRD. One explanation is that YRD is still in the phase of industrial upgrading, and the service sector in many cities is still small and developing. Therefore, migrants may not be sensitive to the city-level tertiary industry after controlling for their industrial sectors at the individual level. A second explanation may be related to the measurement of employment structure of a host city, the percentage of employees in the tertiary sector, which might not be able to fully capture potential impacts of employment structure. Future research may incorporate data on more detailed classification of different sectors, e.g. finance, education, catering and manufacturing, to better explore the impacts of city-level employment structure on settlement intension. The coefficient between

average wage of employees and settlement intention is positive, but statistically insignificant. We will discuss the impact of city-level average wage when we add interaction terms in Model III. The relationship between settlement intention and average housing price is significantly negative, which supports Hypotheses 3. Migrants tend to move away from the host city in the long term if housing costs are high. Compared with migrants living in cities with a population of one to three million, those living in cities with over three million people report higher intensions to settle. However, only the coefficient of CityI is statistically significant. It means that migrants are most willing to settle in mega-cities with over 10 million people or provincial capitals, after holding constant employment structure, wage level, housing price and individual socio-demographic variables. This is in contrast with government policies which aim to redistribute Chinese population in different sized cities by encouraging people to move to medium or smaller cities. Population control policies have been strict in mega-cities. Moreover, local governments use alternative means to discourage migrants to stay, such as demolishing urban villages which provide affordable housing to many low-income migrants and removing unregulated markets where migrants engage in informal economic activities (Mohabir et al., 2017). In contrast, population control is more relaxed in smaller cities. Policies are implemented, especially in county-level cities, to encourage migrants to convert their rural hukou to local urban hukou, at the cost of giving up their land quota in places of origin. However, the amenities associated with local hukou status in small cities are limited, especially when compared with the costs of losing land quota at hometown. The result that migrants prefer to settle in mega-

cities resonates with previous studies that hukou status plays a decreasing role in influencing migrants' settlement intension. It also indicates that the attraction of mega-cities is more than our controlled variables such as proportions of employees in the service sector and average wage level in the study. Factors including quality education services, hospitals and facilities need to be explored in future research.

In Model III, we further add two sets of cross-level interactions, i.e. the interactions between education and average wage at the city level, and between education and urban population size. A statistically significant positive interaction effect between tertiary education and city-level average wage is found—the odds of settlement intention associated with one unit increase in the average wage of a city for migrants with tertiary education is 29.4% larger than that of migrants with junior high-school education, everything else being equal. Changes in the odds of settlement intention related to a change in wage levels between migrants with junior high-school and senior high-school are not significantly different. The results suggest that cities with high wage levels are particularly attractive to highly-educated migrants when they make settlement decisions. This supports our Hypothesis 5 that there are differential impacts of city-level incentives to migrants with different educational attainment. After controlling for all other variables, the interactions between city population size and education are not statistically significant. Estimates on the coefficients of other variables in Model III remain similar to those in Model II, indicating robust correlation between these variables and settlement intention.

Due to debates about generational differences in settlement intension in the

literature, we further explore the determinants of settlement intention for the first-generation and new-generation migrants separately in Table 3. Using the two sub-samples, age is no longer significantly associated with settlement intention. For new-generation migrants, urban hukou does not influence their willingness to settle. Moreover, they are not discouraged by the distance from hometown. In contrast, young migrants originating from other provinces are more willing to settle in the host city, than those originating from YRD. As to city-level attributes, settlement intention of the first-generation migrants is sensitive to population size and housing price while new-generation migrants are not. One explanation is that new-generation migrants may not have considered purchasing houses at their young age, and therefore do not care much about housing price.

[Table 3 about here]

6. Conclusion

Drawing on data from the 2015 MDMS in 26 cities of Yangtze River Delta, this paper extends the literature by examining the impacts on migrants' settlement intention of city-level contexts using multilevel models, while taking into account individual-level demographic and socio-economic characteristics. The results show that housing price has negative impacts on migrants' decision to settle, while wage levels increase the settlement intension of migrants with tertiary education. Moreover, cities with over ten million residents or high administrative status are more attractive to migrants, compared with smaller cities. Lastly, individual differences in demographic and socio-

economic characteristics are also responsible for settlement intention variance. For example, educational attainment is positively related with decisions to settle.

The new urbanization strategy made by the Chinese government proposes that megacities should strictly control their population sizes while other cities should promote migrants' citizenization and encourage them to settle down. Such policies require further consideration, as our results indicate that migrants prefer to settle in mega-cities despite strict population controls. Policy initiatives are needed to enhance the job and living environments in smaller cities to make them more attractive for migrants to settle. Industrial relocation from mega-cities to smaller ones may be beneficial, as more job opportunities will be created in the latter. Besides, local governments need to do more to improve service provision in smaller cities, such as affordable housing, access to medical insurance and children' education services, in order to attract migrants to settle down and to promote inclusive urbanization. For migrants without tertiary education, vocational training and continued education programs will enhance their human capital, which are positively related with settlement intention.

This study has several limitations. First, social integration and attachment in the host city, e.g. interaction with local residents, are closely related with settlement intention. However, the survey does not record relevant information. We can only use other indicators, e.g. children in the city and duration, as proxies for social attachment. Second, there are other factors at city level that shape migrants' settlement decision, such as residential environment at neighbourhood level and detailed classification of

industrial sectors. This can be explored in future work when relevant data are made available. Finally, the study is based on data from 26 cities in the YRD. It would be useful to expand the study to other urban clusters with more small cities to see whether the results can be generalized to the national level.

References

Berger, M. C., & Blomquist, G. C. (1992). Mobility and destination in migration decisions: The roles of earnings quality of life and housing prices. *Journal of Housing Economics*, 2, 37-59.

Bonifazi, C., & Paparusso, A. (2019). Remain or return home: The migration intentions of first-generation migrants in Italy. *Population, Space and Place,* 25: e2174. https://doi.org/10.1002/psp.2174.

Browne, W. J., & Draper, D. (2001). A comparison of Bayesian and likelihood-based methods for fitting multilevel models. *Bayesian Analysis*, 1(3), 473-513.

Chan, K. W. (2010). A China paradox: migrant labor shortage amidst rural labor supply abundance. *Eurasian Geography and Economics*, 51(4), 513–530.

Chen, C., & Fan, C. C. (2016). China's huko puzzle: Why don't rural migrants want urban hukou. *China Review*, 16(3), 9-39.

Chen, Y., & Rosenthal, S. S. (2008). Local amenities and life-cycle migration: Do people move for jobs or fun? *Journal of Urban Economics*, 64(3), 519-537.

Chen, S. W., & Liu, Z. L. (2016). What determines the settlement intention of rural migrants in China? Economic incentives versus sociocultural conditions. *Habitat Intentional*, 58, 42-50.

Constant, A., & Massey, D. S. (2003). Self-selection, earnings, and out-migration: A longitudinal study of immigrants to Germany. *Journal of Population Economics*, 16(4), 631-653.

CPC Central Committee and State Council. (2014). *National Plan for New Urbanization* (2014-2020) [guojia xinxing chengzhenhua guihua (2014-2020)]. Issued March 16, 2014. Accessed 16.02.15 www.gov.cn.

Cui, C., Geertman, S., & Hooimeijer, P. (2016). Access to homeownership in urban China: A comparison between skilled migrants and skilled locals in Nanjing. *Cities*, 50, 188-196.

Faggian, A., Olfert, M. R., & Partridge, M. D. (2011). Inferring regional well-being from individual revealed preferences: The 'voting with your feet' approach. *Cambridge Journal of Regions, Economy and Society*, 5(1), 163-180.

Fan, C. C. (2011). Settlement intention and split households: Findings from a survey of migrants in Beijing's urban villages. *China Review*, 11(2), 11-42.

Findlay, A. M., Stockdale, A., & Stewart, E. (2002). Professional and managerial migration from core to periphery: The case of English migration to Scottish cities. *International Journal of Population Geography*, 8(3), 217-232

Gelman, A. (2008). Scaling regression inputs by dividing by two standard deviations. *Statistics in Medicine*, 27, 2865-2873.

Gelman, A., Carlin, J. B., Stern, H. S., & Rubin, D. B. (2014). *Bayesian Data Analysis*. Taylor & Francis.

Glaeser, E. L., & Gottlieb, J. D. (2006). Urban resurgence and the consumer city. *Urban Studies*, 43(8): 1275-1299

Goldstein, H. (2010). *Multilevel Statistical Methods*, third edition. London, Arnold.

Hoehn, J., Berger, M., & Blomquist, G. C. (1987). A hedonic model of interregional wages, rents and amenity values. *Journal of Regional Science*, 27(4), 605-620.

Jones, K., Johnston, R., Manley, D., Owen, D., & Charlton, C. (2015). Ethnic residential segregation: a multilevel, multigroup, multiscale approach exemplified by London in 2011. *Demography*, 52(6), 1995-2019.

Korinek, K., Entwisle, B., & Jampaklay, A. (2005). Through thick and thin: Layers of social ties and urban settlement among Thai migrants. *American Sociological Review*, 70(5), 779-800.

Liu, Y., & Shen, J. (2014). Jobs or Amenities? Location choices of interprovincial skilled migrants in China, 2000-2005. *Population, Space and Place*, 20(7): 592-605.

Liu, Y., & Shen, J. (2017) Modelling skilled and less-skilled interregional migrations in China, 2000–2005. *Population, Space and Place*, 23(4): 1-17.

Liu, Y., Shen, J., Xu, W., & Wang, G. (2017) From school to university to work: migration of highly educated youths in China. *The Annals of Regional Science*, 59(3), 651-676.

Liu, Z., Wang, Y., & Tao, R. (2013). Social capital and migrant housing experiences in urban China: A structural equation model analysis. *Housing Studies*, 28(8), 1155-1174.

Liu, Z., Wang, Y., & Chen, S. (2017). Does formal housing encourage settlement intention of rural migrants in Chinese cities? A structural equation model analysis. *Urban Studies*, 54(8), 1834-1850.

Meng, X. (2012). Labor market outcomes and reforms in China. *Journal of Economic Perspectives*, 26(4), 75-101.

Mohabir, N., Jiang, Y., & Ma, R. (2017). Chinese floating migrants: Rural-urban migrant labourers' intentions to stay or return. *Habitat International*, 60, 101-110.

National Health and Family Planning Commission, PRC. (2017). *Report on China's migrant population development*. Beijing: China Population Publishing House.

National Bureau of Statistics, PRC. (2016). *Chinese City Statistic Yearbook*. Beijing: China statistics press.

Qian, H. F. (2010). Talent, creativity and regional economic performance: The case of China. *Annals of Regional Science*, 45(1): 133-156

Reyes, B. I. (2001). Immigrant trip duration: The case of immigrants from Western Mexico. *International Migration Review*, 35(4), 1185-1204.

Rasbash, J., Steele, F., Browne, W. J., & Goldstein, H. (2012). *A user's guide to MLwiN* (version 2.26). Centre for Multilevel Modelling, University of Bristol.

Snijders, T. A. B., Bosker, R., J. (2012). Multilevel analysis: an introduction to basic and advanced multilevel modelling (Second edition). London: Sage.

State Council, PRC. (2010). *Major figures of 2010 population census of China*. Beijing: China statistics press.

Tao, L., Hui, E. C. M., Wong, F. K. W., & Chen, T. (2015). Housing choices of migrant workers in China: Beyond the Hukou perspective. *Habitat International*, 49, 474-483.

Thomas, M. (2019). Employment, education and family: Revealing the motives behind internal migration in Great Britain. *Population, Space and Place*, 25: e2233. https://doi.org/10.1002/psp.2233.

Tiebout, C. M. (1956). A pure theory of local expenditures. *Journal of Political Economy*, 64(5), 416-424.

Todaro, M. P. (1969). A model of labour migration and urban unemployment in less developed countries. *The American Economic Review*, 59(1): 138-148.

Zang, B., Lv, P., & Warren, C. M. J. (2015). Housing prices, rural-urban migrants' settlement decisions and their regional differences in China. *Habitat International*, 50, 149-159.

Zhu, Y. (2007). China's floating population and their settlement intention in the cities: Beyond the Hukou reform. *Habitat International*, 31, 65-76.

Zhu, Y., & Chen, W. (2010). The Settlement intention of China's floating population in the cities: Recent changes and multifaceted individual-level determinants. *Population, Space and Place*, 16(4), 253-267.
Zhu, Y., & Lin, L. Y. (2014). Continuity and change in the transition from the first to the second generation of migrants in China: Insights from a survey in Fujian. *Habitat International*, 42, 147-154.

Table 1. Summary of key variables used in the study.

Variables	Description	Proportion (%)/mean
Settlement intention	Willing to settle down in host city (more than 5 years)	55.9%
Individual-level independent variables		
Gender	Male as base category	59.4%
Age		34.6
Education	Junior high school or below (base)	69.3%
	Senior high school	18.4%
	Tertiary education (college or university degree)	12.3%
Occupation type	Production, transportation and building workers (base)	44.1%
	Government employees and professionals	10.4%
	Businessman	9.8%
	Low-skilled service personnel	32.2%
	Other occupations	3.4%
Industry type	Service industry (base)	48.2%
	Manufacture industry	42.2%
	Construction industry	7.1%
	Other industries	2.6%
Hukou type	Agricultural *Hukou* (base)	88.2%
	Urban *Hukou*	11.8%
Marital status	Married (base)	80.9%
	Single	17.3%
	Divorced	1.8%
Income	Monthly income (yuan)	4576
Local children	Number of children in host city	1.2
Hometown children	Number of children in hometown	0.7
Expense-revenue ratio	Ratio of household expenses to revenues	0.474
Medical insurance	Non-local insured (base)	69.8%
	Local insured	30.2%
Duration	Years of duration in host city	4.7
Hometown location	Intra-province migration in YRD (base)	18.6%
	Inter-province migration in YRD	30.0%
	Provinces bordering of YRD	25.0%
	Other region	26.4%
City-level independent variables		
Population size	CityIV (1~3 million) (base)	23.1%
	CityIII (3~5 million)	34.6%
	CityII (5~10 million)	23.1%
	CityI Mega-cities (>10 million and provincial capital)	19.2%
Tertiary industry	Percentage of tertiary industry employees	39.7%
Average wage	Average wage of employees per year(yuan)	60274
Housing price	Property sale price (yuan/m^2)	7741

Note: Intra-province migration refers to movement between cities within a province. Inter-province migration refers to movement across provincial boundaries.

Table 2. Estimation results of multilevel binomial response models. Odds ratios and the associated 95% credible intervals are reported.

	Model I			Model II			Model III		
	Median	2.5 %	97.5 %	Median	2.5 %	97.5 %	Median	2.5 %	97.5 %
Individual-level independent variables									
Female	1.08*	1.02	1.14	1.07*	1.01	1.13	1.07*	1.01	1.13
Age	1.23*	1.13	1.32	1.22*	1.13	1.32	1.22*	1.12	1.32
Age squared	0.91*	0.85	0.96	0.91*	0.85	0.96	0.91*	0.85	0.96
Tertiary education	1.60*	1.43	1.78	1.59*	1.42	1.78	1.12	0.70	1.82
Senior high school	1.08*	1.01	1.16	1.08*	1.00	1.16	1.09	0.79	1.50
Government employees and professionals	1.10	0.99	1.22	1.10	0.98	1.22	1.09	0.98	1.22
Businessman	1.11	0.98	1.26	1.11	0.98	1.26	1.12	0.99	1.27
Low-level service personnel	0.95	0.86	1.04	0.95	0.86	1.04	0.95	0.87	1.04
Other occupations	0.75*	0.62	0.89	0.74*	0.62	0.88	0.74*	0.62	0.89
Manufacture industry	0.69*	0.63	0.75	0.69*	0.63	0.76	0.69*	0.63	0.76
Construction industry	0.53*	0.47	0.60	0.53*	0.47	0.60	0.53*	0.47	0.60
Other industries	0.86	0.70	1.05	0.86	0.70	1.05	0.86*	0.70	1.05
Urban *Hukou*	1.08*	0.98	1.19	1.08	0.98	1.19	1.06*	0.96	1.17
Single	0.65*	0.58	0.71	0.65*	0.58	0.71	0.65*	0.58	0.71
Divorced	0.78*	0.63	0.94	0.77*	0.63	0.94	0.77*	0.64	0.94
Duration	2.39*	2.23	2.55	2.39*	2.24	2.56	2.39*	2.24	2.56
Income	1.61*	1.48	1.74	1.61*	1.48	1.75	1.59*	1.47	1.73
Local medical insured	1.45*	1.35	1.55	1.44*	1.35	1.55	1.44*	1.34	1.54

Hometown children	0.96	0.88	1.04	0.96	0.89	1.04	0.96	0.89	1.04
Local children	1.77*	1.63	1.91	1.77*	1.64	1.91	1.77*	1.63	1.91
Expense-revenue ratio	1.21*	1.14	1.28	1.20*	1.14	1.28	1.20*	1.14	1.27
Inter-province migration in YRD	0.96	0.87	1.04	0.96	0.88	1.05	0.95	0.87	1.04
Provinces bordering of YRD	0.85*	0.77	0.93	0.85*	0.78	0.94	0.84*	0.77	0.93
Other region	0.79*	0.71	0.86	0.79*	0.72	0.86	0.78*	0.71	0.86
City-level independent variables									
CityI				1.75*	1.13	2.59	1.73*	1.06	2.69
CityII				1.43	0.97	2.18	1.41	0.95	2.16
CityIII				1.09	0.76	1.55	1.05	0.74	1.56
Tertiary industry				1.27	0.96	1.70	1.26	0.93	1.68
Average wage				1.22	0.71	1.69	1.16	0.79	1.72
Housing price				0.59*	0.40	0.94	0.61*	0.40	0.93
Tertiary education × Average wage							1.29*	1.07	1.55
Senior high school × Average wage							0.93	0.80	1.09
Tertiary education × CityI							1.19	0.70	1.97
Senior high school × CityI							1.02	0.72	1.46
Tertiary education × CityII							1.22	0.72	2.02
Senior high school × CityII							0.99	0.70	1.40
Tertiary education × CityIII							1.30	0.78	2.15
Senior high school × CityIII							1.06	0.75	1.50
City-level variance	0.07	0.03	0.16	0.09	0.05	0.19	0.07	0.03	0.16
PD	46.21			46.08			54.21		

Note: "*" indicates significance at the 95% credible interval. Default categories are male, junior high school and below, production transportation and building workers, service industry, agricultural hukou, married, non-local medical insured, intra-province migration originated in YRD, CityIV with a population between 1 and 3 million. *PD* is the effective number of parameters from a model .

Table 3. Estimation results from multilevel binomial response models for different cohorts. Odds ratios and the associated 95% credible intervals are reported.

	Model IV: First generation			Model V: New generation		
	Median	2.5%	97.5%	Median	2.5%	97.5%
Individual-level independent variables						
Female	1.11*	1.01	1.21	1.05	0.98	1.13
Age	0.94	0.61	1.42	1.51	0.90	2.58
Age squared	1.03	0.85	1.25	1.05	0.73	1.54
Tertiary education	0.52	0.15	1.69	1.31	0.76	2.26
Senior high school	0.99	0.58	1.71	1.14	0.76	1.69
Government employees and professionals	0.99	0.82	1.21	1.14*	1.00	1.30
Businessman	1.15	0.96	1.38	1.12	0.94	1.33
Low-level service personnel	0.98	0.85	1.12	0.95	0.83	1.08
Other occupations	0.70*	0.54	0.89	0.86	0.67	1.12
Manufacture industry	0.75*	0.65	0.87	0.67*	0.60	0.76
Construction industry	0.54*	0.45	0.64	0.56*	0.47	0.67
Other industries	1.00	0.76	1.31	0.69*	0.50	0.94
Urban *Hukou*	1.28*	1.09	1.51	0.96	0.85	1.09
Single	0.66*	0.46	0.96	0.60*	0.54	0.68
Divorced	0.84	0.67	1.06	0.62*	0.42	0.92
Duration	2.14*	1.98	2.32	3.22*	2.84	3.65
Income	1.52*	1.35	1.72	1.66*	1.48	1.86
Local medical insured	1.58*	1.42	1.76	1.36*	1.25	1.49
Hometown children	1.11	0.99	1.23	0.80*	0.70	0.91
Local children	1.87*	1.67	2.09	1.59*	1.42	1.78
Expense-revenue ratio	1.24*	1.13	1.36	1.19*	1.10	1.28
Inter-province migration in YRD	1.12	0.98	1.28	0.82*	0.73	0.93
Provinces bordering of YRD	0.89	0.78	1.03	0.79*	0.70	0.90
Other region	0.88	0.77	1.01	0.70*	0.61	0.79
City-level independent variables						
CityI	2.06*	1.31	3.41	1.51	0.93	2.69
CityII	1.45	0.94	2.32	1.41	0.89	2.39
CityIII	1.21	0.81	1.81	0.99	0.65	1.54
Tertiary industry	1.29	0.94	1.77	1.30	0.93	1.83
Average wage	1.30	0.88	1.95	1.14	0.74	1.71
Housing price	0.51*	0.35	0.77	0.65	0.42	1.00
Tertiary education × Average wage	1.36	0.82	2.21	1.21	0.98	1.49
Senior high school × Average wage	0.77	0.58	1.05	0.93	0.77	1.12
Tertiary education × CityI	2.28	0.60	8.90	1.12	0.63	2.03
Senior high school × CityI	1.60	0.85	2.97	0.97	0.62	1.52
Tertiary education × CityII	1.86	0.51	7.36	1.08	0.60	1.95

Senior high school × CityII	1.03	0.57	1.87	0.96	0.62	1.49
Tertiary education × CityIII	2.47	0.68	9.71	1.14	0.64	2.05
Senior high school × CityIII	1.24	0.67	2.26	1.02	0.67	1.59
City-level variance	1.06	1.02	1.17	1.07	1.03	1.19
PD	52.02			52.14		

Note: "*" indicates significance at the 95% credible interval. Default categories are male, junior high school and below, production transportation and building workers, service industry, agricultural hukou, married, non-local medical insured, intra-province migration originated in YRD, CityIV with a population between 1 and 3 million. *PD* is the effective number of parameters from a model .

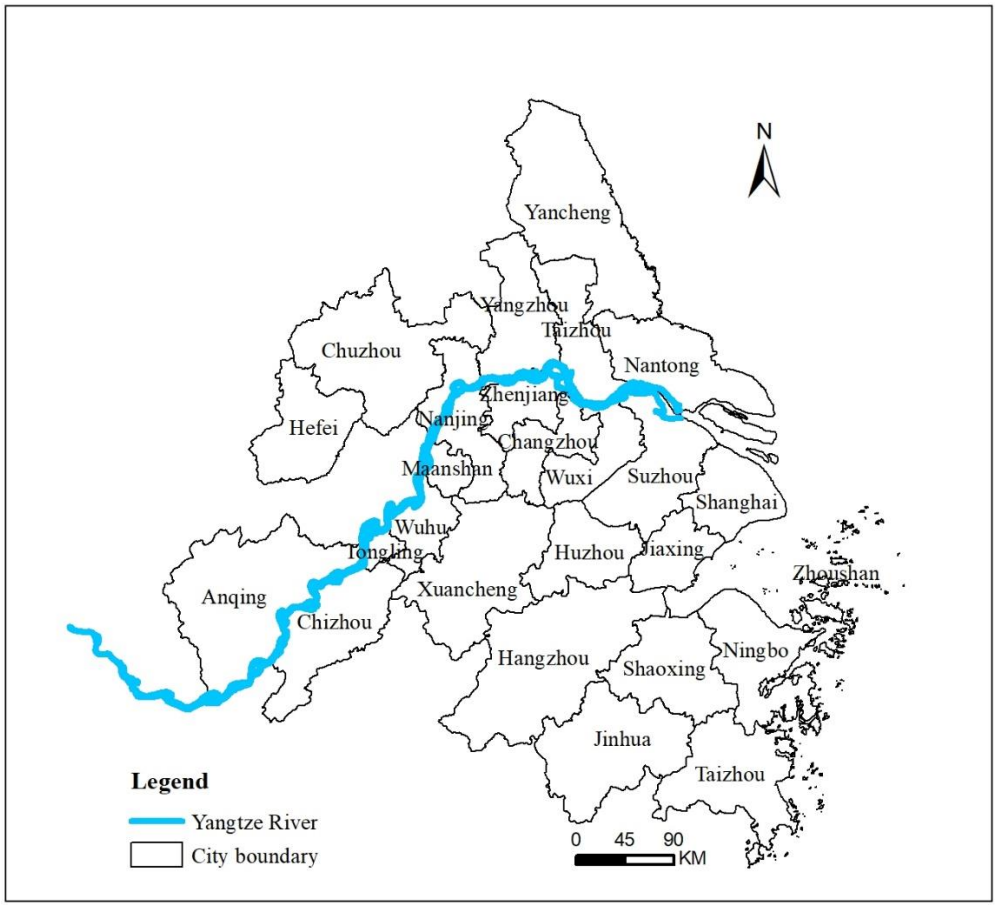

Figure 1. The study area of Yangtze River Delta Urban Agglomerations.

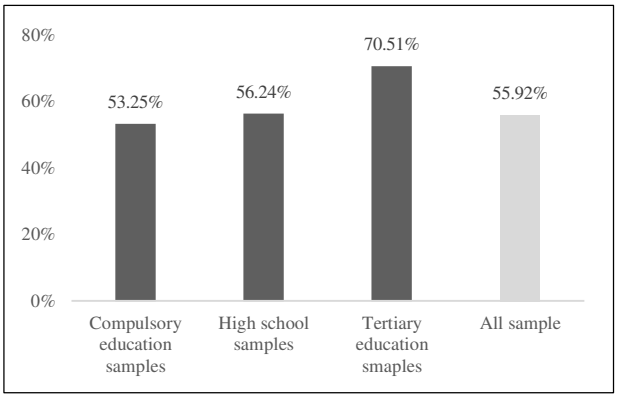

Figure 2. Percentages of migrants with settlement intention, broken down by education qualifications.