Wage Premium and Labor's Migration Choice:

New Evidence from Rural China

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Abstract:

Regional wage premium is widely known to play a significant role in labor's decision on whether to migrate. Although the topic has received considerable attention in recent empirical research in many countries, research on the regional wage premium in China is still relatively scarce. This study investigates the impact of migration on labor's wage premium. Regressing the log wage of every laborer on whether he/she migrates provides a measure of association called the wage premium. The purpose of this study is to provide a new estimate of the wage premium of rural China by considering several methodological issues raised in the existing literature. Using a panel dataset collected from the China Rural Development Survey, we employ a multi-stage stratified cluster sampling procedure, which is stratified by China's agricultural and economic zones; then, we sequentially select provinces, counties, townships, and villages using random sampling; and finally, we select facilities and households within villages, also by random sampling. Our strategy yields a nationally representative sample. The data consist of 2026 households in 25 counties of rural China. We use the last three waves of the survey, conducted each April in 2008, 2012, and 2016. Using ordinary least squares, fixed effects, and sibling effects approaches, our results show that there is a significant wage premium in China. Furthermore, compared to the results from fixed effects and sibling effects, OLS estimation slightly overestimates the wage premium and its impact on the decision of rural labor to migrate. The results also show significant heterogeneity between different destinations for rural migrant labor.

Keywords: Wage premium; migration; rural China
JEL classification: I21, I24, J62

1. Introduction

China's remarkable growth, perhaps the most conspicuous in human history, has been accompanied by the migration of tens of millions of rural laborers to urban areas and cities to seek employment. According to data from the National Bureau of Statistics of China, about 30 million migrant workers left their hometowns in rural China in 1995 to seek off-farm employment in urban areas and cities. In 2005, the number of migrants reached 125 million, and in 2018, 173 million (National Bureau of Statistics of China, 2019a). The scale of the increase of rural migrant workers has aroused wide concern in society.

The topic on rural migrant workers has become the focus of many studies since the 1990s. It also has attracted attention from analysts and policymakers. Previous studies have depicted the profile and trend of labor's migration in rural China (de Brauw, Huang, Rozelle, Zhang, & Zhang, 2002; Zhao, 2005; Chan, 2013; Zhang, Dong, Liu, & Bai, 2018), analyzed the impact factor of labor's decision to migrate (Zhao, 1999; Liu, 2008; Chen & Hamori, 2009; Li, Liu, Luo, Zhang, & Rozelle, 2010; Willmore, Cao, & Xin, 2012; Deininger Jin, Xia, & Huang, 2014), and investigated the effect of migration on the human capital accumulation of the next generation (Chen, Huang, Rozelle, Shi, & Zhang, 2009; Lee & Park, 2010; Hu, 2012; Zhao, Yu, Wang, & Glauben, 2014; Shi et al., 2015; Zhou et al., 2015; Bai et al., 2018). In particular, rural–urban migration plays a very important role in China's economic development, and has been a source of the urban economic growth and rural development (Greenwood, 1997; Lin, Wang, & Zhao, 2004; Cai & Wang, 2008; Li, Li, Wu, & Xiong, 2012; Tombe & Zhu, 2019).

However, there are still few studies that aim to explain the cross-regional migration trends of rural labor, especially on the wage premium. The several studies related to this topic mainly focus on the role of big cities in the wage premium (Ning, 2014; Wang & Li, 2015; Zong & Zhou, 2015; Xi, Chen, Wang, & Wu, 2019). There is one study which investigates the impact of eastbound migration on the wage premium in China (Yang & Zhang, 2017). Our study aims to fill this gap in the research.

Among migrants who left their home counties, their destination of off-farm

employment could be classified into two kinds: cities within their home provinces; and cities outside their home provinces. According to data of the National Bureau of Statistics, about 75.94 million rural laborers seek off-farm employment in cities outside their home provinces in China, representing about 44% of the total migrant workforce. In the central and western regions of China, cross-provincial off-farm employment accounted for more than 55% of the total migrant labor force. In central regions of China, it is even higher than 60% (National Bureau of Statistics of China, 2019a). A large proportion of migrant labor from rural China to big cities has occurred in province-level municipalities or provincial capitals or cities located in the south-eastern regions. The wage gap between rural areas and urban areas (particularly, big cities) is thought to be one of the main driving forces behind migration. In fact, the wage gap across each kind of city may be very high. In that case, what is the size of the wage premium? Furthermore, does it vary across different kinds of migration destinations? How much could it be explained by different living cost across different cities?

Based on these questions, the overall goal of this study is to examine the wage premium and rural labor's decision to migrate in the context of China. We have three specific objectives. First, we seek to investigate whether any wage premium exists by using a unique dataset from rural China collected by ourselves. Second, we aim to understand whether there are any differences in wage premium across different kinds of migration destinations. Last, we try to examine how much the wage premium could be explained by different living cost across different cities.

The results based on ordinary least squares (OLS) show that there are significant wage premium in urban areas and cities. The wage premium estimated by fixed effects (FE) and sibling effects (SE) are much lower than that by OLS estimation. The results show a significant increase of wage premium with the increment of city size. The wage premium remains even after considering the living cost of working location.

The remainder of the paper is structured as follows. We present a literature review in Section 2. We describe the data and empirical strategy in Section 3. Section 4 presents the results. The final section summarizes the main findings and discusses

them.

2. Previous studies

There are a number of studies concentrate on the wage premium in many other countries, mainly in Europe and North America (Yankow, 2006; Gould, 2007; Fu & Ross, 2013; Lkhagvasuren, 2014). Some earlier studies have shown the considerable extent of the raw wage premium (DuMond, Hirsch, & Macpherson, 1999; Glaeser & Mare, 2001; Fu, 2004). For example, Glaeser & Mare (2001) shows that workers in cities earn 33% more than their nonurban counterparts. Taking China as a case, Fu (2004) shows that there exists huge wage gap between the coastal and the inland regions of China, and the workers in the coastal regions enjoy significant wage premium.

It is obvious that the raw wage premium may be caused by ability sorting, making up for high living cost, and so on. In recent years, some studies have attempted to address the sorting problem, self-selection, and endogeneity problem (Combes, Duranton, & Gobillon, 2008; Abramitzky, Boustan, & Eriksson, 2012; Matano & Naticchioni, 2016; Korpi & Clark, 2019). Combes, Duranton, & Gobillon (2008) find the individual skill account for a large fraction of existing wage premium by using a large panel of French workers and controlling for worker characteristics, worker fixed effects, and industry fixed effects. Abramitzky, Boustan, & Eriksson (2012) compile a novel dataset of Norway-to-US migrants and estimate the wage premium by comparing migrants to their brothers who remain in Norway. Their results show that wage premium is relatively low due to migrants are negatively selected from the sending population.

However, the wage premium has attracted little attention from researchers in China, especially from the perspective of rural migrant workers. To the best of our knowledge, there are several studies which have investigated the role of big cities in the wage premium (Ning, 2014; Wang & Li, 2015; Zong & Zhou, 2015; Yang & Zhang, 2017; Xi, Chen, Wang, & Wu, 2019). These studies have not reached consistent conclusions. Ning (2014) finds that an urban wage premium of big cities no longer exists when considering unobservable characteristics and selection bias. Most

of the other studies on this topic find that the urban wage premium still exists (Wang & Li, 2015; Zong & Zhou, 2015; Xi, Chen, Wang, & Wu, 2019). More interestingly, Yang & Zhang (2017) even find wage premium is much larger if unobservable personal characteristics are been considered. It should be noted that these studies all focus on big cities. Taking Ning (2014) as an example, it just employs sample individuals from 15 selected big cities in China. So these studies have certain limitations upon which we would like to improve.

3. Data and identification strategy

3.1 Data

This study used the China Rural Development Survey dataset collected by the Center for Chinese Agricultural Policy of the Chinese Academy of Sciences, which comprises four rounds of surveys conducted in 2005, 2008, 2012, and 2016. We used the data from only the last three waves, as the sample size in the first wave of the survey is much smaller than that in the last three rounds.

A multi-stage stratified sampling procedure was used to select the sample. The sample provinces were randomly selected from each of China's major agro-ecological zones, excluding Tibet, Hainan, Hongkong, Macau, Taiwan and four province-level municipalities (Beijing, Tianjin, Shanghai, and Chongqing). China's major agro-ecological zones are the eastern coastal areas (Jiangsu, Zhejiang, Shandong, Fujian, and Guangdong); the southwestern provinces (Sichuan, Guizhou, Yunnan, and Guangxi); the Loess Plateau (Shanxi, Shaanxi, Inner Mongolia, Ningxia, Gansu, Qinghai, and Xinjiang); the north and central provinces (Hebei, Henan, Anhui, Hubei, Hunan, and Jiangxi); and the northeastern provinces (Liaoning, Jilin, and Heilongjiang). Five provinces were selected from each of China's major agro-ecological zones from a list of provinces arranged in descending order of gross value of industrial output (GVIO). GVIO was used based on the conclusion of Rozelle (1994, 1996) that it is a good predictor of living standard and development potential and is often more reliable than net rural per capita income statistics.

Five sample counties were then selected from each province using a two-step

procedure. First, the enumeration team listed all counties in each province in descending order of per capita GVIO. Second, the five sample counties were randomly selected from each list, after which the team chose the sample townships and villages following the same procedure outlined above. Finally, a nationally representative sample of 100 villages (5 provinces × 5 counties × 2 townships × 2 villages) was selected for this study. The survey team then used village rosters and the survey team's own count of households in the village but not on the roster to randomly choose 20 households in each village.

In these sample households, we investigated all family members, including children,[1] who had separated from their original families owing to marriage or employment. This was mainly through two ways: we checked whether these family members at home were familiar with the information concerning separated family members by calling these separated family members. Alternatively, if family members did not have information about their separated family members when the enumerator was still at the scene of the survey, we used telephone interviews at the time of the survey. Importantly, this survey tracked at least three generations of family members for each household: the household head and spouse (second generation), their parents (first generation), and their children (third generation); alternatively, the household head and spouse (first generation), their children (second generation), and their grandchildren (third generation).

A family in our survey has many pairs of siblings, which allowed us to use the sibling effect model. See Figure 1 for a typical example. It briefly portrays parent–child relationships within the family. In this example family in Figure 1, there are two sets of sibling relationships: child 1 and child 2; grandchild 1and grandchild 2. Such variables as migration, wage and schooling years may vary across individuals in different pairs of sibling relationships; they would not be same for all individuals of different sibling pairs in a family. Individuals, such as Child 1 and child 2, account for the entire sample of "sibling" in the study. To the best of our knowledge, no other studies have collected similar detailed personal information about extended family members over time in rural China.

[1] Children are defined as the direct biological off-spring of both parents who are aged 16 years or above at the time of sampling.

We included individuals aged between 16 and 65 years as our sample. Those aged under 16 years, enrolled in school and college, or unable to work for health-related reasons were excluded from our sample. To focus on wage premium and migration, we restricted our sample to those engaged in off-farm wage employment. Their wages were comprised of three major components: basic wage, subsidies, and bonuses. Thus, the sample size of this study was 2151, 2730, and 2507 for each of the last three waves of the survey, respectively.

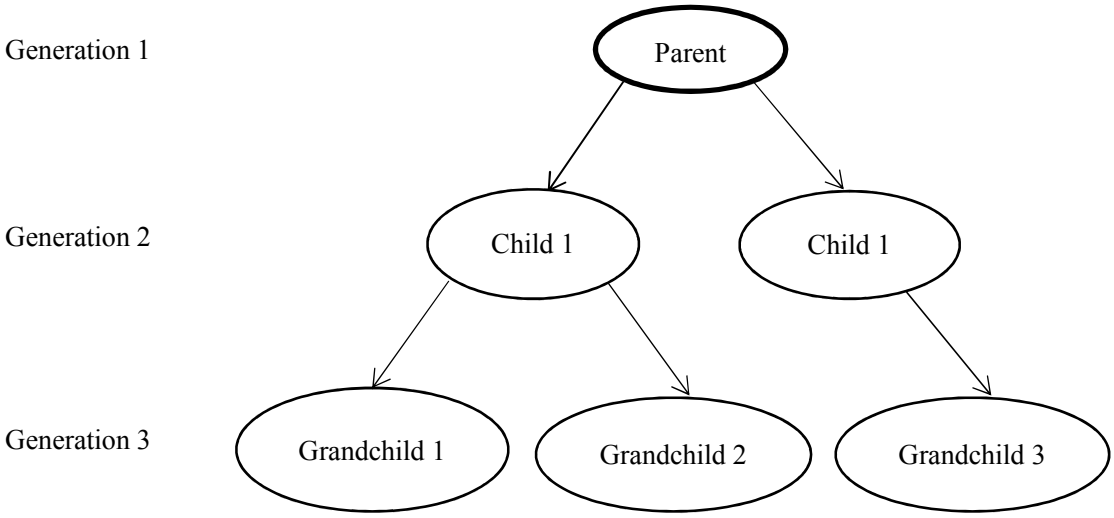

Figure 1. A possible family tree in the case of three generations

We collected the personal characteristics of all family members, such as information on wage, migration experiences, gender, and educational attainment. In the survey, we coded individuals and relationships in the family, which enabled us to match each individual in each year conveniently. Our final sample contains complete information on individuals' migration and wages.

3.2 Empirical strategy

In this study, we analyzed the wage premium and the rural-to-urban migration selection by adopting several methods. The unique characteristics of the data used in this study enabled us to apply the estimation strategies of fixed effects and sibling effects to deal with the problems of selection and endogeneity. We discuss these estimation strategies in detail in the following subsections.

3.2.1 OLS baseline estimation

Following Glaeser and Mare (2001) and Abramitzky, Boustan, and Eriksson (2012), we measured the wage premium by employing individual-level data. For each individual *i* in time t, we obtained

$$ln\ W_{it} = X_{it}^{'}\beta + Migrant_{it}^{'}\gamma + \varepsilon_{it} \quad (1)$$

where $ln\ W_{it}$ is the log of the CPI-deflated hourly wage for individual i at time t. $X_{it}^{'}$ is a vector of individual characteristics containing gender, educational attainment, age, squared age, Communist Party of China (CPC) member, year dummy, county dummy, and occupation dummy. β contains the corresponding coefficients of these variables. $Migrant_{it}^{'}$ is a dummy variable describing whether the individual migrates to an urban area outside of his/her own county or province. Vector γ represents the return from migration, that is, the wage premium. ε_{it} is the error term.

3.2.2 Fixed effects

Many studies have discussed the role of individual ability in determining the wage premium (Yankow, 2006), reporting that the wage premium could be explained by ability to some extent. Cities pay higher wages because they attract the most highly skilled and able workers. However, the OLS baseline estimation in Subsection 3.2.1 would be biased, since its control variables could not adequately capture the skills and ability of migrants. In an attempt to extend this effort, this study aims to narrow the extent of the bias by accounting for unobserved ability and skills in the estimation.

Equation (1) is modified to account for unobserved personal ability that is time invariant. The modified wage equation could be written as

$$ln\ W_{it} = X_{it}^{'}\beta + Migrant_{it}^{'}\gamma + \alpha_i + \varepsilon_{it} \quad (2)$$

In equation (2), α_i stands for the individual-specific and time-invariant ability that was omitted in equation (1). The OLS baseline estimation would be biased upward if the ability were positively correlated to the decision on migration. α_i

could be eliminated by employing fixed effects estimation.

3.2.3 Sibling effects

Except for the endogeneity problem, migrants are positively or negatively self-selected. Thus, the estimation still could be biased. In this subsection, this study compares the wage of migrants and their non-migrant siblings and eliminates selection across families. This is because selection bias occurs if migrants from specific family types (richer or poorer; more ambitious or mediocre) are more likely migrate to urban areas and cities.

We consider the following equation in which the error term is now decomposed into a component that is shared between siblings in the same family (α_j) and the other component, which is a purely random error term (ε_{it}).

$$ln\ W_{ij} = X_{ij}^{'}\beta + Migrant_{ij}^{'}\gamma + \alpha_j + \varepsilon_{ij} \quad (3)$$

Running family fixed effects would eliminate the portion that is shared between siblings in a family. By using this estimation, the bias caused by the correlation between family background and/or characteristics and the probability of migration would be eliminated to a large extent.

4. Results

4.1 Descriptive statistics

Table 1 shows the descriptive statistics of the sample in this study. According to our data, 50% of rural laborers seek off-farm employment in cities or urban areas outside their home counties (row 2, column 3). Among them, 46% work in cities within their home provinces and a much higher percentage work in cities outside their home provinces (rows 2 and 3, column 3). This is consistent with previous studies (Zhang et al., 2018). The average hourly wage of the sample individual is 10.31 RMB, which equals less than 2 USD (row 1, column 3). However, the average hourly wage has undergone a dramatical increase since 2007, from 5.37 RMB to 14.58 RMB in 2015. The results are similar to those of some other studies (Li et al., 2012).

The average schooling of these sample individuals is 8.82 years, which is approaching the end of the 9-year period of compulsory schooling (row 3, column 3). Men account for 66% of all sample individuals (row 4, column 3). The average age of the sample is 36.22 years (row 5, column 3). Among these sample individuals, 9% are CPC members (row 6, column 8).

Table 1. Descriptive statistics

	Description	Max	Min	Mean	SD	N
		(1)	(2)	(3)	(4)	(5)
(1) Migration		1	0	0.50	0.50	7383
(2) Migration within the province	1=yes, 0=no	1	0	0.23	0.50	7383
(3) Migration outside the province	1=yes, 0=no	1	0	0.27	0.44	7383
(4) Wage	Individual's hourly wage	99.21	0	10.31	9.82	7388
(5) Education	Schooling years	22	0	8.82	3.29	7541
(6) Male	1=yes, 0=no	1	0	0.66	0.47	7545
(7) Age	Years	65	16	36.22	12.38	7412
(8) CPC member	1=yes, 0=no	1	0	0.09	0.29	7389

Data source: Authors' survey.

4.2 OLS estimation results

Table 2 contains the OLS estimation results of the wage premium based on equation (1). According to the OLS estimation, there is a significant wage premium in urban areas and cities, both outside their home counties or provinces, for those rural migrant workers (Table 2). Column 1 pertains to the full sample and columns 2–4 to the sample from each round of survey. The estimation for migration is measured at 0.248 with a standard error of 0.025, suggesting that migrants in urban areas or cities receive a 24.8% wage premium over rural laborers who remain within their home counties (row 1, column 1). The estimation results are similar for each survey's subsample while the wage premium is higher in 2008, which seems to show a decreasing wage premium since 2008 (row 1, columns 2–4). The estimation results are also interesting. The role of education in determining the hourly wage is almost constant at 2.4% (row 3). On average, men earn 23.9% more than women (row 4, column 1). However, the gender wage gap has decreased since 2008 (row 4, columns 2–4), which may imply a decrease of discrimination, the evolution of the labor market, or a spillover effect of significant increase in women's human capital. Age has a decreasing positive effect on the hourly wage of rural migrant workers (rows 5 and 6,

columns 1–4). Being a CPC member may also have a positive effect on hourly wage (row 7, columns 1–4). There is a similar result for those rural migrant workers in cities outside their home provinces (columns 5–8).

Table 2. OLS regressions of the wage premium in China

	Log hourly wage				Log hourly wage			
	Full sample	2008	2012	2016	Full sample	2008	2012	2016
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Migration I	0.248***	0.291***	0.228***	0.236***				
	(0.025)	(0.052)	(0.034)	(0.035)				
(2) Migration II					0.255***	0.284***	0.220***	0.286***
					(0.028)	(0.052)	(0.043)	(0.041)
(3) Education	0.024***	0.025***	0.024***	0.024***	0.026***	0.025***	0.026***	0.026***
	(0.003)	(0.006)	(0.005)	(0.005)	(0.003)	(0.006)	(0.005)	(0.005)
(4) Male (1=yes)	0.239***	0.292***	0.243***	0.188***	0.246***	0.305***	0.251***	0.187***
	(0.020)	(0.039)	(0.028)	(0.029)	(0.021)	(0.039)	(0.027)	(0.029)
(5) Age	0.058***	0.065***	0.063***	0.049***	0.056***	0.062***	0.061***	0.046***
	(0.006)	(0.012)	(0.007)	(0.007)	(0.006)	(0.012)	(0.007)	(0.007)
(6) Age-squared	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(7) CPC member	0.136***	0.074	0.133**	0.195***	0.126***	0.078	0.116*	0.185***
(1=yes)	(0.036)	(0.088)	(0.059)	(0.056)	(0.037)	(0.089)	(0.060)	(0.056)
(8) Year dummy	included				included			
(9) Occupation dummy	included	included	included	included	included	included	included	included
(10) Constant	0.106	-0.155	0.725***	1.539***	0.180	-0.059	0.801***	1.615***
	(0.136)	(0.308)	(0.181)	(0.152)	(0.134)	(0.294)	(0.186)	(0.153)
(11) Observations	7,279	2,088	2,702	2,489	7,279	2,088	2,702	2,489
(12) R-squared	0.383	0.161	0.242	0.241	0.382	0.160	0.239	0.244

Data source: Authors' survey.

Notes: (1) Migration I is a dummy variable that equals 1 if rural migrant workers seek off-farm employment outside their home counties, and 0 otherwise; Migration II is a dummy variable that equals 1 if rural migrant workers seek off-farm employment outside their home provinces, and 0 otherwise. (2) Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

4.3 Fixed effects results

It is possible that individuals who migrated to urban areas have much higher unobservable ability. In other words, migrants would be positively sorted on unobserved characteristics, such as some kind of aptitude, gifted genius, or ambition. To eliminate the impact of time-invariant unobserved characteristics on the results of

the wage premium estimated in Subsection 4.2, we employ a specification including individual fixed effects. The results show that migrants in urban areas or cities receive an 18.3% and 23.1% wage premium over rural laborers residing within their home counties and home provinces, respectively (Table 3, row 1, column 1; row 2, column 3). The wage premium shows a consistent result if the individual-specific time-variant variables are controlled (row 1, column 2; row 2, column 4). The wage premium estimated by fixed effects is smaller than that by the OLS estimation. This finding may imply that positive sorting on unobservable ability could explain some part of the wage premium. However, the results also show that the existence of wage premium through positive sorting is taken into consideration. This is consistent with the findings of previous studies (Yankow, 2006).

Table 3. FE regressions of the wage premium in China

		Log hourly wage			
Explanatory variables		(1)	(2)	(3)	(4)
(1)	Migration I	0.183***	0.200***		
		(0.050)	(0.051)		
(2)	Migration II			0.231***	0.250***
				(0.051)	(0.050)
(3)	Age		0.049		0.056
			(0.033)		(0.034)
(4)	Age-squared		-0.001***		-0.001***
			(0.000)		(0.000)
(5)	CPC member (1=yes)		0.163*		0.167*
			(0.097)		(0.097)
(6)	Year dummy	included	included	included	included
(7)	Occupation dummy	included	included	included	included
(8)	Constant	1.325***	0.700	1.328***	0.488
		(0.116)	(1.009)	(0.111)	(1.037)
(9)	Observations	7,307	7,284	7,307	7,284
(10)	R-squared	0.414	0.421	0.415	0.423
(11)	Number of households	4,664	4,654	4,664	4,654

Data source: Authors' survey.

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

4.4 Sibling sample results

To alleviate the impact of self-selection on the estimation of wage premium, we employ a similar method to that of Abramitzky, Boustan, and Eriksson (2012) for the

further analysis. They compare siblings in which one has migrated and the other has remained. We apply this approach to estimate the wage premium further. First, the OLS method is used to estimate the sibling sample. The wage premium is almost the same as the results estimated for the full sample with the OLS method (0.207 vs. 0.248) (Table 4, row 1, column 1). The impacts of other variables are also consistent with the results of Table 2.

Table 4. OLS regressions of the wage premium in China, sibling sample

	Log hourly wage				Log hourly wage			
	Full sample	2008	2012	2016	Full sample	2008	2012	2016
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Migration I	0.207***	0.217*	0.188**	0.215**				
	(0.053)	(0.115)	(0.087)	(0.100)				
(2) Migration II					0.303***	0.271***	0.253**	0.417***
					(0.059)	(0.088)	(0.100)	(0.120)
(3) Education	0.033***	0.026	0.027*	0.013	0.034***	0.029	0.028*	0.010
	(0.010)	(0.018)	(0.015)	(0.022)	(0.010)	(0.018)	(0.014)	(0.022)
(4) Male (1=yes)	0.180***	0.218**	0.132*	0.141	0.161***	0.213**	0.114	0.092
	(0.049)	(0.087)	(0.076)	(0.107)	(0.050)	(0.084)	(0.078)	(0.105)
(5) Age	0.103***	0.086	0.203**	0.054	0.104***	0.084	0.196**	0.067
	(0.034)	(0.060)	(0.081)	(0.058)	(0.034)	(0.058)	(0.078)	(0.053)
(6) Age-squared	-0.001**	-0.001	-0.003**	-0.001	-0.001**	-0.001	-0.003**	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(7) CPC member	0.029	-0.046	-0.053	0.279*	0.056	0.030	-0.051	0.268*
(1=yes)	(0.087)	(0.174)	(0.185)	(0.147)	(0.086)	(0.177)	(0.181)	(0.139)
(8) Year dummy	included				included			
(9) Occupation dummy	included	included	included	included	included	included	included	included
(10) Constant	-0.742	-0.134	-1.204	1.747*	-0.730	-0.018	-1.158	1.501
	(0.610)	(0.825)	(1.233)	(1.002)	(0.602)	(0.835)	(1.173)	(0.946)
(11) Observations	985	361	375	249	985	361	375	249
(12) R-squared	0.479	0.314	0.276	0.399	0.491	0.324	0.288	0.425

Data source: Authors' survey.
Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Next, we examine the wage premium for the sibling sample with sibling fixed effects. The results are presented in Table 5. The wage premium decreases to 0.188 and is almost significant at the level of 10% (row 1, column 1). This finding shows that wage premium estimated in Table 2 is overestimated owing to self-selection. Both Tables 3 and 5 verify that unobservable characteristics and self-selection would

overestimate the wage premium to some extent. We expect that there might not be a significant wage premium within a province.

Table 5. SE regressions of the wage premium in China, sibling sample

	Log hourly wage				Log hourly wage			
	Full sample	2008	2012	2016	Full sample	2008	2012	2016
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Migration I	0.188***	0.149	0.265**	0.182				
	(0.061)	(0.137)	(0.111)	(0.135)				
(2) Migration II					0.246***	0.212**	0.276**	0.232**
					(0.063)	(0.098)	(0.133)	(0.115)
(3) Education	0.030**	-0.017	0.041	0.026	0.039***	-0.014	0.041	0.025
	(0.015)	(0.022)	(0.026)	(0.024)	(0.012)	(0.022)	(0.025)	(0.024)
(4) Male (1=yes)	0.117*	0.096	0.153	0.134	0.138**	0.097	0.141	0.135
	(0.064)	(0.096)	(0.092)	(0.135)	(0.063)	(0.096)	(0.093)	(0.124)
(5) Age	0.106**	0.004	0.164**	0.024	0.098***	0.005	0.163**	0.021
	(0.041)	(0.083)	(0.074)	(0.091)	(0.037)	(0.082)	(0.069)	(0.089)
(6) Age-squared	-0.002**	0.001	-0.003*	-0.000	-0.001**	0.001	-0.003**	-0.000
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
(7) CPC member	0.046	-0.120	0.119	0.112	0.093	-0.034	0.148	0.121
(1=yes)	(0.121)	(0.224)	(0.234)	(0.220)	(0.133)	(0.238)	(0.230)	(0.220)
(8) Year dummy	included				included			
(9) Occupation dummy	included	included	included	included	included	included	included	included
(10) Constant	-0.174	0.734	1.198	1.611	-0.828	0.797	1.047	1.691
	(0.793)	(1.233)	(1.327)	(1.440)	(0.529)	(1.189)	(1.224)	(1.416)
(11) Observations	985	361	375	249	985	361	375	249
(12) R-squared	0.355	0.229	0.252	0.342	0.304	0.237	0.256	0.346

Data source: Authors' survey.

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

4.5 Results of further tests

As mentioned in subsection 3.2.1, individuals who seek off-farm employment in urban areas or cities and outside their own counties/provinces are considered as migrants in the analysis up to now. However, there are huge differences among different regions and cities in China. In this subsection, we employ two robustness checks. The first investigates the heterogeneity of the wage premium among different kinds of cities. The second estimates the wage premium considering the cost of living.

City-level data are from the National Bureau of Statistics of China and data on house prices are from China Real Estate Information (National Bureau of Statistics of China, 2019c; State Information Center, 2019). Then, we match the survey data of CRDS and the city-level data.

4.5.1 City size and wage premium

It is well known that China has undergone a dramatic urbanization process since the reform and opening up. During this process, in the last 20 years, the country has experienced unprecedented and rapid development of cities. The growth of cities is caused by concentration of population. Then, does the wage premium vary with city size? In this subsection, we undertake an analysis on this issue.

First, we divide the destination city of rural migrant workers into four city types: A, B, C, and D. City type A stands for those cities with less than 500,000 inhabitants, city type B those with 500,000–999,999 inhabitants, city type C those with 1 million–4,999,999 inhabitants, and city type D those with 5 million or more inhabitants. The criteria for this city size categorization are consistent with those set by China's central government (The Central People's Government of the People's Republic of China, 2014). This study makes a slightly adjustment, that is, we incorporate two types of criteria of the central government (5 million–10 million inhabitants; and more than 10 million inhabitants) into one type, City type D. We make this adjustment because the sample from cities with more than 10 million inhabitants is very small.

Table 6 show the result of the wage premium across different city sizes. Column 1 pertains to an estimation of wage premium of four city types using the full sample. Columns 2–4 are the same estimation using sub-samples from 2008, 2012, and 2016, respectively. The estimation for wage premium is measured at 0.113 with a standard error of 0.057, implying that rural laborers who migrated to city type A receive an 11.3% wage premium over workers residing within their own counties (row 1, column 1). Rural laborers who migrated to city type B receive a much higher percentage of wage premium over workers residing within their own provinces. The result indicates that they receive an 18.6% wage premium, nearly double that of those who migrated to city type A (row 2, column 1). The wage premium of rural laborers who migrated to

city type C is slightly higher than that of those who migrated to city type B (row 3, column 1). However, the wage premium of rural laborers who migrated to city type D shows a dramatic increment compared to the first three city types (row 4, column 1). The coefficients of the other control variables are consistent with the previous estimation (rows 5–9, column 1).

Table 6. City size and the wage premium in China

		Log hourly wage			
		Full sample	2008	2012	2016
Explanatory variables		(1)	(2)	(3)	(4)
(1)	Migration (city type A)	0.113*	0.178	0.068	0.007
		(0.057)	(0.128)	(0.085)	(0.135)
(2)	Migration (city type B)	0.186***	0.270***	0.186***	0.129**
		(0.041)	(0.096)	(0.068)	(0.064)
(3)	Migration (city type C)	0.202***	0.203**	0.275***	0.119**
		(0.043)	(0.094)	(0.055)	(0.055)
(4)	Migration (city type D)	0.295***	0.284***	0.333***	0.279***
		(0.036)	(0.093)	(0.056)	(0.044)
(5)	Education	0.021***	0.018**	0.021***	0.023***
		(0.005)	(0.009)	(0.008)	(0.007)
(6)	Male	0.167***	0.253***	0.139***	0.126**
		(0.031)	(0.067)	(0.047)	(0.049)
(7)	Age	0.072***	0.097***	0.084***	0.048***
		(0.009)	(0.022)	(0.012)	(0.013)
(8)	Age-squared	-0.001***	-0.001***	-0.001***	-0.001***
		(0.000)	(0.000)	(0.000)	(0.000)
(9)	CPC member (1=yes)	0.139**	0.135	0.152*	0.166**
		(0.053)	(0.143)	(0.087)	(0.068)
(10)	Year dummy	included		included	
(11)	Occupation dummy	included	included	included	included
(12)	Constant	-0.020	-0.102	0.312	1.532***
		(0.204)	(0.396)	(0.301)	(0.300)
(13)	Observations	3,620	949	1,322	1,349
(14)	R-squared	0.390	0.175	0.218	0.229

Data source: Authors' survey.
Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

The wage premium of working in different kinds of cities varies in different years. Overall, the results show that for most kind of city type, the wage premium declines as the years go on (rows 1–4, columns 2–4). Taking as an example, rural

laborers who migrated to city type B, the wage premium in 2008 is 27% and decreased to 18.6% and 12.9% in 2012 and 2016, respectively (row 2, columns 2–4). However, it only undergoes a minute decrease for those rural laborers who migrated to city type D. For those controlled variables, the effect of being a man on the hourly wage decreases as the years pass (row 4, columns 2–4). Meanwhile, the effects of education and CPC member on the hourly wage increase as the years go on (row 5, columns 2–4; row 9, columns 2–4).

4.5.2 Housing cost and wage premium

Rural migrant labors in China mainly aim to earn wages by working in cities. They can bear the brunt of very bad living conditions. In fact, the lowest level of consumption varies little from place to place in China. Thus, we expect that the living cost might not have much impact on the wage premium. However, some studies refer to housing cost (Eeckhout, Pinheiro, & Schmidheiny, 2014). Then, we include the log form of house prices in the equation as representative of living cost to investigate the impact of living cost on the wage premium.

Table 7 shows the result of wage premium including the new included variables. The results are consistent with the results of Table 2. It shows that rural laborers who migrated outside their home counties receive 17.8% wage premium over those residing in their home counties (row 1, columns 1). For rural labors who migrated out of their home province, the wage premium is 16.8% (row 2, columns 5). This interesting result shows that the wage premium of those working outside their home provinces is even relatively lower than the wage premium of those working within their home province.

The wage premium of rural laborers who migrated within their home provinces decreases as the years go on. As the results show, the wage premium in 2008 is 22.2%, and it decreased to 19.7% and 9.2% in 2012 and 2016 (row 1, columns 2–4). However, the results of those who migrated outside their home provinces seem to tell a different story (row 2, columns 6–8).

Comparing the wage premium of working in cities outside home county and

province among 3 years, it shows that the wage premium of working outside home province is not much higher than those working within their home provinces (row 1, columns 2 and 3; row 2, columns 6 and 7). In 2016, the wage premium of working outside home province is higher than those working within their home provinces (row 1, column 4; row 2, column 8).

Table 7. Wage premium and house price, sibling sample

	Log hourly wage				Log hourly wage			
Explanatory variables	Full sample	2008	2012	2016	Full sample	2008	2012	2016
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Migration I	0.178***	0.222***	0.197***	0.092**				
	(0.031)	(0.074)	(0.047)	(0.045)				
(2) Migration II					0.168***	0.237***	0.133***	0.168***
					(0.033)	(0.069)	(0.048)	(0.062)
(2) Education	0.021***	0.017*	0.022***	0.023***	0.022***	0.016*	0.024***	0.024***
	(0.005)	(0.009)	(0.008)	(0.007)	(0.005)	(0.009)	(0.008)	(0.007)
(3) Male (1=yes)	0.171***	0.261***	0.145***	0.128***	0.175***	0.264***	0.155***	0.129***
	(0.031)	(0.065)	(0.047)	(0.048)	(0.032)	(0.066)	(0.047)	(0.048)
(4) Age	0.072***	0.097***	0.084***	0.049***	0.072***	0.097***	0.083***	0.049***
	(0.009)	(0.022)	(0.012)	(0.014)	(0.010)	(0.022)	(0.013)	(0.014)
(5) Age-squared	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(6) CPC member (1=yes)	0.141***	0.126	0.148*	0.176**	0.132**	0.118	0.128	0.174**
	(0.053)	(0.143)	(0.087)	(0.068)	(0.054)	(0.145)	(0.089)	(0.068)
(7) Log house price	0.087***	0.008	0.110***	0.146***	0.075***	-0.012	0.125***	0.089*
	(0.023)	(0.052)	(0.035)	(0.038)	(0.026)	(0.055)	(0.038)	(0.050)
(8) Year dummy	included				included			
(9) Occupation dummy	included	included	included	included	included	included	included	included
(10) Constant	-0.686**	-0.148	-0.543	0.275	-0.580*	0.049	-0.640	0.766
	(0.296)	(0.617)	(0.432)	(0.470)	(0.304)	(0.627)	(0.433)	(0.541)
(11) Observations	3,616	946	1,322	1,348	3,616	946	1,322	1,348
(12) R-squared	0.390	0.177	0.216	0.230	0.388	0.179	0.209	0.232

Data source: Authors' survey.

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

5. Conclusion and discussion

In this study, we have estimated the wage premium of labor using a sample that tracks three rounds of samples in rural China. Using OLS, fixed effects, and sibling effects, we find robust evidence of a wage premium for those who migrate out of their

home county. OLS overestimates the wage premium compared to fixed effects and sibling effects, which matches our predictions. By using fixed effects and sibling effects estimation, we find that individuals who migrate out their own counties do earn a wage premium. The results of fixed effects and sibling effects more accurately estimate the wage premium, because they work toward eliminating unobservable sibling characteristics that may also affect the wage premium. Rural migrants who seek employment opportunities in cities outside their home provinces, especially big cities, earn more than those who work within their home provinces even if living cost has been considered.

As far as we know, many previous studies show the wage earned by seeking employment opportunities in cities and urban areas outside their home counties may play an important role in poverty alleviation and rural development (Du, Park, & Wang, 2005; Yang, 2008; Huang J., Zhi, Huang Z., Rozelle, & Giles, 2011). So the migration of rural labor has its spillover effect. Moreover, it is expected that human capital of those migrants could be improved along with their employment experience in cities and urban areas. Some studies even show that the wage premium is mainly rooted in human capital accumulation in urban areas and cities (Eeckhout, Pinheiro, & Schmidheiny, 2014; Roca & Puga, 2017). Unfortunately, due to data limitation, we cannot test it in this study. Since human capital is the main source of income, migration would help improve the ability of those individuals to earn higher income. More importantly, it could potentially have positive effect on human capital development of their next generation. Thus, it may help to foster a human capital foundation for China's future development.

However, there are still some barriers that restrict labor migration among different administrative regions. For example, under constraints from institutional arrangements, such as the Household Registration System (*hukou*), in China, rural migrant families who live in cities benefit little from the available human resource service programs that fund education and health (Zhao et al., 2014). Measures are required to remove barriers that restrict labor migration and achieve the goal of a unified and freely flowing labor market across China. Such measures could include reducing discrimination and division in the *hukou* system, providing better infrastructure, and enabling the basic role of the market to function for the optimal

utilization of production factors. If these goals could be achieved to some extent, potential gains would be large for individuals and their families, as well as for national development.

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