




The Effects of Health on the Settlement Intention of Rural–Urban Migrants: Evidence from Eight Chinese Cities

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Abstract

The growing number of rural–urban migrants in China has made it important to understand the factors contributing to this migration. By using data from a nationally representative survey and multilevel logistic regression, this study examines the extent to which the health of rural–urban migrants influences their settlement intention in the cities chosen as their destinations. It goes beyond past studies by disentangling the complexity of settlement intention into short- and long-term decisions, and by examining the moderating role of social support provided by the host society. The results of regression analysis revealed that physical and mental health play a crucial role in shaping the settlement intention of migrants, but their effects are not always identical in cases of short- and long-term intentions. Migrants consider their mental rather than physical health when reporting short-term settlement intention, and assign greater importance to physical health than mental health when indicating long-term settlement intention. Furthermore, the relationship between migrants' health and their settlement intention is moderated by social support from local residents and the local neighbourhood. These results highlight the importance of reducing health inequality across social groups to allow for inclusive urbanization in China.

Keywords Rural–urban migrants · Mental health · Physical health · Settlement intention · Social support · China

Introduction

As a response to rapid economic development and growing demand for labour in urban areas, migration restrictions have gradually been relaxed since the mid-1980s in China,

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and millions of rural–urban migrants have flocked to urban areas to improve their economic wellbeing (Fan 2002). The rural–urban migrant population in China was 245 million in 2017 (NPFPC 2018). Enabling eligible migrants to settle in cities has thus emerged as a crucial part of China’s recently advocated new-style urbanization. Essential to this is the willingness and ability of rural–urban migrants to be rooted in host cities. While a large body of literature has been devoted to the linkage between the health status of immigrants/migrants and their mobility in western countries (Abraído-lanza et al. 1999; Norman et al. 2005; Green et al. 2017), only recently has this relationship received attention from researchers in the context of Chinese rural–urban migration (Chen 2011; Xie et al. 2017; Lu and Qin 2014). A few studies have found that healthier migrants have a higher tendency of settling in host cities (Xie et al. 2017) because they tend to secure better-paid and more stable jobs in their destination cities than their unhealthy counterparts (Qin et al. 2015; Gao et al. 2015). In addition, due to the constraints of the *hukou* system, migrants in poor health have no choice but to return to their hometown for healthcare services (Lin et al. 2011; Cheung 2014). These studies have provided an insight into the correlation between health and the settlement intention of migrants, but some gaps persist in our understanding of the issue.

One such gap is the connection between the short- and long-term settlement plans of migrants and their health (e.g. Zhu and Chen 2010; Cao et al. 2015; Chen and Liu 2016). Previous studies have shown that the short-term settlement intention of migrants does not necessarily imply their long-term plans (Sun and Fan 2011). The short-term settlement intention has more to do with a migrants’ ability to adapt to a host society (e.g. by securing a job, temporary accommodation, and social integration) (Sun and Fan 2011), while their long-term plan seems to rely more on institutional factors and individual capabilities (e.g. transferring the *hukou* status and purchasing a dwelling) (Zhu and Chen 2010; Huang et al. 2018). Health problems can eventually drive migrants back home (Xie et al. 2017), where they will attempt to maintain a livelihood even though their health may deteriorate (Han et al. 2014). Therefore, it is necessary to consider the effect of health in determining the trajectory of migration.

There is another research gap due to the inadequate attention given to the role of local social support in the host city in moderating the relationship between the health of migrants and their settlement intention. Previous studies have revealed the alleviation effect of neighbourhood-level social support on health outcomes (Wang et al. 2019; Kawachi and Berkman 2001; Kawachi et al. 1999; Liu et al. 2017). Others have shown a strong connection between local social support and the settlement intention of migrants (Liu et al. 2016; Du and Li 2012). However, there is a lack of literature regarding the moderating effect of local social support on the correlation between the health of migrants and their settlement decision. The buffering effect hypothesis claims that social support protects people from the potentially adverse effects of stressful events, such as physical illness and mental disorders (Cohen and Wills 1985; Wang et al. 2018). For this reason, social support provided by the local neighbourhood may alleviate hardships stemming from health issues and relieve the consequence stress arising among rural–urban migrants (Palmer and Xu 2013; Wen et al. 2010).

To bridge the above limitations, this study explores how the health status of rural–urban migrants influences their settlement intentions in destinations within China by employing data from the 2014 National Migrant Population Dynamic Monitoring

Survey (MDMS). It goes beyond previous studies on the effects of the health of migrants on their settlement intention by disentangling the complexity of this issue (i.e. by breaking it down into short- and long-term intentions), and by distinguishing between the effects of physical and mental health on the trajectory of settlement. It goes a step further by shedding a light on the moderating effect of the social support provided by host city.

The remainder of this paper proceeds as follows: In the second section, we review the literature on migrants' intention to settle in destination cities. In third section, we introduce the source of data and the variables. Fourth section reports the results of regression analysis, and Fifth section discusses the theoretical contributions of empirical findings. The paper concludes with a summary of key findings and policy suggestions.

Literature Review

The Settlement Intention of Migrants in Cities

Research on the settlement of migrants and their intention to return home began when many countries with high immigration rates (e.g. Europe and North America) experienced the migration of guest workers back to their home countries (Ette et al. 2016). The explanations offered for this were primarily from an economic perspective, with an emphasis on the differentials of economic development and income (e.g. relative economic disparity, human capital, and purchasing power) between the home and host countries (Sjaastad 1962; Harris and Todaro 1970). Interpretations from other perspectives were gradually proposed, and these highlighted the role of non-pecuniary motives (e.g. position in the lifecycle framework and family structure) (Stark 1992; McHugh 2000). With industrialization and massive internal immigration in developing countries, researchers have gradually realised the multipolar nature of internal migration, argued against a binary definition of migrants as either rural or urban residents, and have defined the form of temporary/circular migration (Hugo 1998). A few studies have further interpreted internal immigration as a means for migrants to support households in rural areas (Hugo 2006; Fan 2011). In this way, migrants could exploit the advantages of both lives by spending in low-cost countryside areas, while earning in high-income urban areas (Piore 1979; Hugo 2006).

In China, rural–urban migrants reside in urban areas but their *hukou* are registered in the countryside (Xiang et al. 2018; Liu and Xu 2017). Along with the rapid urbanization recently experienced in China, the permanent settlement intention of migrants has aroused research interest, and a series of factors have been considered to interpret these phenomena (e.g. institutional, demographic, socioeconomic, and health- and social capital-related) (Zhu and Chen 2010; Hao and Tang 2015; Xie and Chen 2018). Coupled with the non-permanent internal migration in other developing countries (Hugo 1998), the existence of a temporary/circular migration pattern in China has been identified (Zhu 2004; Fan 2011). Some migrants tend to keep moving back and forth between rural and urban areas for the sake of the socioeconomic wellbeing of their households (Zhu 2004). Meanwhile, confronted with long-term uncertainties (e.g. institutional change and family planning) and objective barriers (e.g. institutional

factors and social exclusion) (Xie and Chen 2018; Chen and Fan 2016; Yang et al. 2016), not every rural–urban migrant can be accepted by urban society, and some only formulate their settlement intention in the short-term.

Rural–urban migrants are cautious about permanently settling in cities. They do not wish to convert to an urban *hukou* at the cost of relinquishing the rights associated with farms and residential land in countryside (Chen and Fan 2016). In an ideal situation, they expect that to accommodate the pace of urbanization, the government will expropriate their farmland and compensate them for their loss. After exhausting all the benefits of their rural *hukou*, they then might feel free to transfer their status to the city (Hao and Tang 2015). A safe *hukou* strategy is to therefore adopt a wait-and-see attitude regarding their settlement intention. Hence, the settlement trajectory of rural–urban migrants in China is complicated, and it is necessary to distinguish the different time dimensions of settlement intention and its determinants.

Health and the Settlement Intention of Migrants

Previous studies have revealed a paradoxical pattern regarding the outcomes of migrant health. Although migrants usually dwell in undesirable environments, have low socioeconomic status, and lack the kind of healthcare access that is available to urban residents (Hummer et al. 2004), they are in better health relative to the residents of both their origin and destination (Schimmele et al. 2005; Riosmena et al. 2013). Two main explanations have been proposed to explain this health-related paradox. The first one is called the “healthy migrant” hypothesis, which states that migrants are a group selected for with respect to health (Rubalcava et al. 2008). The second is the “salmon bias” hypothesis (Abraído-lanza et al. 1999), which suggests a correlation between settling and returning migrants. It postulates that migrants with physical problems have a greater tendency to return home (Palloni and Arias 2004; Turra and Elo 2008). Nevertheless, many empirical studies of the salmon bias hypothesis have faced a lack of accessible data and have resorted to merely considering individual profiles to verify this hypothesis. Some studies have investigated the correlation between the future settlement intention and the health of migrants residing in cities (Xie et al. 2017; Lu and Qin 2014), whereas others tracked migrants who had returned home to examine their health (Ullmann et al. 2011; Diaz et al. 2016). Each individual profile is crucial to understand the health-related consequences of urban migration and the salmon bias hypothesis. Mental status has been confirmed to be a vital component of overall health status. Migrants with fewer mental problems tend to reside in the host cities (Diaz et al. 2016; Xie et al. 2017).

In China, the linkage between the health and mobility of migrants has been bridged. Some researchers have confirmed the health migration hypothesis, whereby healthier rural residents are more likely to migrate to cities (Chen 2011; Zhang et al. 2015; Lu and Qin 2014). Moreover, because the return of internal migrants is difficult to track, a few studies have focused on the migrants that remained in host cities and investigated the correlation between their health status and choice of future destination. The findings suggest that the salmon bias seems plausible in urban China. Migrants who suffer from health problems show a tendency to eventually return home (Lu and Qin 2014; Xie et al. 2017). With respect to long-term settlement intention, health therefore appears to have a significant effect.

It is not clear if health exerts a similar impact on the settlement intention of migrants in urban areas over the short- and long-term. It also remains unclear if migrants have a

different level of sensitivity to their physical and mental health status in regard to their settlement intention. It is assumed that the physical and mental status of migrants differs after they move into cities (Chen 2011), and there are two factors that might have different roles in their migration experience. For a short-term stay, some migrants may be able to cope with a deterioration in their health due to economic pressures that compel them to continue working (Han et al. 2014). In the long-term, this negative strategy might not work for financial reasons and due to institutional constraints. Home ownership in cities is a crucial indicator that can be used to predict the intention of migrants to settle permanently (Zang et al. 2015; Xie and Chen 2018). It is challenging for migrants in poor health to maintain productivity for the many years that it would take to save enough money to purchase a house. Housing prices in China are growing rapidly and physical health directly determines the employment and income status of migrants (Qin et al. 2015). Moreover, with the reform of the *hukou* system, health and employment status will also influence migrants' access to an urban *hukou*. As urban *hukou* allows people to qualify for public medical services in host cities, and these medical schemes are not transferable across regions (Hou et al. 2017). A lack of access to urban public services will therefore exclude migrants in poor health from the relevant institutions in their host cities (Huang et al. 2014). We therefore assumed that migrants were particularly sensitive to physical status when considering whether to settle in a destination over the long-term. Hence, the following hypothesis was proposed:

H1: Physical Health Exerts a Stronger Influence on the Intention of Migrants to Settle Permanently in Cities than it Does in the Short Term

In contrast to the above, it is assumed that the role of mental health is different. The mental health of migrants is strongly associated with their willingness and ability to integrate into a host city. The underlying logic is that social networks are crucial for shaping temporary migration (Sun and Fan 2011), and migrants in better mental health are more capable of constructing new social ties with local residents (Xie et al. 2017). Integration into host societies is crucial for adjustment to the new environment, the exchange of information, and searching for employment and accommodation because rural–urban migrants have limited social capital in host cities (Liu et al. 2012; Yue et al. 2013; Wang et al. 2016). Migrants in poor mental health may isolate themselves from local residents and maintain a strong connection with their home location because these social bonds can mitigate the mental stress that they suffer (Wong et al. 2008; Bhugra 2004). Therefore, if migrants have mental problems due to the stress of adaptation to an unfamiliar urban society in the short-term, their health status might worsen (Chen 2011). Moreover, in the long-term, the mental health of migrants is volatile and unsteady, along with their achievements and living status. We thus hypothesized that the intention of migrants to settle in the short-term is more sensitive to their mental health than their plan to do so in the long term. The second hypothesis was as follows:

H2: Mental Health Is more Important in Shaping the Migrants' Intention to Temporarily Settle in Cities than for the Long Term

Social support from friends, neighbours, and neighbourhood organisations are critical for promoting the integration of migrants into the host society (Li et al. 2007). In China,

in response to the slow evolution of public service equalisation for migrants, social support and neighbourhood services have become vital channels for them to gain resources and assistance, especially migrants in disadvantageous situations. Studies have revealed that social support provides a buffer against socioeconomic disadvantages and the resultant stress (Wang et al. 2016; Liu et al. 2017), and the basic services provided by the neighbourhood are positively associated with migrant health (Liang et al. 2010; Palmer and Xu, 2013; Wen et al. 2010). The role of local social support in the relationship between the health of migrants and their settlement intention has not been thoroughly investigated. It has been previously noted that social support is important in reducing stress and anxiety among migrants (Liu et al. 2017), and plays different roles among different groups of people (Levecque and Van Rossem 2015). We thus assume that sufficient social support can alleviate the negative effects of health-related problems on the settlement intention of migrants and ease relevant concerns to increase their likelihood of staying in their destination cities. Therefore, a third hypothesis is proposed:

H3: Neighbourhood Services and Social Support from Local Residents Moderate the Relationship between Migrants' Health Conditions and their Settlement Intention in Cities

Data and Methods

Data

We used data from the nationally representative Migrant Dynamic Monitoring Survey (MDMS) carried out by the National Population and Family Planning Commission of China (NPFPC). The individual-level dataset consisted of a main questionnaire and a mental health sub-dataset. This sub-dataset provided detailed information on rural–urban migrants from eight cities (Beijing, Jiaying, Zhengzhou, Qingdao, Xiamen, Shenzhen, Zhongshan, and Chengdu). These cities were selected for the following reasons. First, they were the pilot cities under the “Equalisation of Basic Public Service” project of the NPFPC, because of which detailed records of neighbourhood services provided in them were available. This project provides researchers with the opportunity to investigate the influence of neighbourhood-level services and social integration on the settlement intention of migrants. Second, these cities are located in different regions of China (eastern, middle, and western China). They vary by level of economic development and *hukou* policy. Third, these cities are major destinations for rural–urban migrants in China,¹ and migrants therein were representative of those moving from the countryside or small-to-medium cities to large ones.

The survey contained the information on 16,000 respondents (2,000 respondents from each city). All respondents were between 15 and 59 years old in May 2014, and had migrated to another county (based on *hukou* registration) where they had stayed for

¹ According to the census data from 2014, a total of 8.19, 1.09, 3.40, 2.00, 2.86, 15.32, 1.63, and 4.97 million migrants resided in Beijing, Jiaying, Zhengzhou, Qingdao, Xiamen, Shenzhen, Zhongshan, and Chengdu, respectively.

more than a month. The sampling approach used for the survey was three-stage probability proportion to size (PPS). First, the MDMS selected primary sampling units (towns and sub-districts) from the eight cities. Second, secondary sampling units (neighbourhood-level units) were selected from the primary sampled units. Third, two methods (top down and bottom up) were used to select 20 households from each neighbourhood unit and one member from each household was sampled. Apart from individual questionnaires, neighbourhood-level questionnaires were collected by MDMS. We matched the individual-level and neighbourhood-level data based on the corresponding neighbourhood code. A total of 12,188 individual migrants living in 750 neighbourhoods were sampled in our dataset.

Methodology

We used multilevel logistic models with the following specification for the analysis (Goldstein 2010):

$$\log\left(\frac{P_{ijk}}{1-P_{ijk}}\right) = \delta_0 + \alpha X_{ijk} + \beta Z_{jk} + \gamma C_k + \mu_j$$

The above equation shows the probability of settlement intention $P(y_{ijk} = 1)$ of individual i in neighbourhood j in city k , X_{ijk} represents individual-level variables, Z_{jk} represents neighbourhood-level variables, and C_k represents city-level variables. α , β , and γ are the corresponding coefficients, and μ_j is the random effect of unobserved factors at the neighbourhood level, $\mu \sim N(0, \sigma_\mu^2)$.

We then used the intra-class correlation coefficient (ICC) to measure the variance level within each neighbourhood:

$$ICC = \frac{\sigma_b^2}{\sigma_w^2 + \sigma_b^2}$$

Specifically, σ_b^2 is the inter-neighbourhood variance, σ_w^2 is intra-neighbourhood variance, and σ_w^2 denotes the variance of the standard logistic distribution. A large ICC implies a high level of intra-neighbourhood variance clustering. In addition, the likelihood ratio was used to examine the validity of employing multilevel regression.

Measurement of Variables

Settlement Intention

The official MDMS report defined five years as the threshold between short- and long-term migration (Floating Population Division of The National Health and Family Planning Commission of China 2015), while the average floating time of China's migrants was 4.3 years. It evaluated the settlement intention of migrants according to two questions. (1) Short-term settlement intention: "Do you intend to reside in the current city for the next five years?" The dependent variable was labelled "1" if respondents replied "Yes" and "0" for other answers. (2) Long-term settlement

intention: “Do you intend to reside in the current city permanently?” The dependent variable was labelled “1” for the response “Yes” and “0” otherwise.

Physical Health

Self-rated health has been extensively used to measure the objective health status (Mossey and Shapiro 1982; Xie et al. 2017). Based on a respondent’s answer, we categorized their self-rated physical status as follows: “How would you rate your overall state of physical health?” In response, the respondents give a score from 1 and 5 on a Likert scale, indicating a physical health status from low to high. As the number of migrants reported being in “very poor” or “poor” health were less than 10% of the total, we reported physical health as a dichotomous variable: fair health or below (self-reported score from 1 to 3) and good health (self-reported score from 4 to 5). This had a good validity for similar distributions of self-reported health among migrants (Lu and Qin 2014; Xie et al. 2017).

Mental Health

The measurement of mental health was based on the Kessler Psychological Distress Scale (K6) (Kessler et al. 2003). Past studies have documented its validity in different contexts (Furukawa et al. 2003; Hilton and Whiteford 2010). To calculate the mental status of migrants precisely, the MDMS used the following questions. “Did you feel nervous?,” “Did you feel hopeless?,” “Did you feel restless or fidgety?,” “Did you feel so depressed that nothing could cheer you up?,” “Did you feel that everything was an effort?,” and “Did you feel worthless?” Using the Likert scale, the respondents ranked each question from 1 to 4 based on their status in the last month, respectively representing “never,” “occasionally,” “always,” and “all the time.” Based on each question, the scores for the six questions were summed to get a total score, with a range from 6 to 24. To determine any correlations among the six items, we used Cronbach’s alpha coefficient of scale. The result showed that the measurement was reasonable, with a coefficient of 0.8339.

Social Relationship with Local Residents

The MDMS invited the respondents to rate their relationships with local residents based on a five-point Likert scale. Because less than 5% of the respondents reported “very bad” or “bad” relationships with local residents, we treated social relationships as a dichotomous variable: “1” for a good relationship (response = 4–5) and “0” for a fair or a bad relationship (response = 1–3).

Neighbourhood Service

This was measured by the availability of neighbourhood services to rural–urban migrants in the sampled neighbourhood. The instrument of neighbourhood services consisted of the following 10 service-related items: “medical service,” “health counselling,” “psychological counselling,” “public health education,” “life support,” “vocational training,” “employment aid,” “voluntary activities,” “organising recreational

activities,” and “help with children’s admissions.” Each item was coded “1” if the relevant service had been provided, and the overall score was the sum of scores for the 10 items.

Control Variable

For consistency with previous studies (Hao and Tang 2015; Huang et al. 2018), we controlled for a series of covariables in all regression models, including demographic characteristics, socioeconomic status, migration characteristics, and participation in medical insurance. In addition, due to the heterogeneity of cities and regions (Xu and Ouyang 2018; Zeng et al. 2019; Liu and Gu 2019), two city-level variables (average GDP and population size) were included to capture the inter-city variation at the developmental level. The variance inflation factor (VIF) was used to investigate multicollinearity among all variables, with no severe multicollinearity observed as the total VIF score for independent variables was <7 . In the following models, all of the continuous variables were standardized, and statistical analysis was conducted with STATA 15.1.

Results

Descriptive Statistics

Table 1 summarizes the characteristics of variables. With regard to settlement intention, approximately 90% of the respondents were willing to reside in the cities that they had been in for the next five years, and 61% intended to settle there permanently. This suggests that the migrants exhibited a strong short-term settlement intention, with approximately 29% of short-term stayers not intending to permanently settle in destination cities. This result was consistent with previous findings, whereby not every rural–urban migrant was willing and able to adapt to host cities. With regard to health, nearly 40% of the sampled migrants were in fair or poor physical health, although their mental health was relatively good. The average age of the respondents was 33 years, with 4.3 years of average residence in their destination cities.

Table 2 shows the correlation between health and settlement intention. With respect to short-term settlement intention, the results indicated that migrants with better mental health tended to reside in cities in the short-term (0.90 versus 0.87, $p = 0.036$), and the average settlement intention of migrants in better physical health to settle in the short-term was no higher (0.90 versus 0.90, $p = 0.568$). Migrants in better physical health were inclined to have a stronger settlement intention in the long-term (0.60 versus 0.58, $p = 0.045$), whereas the average settlement intention in the long-term was similar between groups with different levels of mental health (0.60 versus 0.59, $p = 0.058$). In the following sector, we investigated the correlation between the health status of migrants and their settlement intention in two dimensions by controlling other variables.

Main Effect

The ICC for different null models (without any variables) was used to calculate intra-neighbourhood variance. With regard to settlement intention in the short and long term,

Table 1 Descriptive statistics of variables

Variables	Description	Frequency	Percentage (%)
Gender	Male	6708	55
	Female	5480	45
Education	Junior high school or below	8526	66
	Senior high school	3957	32
	College or above	221	2
Arrangement of children	Migrate along with child(ren)	5370	44
	Child(ren) left in the hometown/no child(ren)	6818	56
Arrangement of parents	Migrate along with parent(s)	493	4
	Parent(s) left in the hometown	11695	96
Arrangement of spouse	Migrate along with spouse	8287	74
	Spouse left in the hometown/no spouse	3901	26
Physical health	Fair health or below (1–3)	4649	38
	Good health (4–5)	7539	62
Participation in medical insurance	Urban medical insurance	3092	25
	No urban medical insurance	12385	75
	Rural medical insurance	6666	55
	No rural medical insurance	5522	45
Relationship with local residents	Bad relationship (1–3)	485	4
	Good relationship (4–5)	11703	96
Migration type	Interprovince migration	6470	53
	Intraprovince migration	5718	47
Urban-settlement intention	Not willing to settle in next five years	1246	10
	Willing to settle in next five years	10942	90
	Not willing to settle permanently	4946	41
	Willing to settle in next five years	7242	59
Continuous variable		Mean value	(S.D.)
Age	Age	33.46	8.8
Income	Individual monthly income (Yuan RMB)	3697.03	4011.2
Property in the origin place	Housing floor size (square meters)	150.77	94.4
	Farm land size (<i>mu</i>)	4.03	11.1
Migration experience	Years of being away from <i>hukou</i> location	4.25	4.4
Mental health	Kessler Psychological Distress scale (K6)	26.65	3.0
Neighbourhood-level variables	Neighbourhood services	6.77	2.5
City-level variables	GDP per capita (Yuan RMB)	9.05	0.2
	The number of usual residents (million)	13.49	0.6

the ICC values of the two models were 0.177 and 0.250, respectively. This indicates that, in either time dimension, the settlement intention was similar within the same

neighbourhood, which justified the use of multilevel models. The results of log-likelihood ratio tests confirmed that two-level models had a stronger fitness.

Table 3 shows the results of the first two logistic models. As expected, mental health was significantly positively correlated with the settlement intention in the short-term, while the effect of physical health was limited (Model 1). Specifically, a one-point increase in mental health increased the odds of a migrant intending to settle in the host city for the next five years by 0.8%. Because mental health status is closely related to social integration and acceptance (Xie et al. 2017), our finding showed that migrants that were more adapted to the urban environment were more inclined to reside temporarily in host cities. When predicting the intention to settle in the long-term, physical health was a crucial determinant, while mental health did not have a statistically significant effect (Model 2). Specifically, a better physical health increased the odds of settling in the host city in the long-term by 3.1%. These results indicated that, although health status was not the most important determinant of the settlement intention, it played a crucial role in shaping migration trajectories. Migrants face the pressure of earning a living. To make enough money in cities, they rarely take account of the physical conditions involved when considering settling in the short-term. Nevertheless, when facing an irreversible deterioration in health, migrants with physical problems tend to return home. Physical health therefore significantly influences the intention of migrants to permanently settle in a particular destination. The results verified both H1 and H2, whereby migrants considered their mental health and were less sensitive to physical health when deliberating on whether to settle in cities in the short-term. In contrast, physical health played a crucial role in their intention to settle in the long-term, whereas this decision rarely considered their recent mental health.

A series of individual-level control variables were significantly associated with the settlement intention of migrants—economic status, social networks, and family situation—and exerted similar effects in the short and long term. Specifically, migrants with higher socioeconomic attributes, who have medical insurance, migrate with family

Table 2 The relationship between migrants' health status and settlement intention

			Willing to stay	Not willing to stay	Mean value of settlement intention	<i>P</i> value
Short-term settlement intention	Physical health status	Fair or poor	4183	466	0.90	0.568
		Good	6759	780	0.90	
	Mental health status	Fair or poor (6–20)	473	70	0.87	0.036
		Good (21–30)	10469	1176	0.90	
Permanent settlement intention	Physical health status	Fair or poor	2688	1961	0.58	0.045
		Good	4554	2985	0.60	
	Mental health status	Fair or poor (6–20)	358	245	0.59	0.058
		Good (21–30)	6904	4701	0.60	

members, and are better adapted to host cities, tend to exhibit a stronger settlement intention (Zhu and Chen 2010; Huang et al. 2018; Xie et al. 2017). For neighbourhood-level factors, only neighbourhood services were significantly correlated with the willingness to reside permanently in host cities. This implies that, as a complement to public service, neighbourhood services could consolidate the decision of a migrant to settle in the long-term (Huang et al. 2018), while its positive effect is limited in the short-term. With regard to contextual city-level variables, the population of the destination city is a positive predictor of the settlement intention of migrants (Liu et al. 2018) because larger cities are associated with better infrastructure, convenient public services, and abundant opportunities for employment. In contrast, economic development is negatively related to the settlement intention, probably due to the high cost of living and unaffordable housing.

Moderating Effect

Four interaction terms were added to the regression models, and the results are listed in Table 4. With respect to the settlement intention of migrants in the short-term, both their physical and mental status could be moderated by their relationships with local residents (Model 3). This is because migrants rely heavily on social capital in host cities where local social networks can provide them with abundant reciprocity (Lu and Qin 2014; Yue et al. 2013). Consequently, the positive effect of local social support strengthens their intention to reside in host cities. However, no evidence was found to indicate that the negative effect of health problems can be alleviated merely by neighbourhood service. Because migrants with health problems are invariably confronted by failure in urban society, based on their individual needs, they are more concerned about the quality of practical help offered via social support, and the benefit of uniform service provision therefore becomes limited.

Regarding long-term settlement intention, only neighbourhood services and physical health can jointly determine the settlement intention of migrants (Model 4). This suggests that the provision of neighbourhood services can relieve the negative effects of physical health on migrants' choice of long-term destination. However, there is no evidence to show that social support can alleviate the negative effects of mental health problems. These results indicate the importance of neighbourhood services for the long-term settlement intention of migrants. If the government can provide accessible and consistent services, the anxiety caused to migrants by physical health problems can be mitigated. In this sense, these results partially support H3, i.e. neighbourhood services and social support from the local society can strengthen the willingness of migrants with poor health to settle in destination cities.

Discussion

This research contributes to the body of knowledge on migration and health in the following ways: First, our findings supplement studies on the salmon bias hypothesis by distinguishing between short-term and long-term settlement intention of migrants. This intention can be influenced by many factors like economic status, social networks, and family composition. Our study found that most factors excluding health have

Table 3 Multilevel logistic regression on the effects of health status on urban-settlement intention of rural-urban migrants

Dependent variables	Model 1		Model 2	
	Short-term settlement intention		Long-term settlement intention	
	Coefficients	T-value	Coefficients	T-value
Independent variables				
Physical health (ref. = fair health or below)	0.005	(0.77)	0.031***	(3.49)
Mental health	0.008***	(2.77)	0.007	(1.52)
Relationship with local residents (ref. = bad relationship)	0.045***	(3.21)	0.073***	(3.46)
Provision of neighbourhood service	0.005	(1.03)	0.017**	(2.04)
Control variables				
Age	0.065***	(3.19)	0.064***	(3.19)
Age (squared)	-0.065***	(-3.30)	-0.065***	(-3.31)
Gender (ref. = female)	-0.005	(-1.17)	-0.022***	(-2.83)
Senior high school (ref. = junior high school or below)	0.021***	(3.52)	0.060***	(6.48)
College or above (ref. = junior high school or below)	0.026	(1.30)	0.154***	(5.17)
Migrate with spouse (ref. = no spouse/not follow)	0.048***	(5.77)	0.118***	(9.44)
Migrate with child(ren) (ref. = no child(ren)/not follow)	0.032***	(4.95)	0.106***	(10.78)
Migrate with parent(s) (ref. = not follow)	0.050***	(3.64)	0.108**	(5.26)
Monthly income	0.008***	(2.88)	0.031***	(7.15)
Housing floor size in hometown	-0.007***	(-2.64)	0.001	(-0.01)
Farming land size in hometown	-0.001	(-0.54)	0.001	(0.07)
Urban medical insurance (ref. = no insurance)	0.028**	(1.97)	0.056***	(2.59)
Rural medical insurance (ref. = no insurance)	-0.010*	(-1.69)	-0.031***	(-3.31)
Intraprovince migration (ref. = interprovince migration)	-0.038***	(-5.59)	-0.078***	(-7.63)
Migration years	0.024***	(8.01)	0.063***	(13.67)
GDP per capita	-0.011	(-0.83)	-0.059***	(-2.94)
City population	0.025**	(2.05)	0.060***	(2.99)
Constant	0.870***	(90.92)	0.511***	(34.66)
AIC	3771.49		13916.65	
Log likelihood	-1857.30		-6929.79	
N(individuals)	12188		12188	
N(neighbourhoods)	744		744	

t statistics in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

similar effects on the long-term and short-term settlement intentions of migrants. Mental health mainly affects short-term intention while physical health exerts an influence on their long-term intention. This is why we emphasised the role of health-related factors in determining settlement intention. Instead of simply regarding poor health as a constraint on migrants residing in destination cities, it is necessary to understand it from a dialectical perspective. Specifically, it is likely that in the context

Table 4 Multi-level logistic regression results on the moderating effects of relationship with local residents and neighbourhood service

Dependent variables	Model 3		Model 4	
	Coefficients	T-value	Coefficients	T-value
<i>Independent variables</i>				
Physical health (ref. = bad health or below)	0.005	(1.44)	0.035****	(3.42)
Mental health	0.008****	(2.35)	0.007	(1.60)
Relationship with local residents (ref. = bad relationship)	0.045****	(3.21)	0.067**	(2.16)
Provision of neighbourhood service	0.005	(1.03)	0.021**	(2.45)
<i>Interaction items</i>				
Physical health x social relationship with local residents	0.090****	(3.29)	0.018	(0.44)
Physical health x neighbourhood service	-0.005	(-0.88)	0.021****	(2.45)
Mental health x social relationship with local residents	0.019*	(1.60)	0.008	(0.47)
Mental health x neighbourhood service	0.002	(0.67)	0.001	(0.27)
<i>Control variables</i>				
Age	0.065****	(3.22)	0.064****	(3.19)
Age (squared)	-0.065****	(-3.33)	-0.065****	(-3.31)
Gender (ref. = female)	-0.006	(-1.16)	-0.022****	(-2.87)
Senior high school (ref. = junior high school or below)	0.021****	(3.51)	0.060****	(6.48)
College or above (ref. = junior high school or below)	0.026	(1.31)	0.154****	(5.17)
Migrate with spouse (ref. = no spouse/not follow)	0.048****	(5.78)	0.118****	(9.44)
Migrate with child(ren) (ref. = no child(ren)/not follow)	0.032****	(4.94)	0.106****	(10.78)
Migrate with parent(s) (ref. = not follow)	0.050****	(3.69)	0.108**	(5.26)
Monthly income	0.008****	(2.88)	0.032****	(7.19)
Housing floor size in hometown	-0.007****	(-2.61)	-0.000	(-0.01)
Farming land size in hometown	-0.001	(-0.55)	0.000	(0.06)
Urban medical insurance (ref. = no insurance)	0.028**	(2.01)	0.057****	(2.61)
Rural medical insurance (ref. = no insurance)	-0.010*	(-1.72)	-0.031****	(-3.32)
Intraprovince migration (ref. = interprovince migration)	-0.038****	(-5.57)	-0.078****	(-7.62)
Migration years	0.024****	(8.05)	0.063****	(13.67)
GDP per capita	-0.011	(-0.84)	-0.059****	(-2.94)
City population	0.026**	(2.07)	0.060****	(2.99)
Constant	0.870****	90.92	0.511****	30.91
AIC	3768.936		13922.47	
Log likelihood	-1850.93		-6926.30	
N(individuals)	12188		12188	
N(neighbourhoods)	744		744	

t statistics in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

of the settling trajectory of migrants, the effects of different constrains that motivate them to return to their hometowns are not stationary. Migrants are sensitive to their mental health in short-term planning, it has only a moderate impact on their decision to settle in cities in the long run. Physical health mainly constrains their long-term residence in urban areas. Our choice of five years as the demarcation point does not mean that it is a clear-cut threshold to distinguish between long- and short-term intentions. The effect of health on settlement intention is not linear and, to some extent, the long-range perspective is dependent on health in the near future.

Second, our findings reveal the complex relationship between physical/mental health and migrants' long-term/short-term settlement intention. The key to understand the different effects of health on the body/mind is in the inconsistency between migrants' willingness to settle in their destination cities and their capability of settling down. In terms of planning by migrants, social constraints are the major challenges to overcome when residing in cities, because social integration into the host society (e.g. information exchange and reciprocity) is essential to their success in permanently settling in their destination cities. Due to the endurance of migrants, physical health problems are not a major obstacle in short-term planning. By contrast, for long-term considerations, good physical health conditions could significantly enhance competitiveness and enable the constraints of permanently settling in cities to be tackled (e.g. financial and hukou-related constraints). Good physical health is therefore a significant precondition for permanent residence. For their unhealthy counterparts, an 'endurance strategy' might not work in the long run.

Third, our findings go beyond previous studies on the salmon bias hypothesis by considering the moderating effect of local social support from the host neighbourhood. Having a strong relationship with local residents and access to adequate neighbourhood services may mitigate the negative effects of poor health on migrants' intention to settle in their destination cities. Moreover, migrants who have a strong relationship with local residents and receive various neighbourhood services are more likely to be ones who integrate into the host society, where such migrants tend to be willing and able to settle in the destination city. Therefore, local social support can facilitate the settlement of migrants in their destination cities.

Conclusion and Policy Implications

By using data from the 2014 MDMS and multilevel logistic regression, this study investigated the linkage between migrants' health and their intention to settle in their urban destination cities. To illustrate the role of an individual's physical and mental health status in shaping the different dimensions of settlement intention, we proposed three hypotheses. In response to the first two, the results illustrated that physical and mental health were both important to the settlement intention of migrants, whereas their effects were not always identical regarding the intention to settle over the short- and long-term. Specifically, compared with physical health status, mental health status was more crucial in influencing the decisions of migrants to settle in the short-term. The opposite effect held in terms of the decision in the long-term. To better comprehend the effects of social support, we proposed a third hypothesis. The findings revealed that the

linkage between the health of migrants and their settlement intention in destinations could be moderated by social support from local residents and communities.

From the results of our study, it was possible to derive some policy suggestions. Previous work has concluded that China's urbanization is associated with risks to health (Miao and Wu 2016). To shape the long-term settlement intention of migrants in their destinations, and given that many rural–urban migrants face the threat of deteriorating health in cities (Qin et al. 2015; Xie et al. 2017), the government needs to formulate sound medical policies and protect them against risks. This can significantly increase the probability of their long-term settlement in host cities. Furthermore, the correlation between the mental health of migrants and their settlement intention means that their mental status deserves more attention. In practice, mental health care is a complicated undertaking, and the government should cooperate with neighbourhood/village committees and adopt countermeasures to create a positive neighbourhood atmosphere. In addition, these organisations should provide migrants, and especially newcomers, with sufficient services to adapt and integrate into host communities. Only in this way can governments at all levels achieve the goal of sustainable urbanization.

The study has some limitations. First, despite distinguishing between short- and long-term settlement intentions, we only could observe the intentions of migrants at one point in time. Second, instead of using objective health status, we adopted self-rated health indicators, which can lead to a response bias. Moreover, our measurement of neighbourhood services was based on the provision of different neighbourhood services, failing to reflect their actual quality and coverage. Third, our data were only based on only eight large Chinese cities. We should thus be careful when generalizing the findings of this study to all migrant groups in China.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that there are no conflicts interest.

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