Clustering in declining industries? The economic-social isolation and instability of migrant workers in Beijing

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ABSTRACT

The industrial restructuring in China has led to constant adjustments in employment. Migrant workers play an important role in the labor market, and the relationship between migrant employment and industrial evolution is worthy of attention. Previous studies have revealed the negative impact of industrial restructuring on the employment of migrant workers, but few studies have paid attention to the employment choice of migrant workers under the background of industrial evolution, and how these choices affect their lives. Based on data from Beijing, this study empirically finds that, compared with the control group, migrant workers are more likely to work in industries in which the proportion of value-added in GDP continues to decline. After controlling individual characteristics, the wage level, social integration, and settlement intention of migrant workers employed in declining industries are significantly lower than those in non-declining industries. This paper contributes to the literature on understanding the integration and stability of migrant workers from the perspective of industry choice. The findings provide insights for improving the employability of migrant workers and their adaptability to China's industrial restructuring as well as for promoting the process of migrant citizenization.

1. Introduction

The large-scale mobility of the labor force is an important component of the economic development and reform of New China. According to official statistics, in 2018, China had 173 million migrant workers, accounting for 22.3 percent of all employed persons. This group is not entitled to the same legal rights as permanent urban residents because they lack *hukou*, official household registration (Zhang, 2001). The migrant workers, dominated by the rural surplus labor force, are concentrated in industries with poor employment environments and low incomes (Doeringer & Michael, 1970; Guo & Iredale, 2004). They have become the backbone of China's export, manufacturing, and low-end service sectors in urban areas (Knight, Song, & Huaibin, 1999), yet many migrant workers are marginalized and face serious integration problems in cities (Cui, Nahm, & Tani, 2015; Guo & Iredale, 2004; Kogan, 2011).

Issues related to the employment and livelihood of migrants in China have attracted much attention in the existing literature. Improving the citizenization level of migrants and enhancing their production and living standards has always been the goal of the government and society.

Previous studies have pointed out that migrant workers are concentrated in specific industries, but they have not further revealed the corresponding relationship between the employment choice of migrant workers and industry characteristics. Studies have analyzed why migrant workers have disadvantageous employment and living situations from the perspectives of labor market segmentation, social system, household registration type, employability, residential location, and so on (Holbrow & Nagayoshi, 2016; Wang, Guo, & Cheng, 2013; Wang, Chi Chan, & Yang, 2020; Li, Yang, & Chen, 2014; Shen, 2017; Zhang, 2020). However, more attention should to be paid to the impact of employment choices on the lives and long-term development of migrant workers.

The industrial structure in China is constantly restructuring. However, if migrant workers fail to make corresponding employment adjustments, they will remain in certain industries, which may limit their production and exacerbate other life difficulties. A preliminary analysis of migrant employment data and industry development shows that the proportion of value-added in GDP for some industries has shown continuous decline in recent years, but the proportion of migrant workers employed in these industries has not significantly decreased. This may be because migrant workers have not kept up with these

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changes; that is, the migrant workers failed to recognize the industry development trend and to respond in a rational and timely manner. It also may be that residents have more effectively recognized the industrial restructuring and withdrawn from declining industries, leaving migrant workers to fill these vacancies. However, regardless of the reason is, there is a question that is worth discussing that has not yet been considered, that is, whether being employed in declining industries impacts migrant workers' income, social integration, and stability, and what are these impacts? Revealing the answer to these questions will offer a new perspective on the factors that influence migrant workers' integration into a city. Improving the living standard of migrant workers and speeding up their citizenization is not only an important goal for China's new urbanization, but also a common problem for societies integrating migrant workers all over the world.

In recent years, Beijing has entered the development stage of reducing quantity and improving quality, the process of industrial restructuring has been accelerated, and a policy of population dispersal—driven by industrial dispersal—has been continuously promoted. From the data, it can be clearly observed that the value-added of some industries has continued to decline in recent years. Under this background, have migrant workers' employment choices changed? Beijing is a typical sample that can be used to reveal the relationship between the employment choice of migrant workers and the industry growth trend in China. Thus, this paper empirically analyzes detailed monitoring data for migrant workers and economic statistics in Beijing and further explores the impact of being employed in declining industries on the economic-social integration and stability of migrant workers. This will help to understand the factors influencing migrant workers' lives and integration from the perspective of employment choice.

The rest of the paper is organized as follows. Section 2 reviews the literature on the effect of industry mix and restructuring on migrant workers, the employment preference of migrant workers, the economic-social integration status of migrant workers, and the factors influencing that status. This background, combined with an analysis of China's reality, puts forward the theoretical framework of this study. Section 3 introduces the data collection and analysis methods, and the econometric results are presented and discussed in Section 4. Here, two results will be revealed: whether migrant workers cluster in declining industries, and the impact of employment in declining industries on the economic-social integration and stability of migrant workers. Section 5 provides the conclusions and a discussion of the policy implications of the study.

2. Literature review and theoretical framework

2.1. Literature review

Like many other countries and regions, China's migrant workers are at a disadvantage in the labor market in comparison to residents (Wang, Guo, & Cheng, 2013; Fan, 2004; Cui et al., 2015). Even if they have the same level of education and skills, migrant workers are not treated the same as residents with regard to wages, job security, job level, and so on (Brodmann & Polavieja, 2010; Fullin & Reyneri, 2011; Stier & Levanon, 2003). Because of labor market segmentation, migrants are more likely to cluster in industries with poor employment environments, low wages, high labor intensity, and high health risks (Creese & Weibe, 2012; Knight et al., 1999; Liu, 2011). Residents benefited more from employment benefits brought about by a region's economic growth and industrial mix than migrants (Bartik, 1993; Easton & King, 2000; Partridge & Rickman, 1996). The theory of labor market segmentation can provide a partial explanation for this (Hiebert, 2008), while the state deepens the bifurcation effects about which labor market segmentation theory is concerned (Fan, 2004).

Partridge & Rickman (1999) examined the impact of industrial mix on migrants and demonstrated the policy implication of the link between the industry mobility and geographic mobility of migrants. In China, it is the consensus that the employment structure should adapt to industrial changes. Previous studies have revealed that the industrial restructuring will shock migrant employment, pointing out that the enhanced labor skills requirements of industrial restructuring will have a negative impact on the low-skilled labor force (Chen & Zhou, 2010). In industries where migrant workers are concentrated, the "crowding-out" effect of capital substitution and technological progress on migrant workers is becoming increasingly evident (Zhao, Sun, & Tan, 2015). Industrial restructuring has reduced the job security of the new generation of migrant workers because of their poor employability (Li et al., 2014). The cases of Shenzhen and Foshan show that different types of economic upgrading influence social upgrading differently and that both cause a pushing-out effect for rural migrant workers (Wang et al., 2020).

Most migrant workers are marginalized and face serious integration problems in the labor market (Guo & Iredale, 2004; Kogan, 2011; Cui et al., 2015). A large body of literature on the living conditions of s as they relate to employment has revealed negative situations in specific industries. For example, in the United States, migrant nurses had lower job satisfaction than non-migrant nurses; higher job satisfaction is noted with higher earnings levels (Siow & Ng, 2013). Migrant Mexican woman in Maryland's seafood industry experience injury, disability, and daily instability (Sangaramoorthy, 2019). Migrant workers in Australian horticulture are vulnerable within the employment relationship (Alexander, 2011). The vast majority of migrant workers in the Chinese construction industry lack labor contracts to verify their status and protect their rights as workers (Wang, 2019) . A case study in the shoe-making industry shows that Chinese assembly-line workers are at high risk of depression (Ren, Yu, & Dang, 2019)

Factors such as institutional structures and social identity have an important impact on the integration of migrants both in China and other countries (Holbrow & Nagayoshi, 2016). In particular, the type of household registration in China is a key aspect (Wang et al., 2013). Low employability is also a disadvantage among migrant workers (Li et al., 2014; Zhang, 2020). The division of industry impacts the wage gap between migrant workers and urban residents (Meng & Zhang, 2001). Regarding internal differentiation among migrants, the literature finds that cultural norms regarding gender and work in their countries of origin affects the employment rates of female immigrants (He & Gerber, 2020). The industry mix is a cause of low wages for less-educated workers, especially women (Easton & King, 2000). Segmentation of the migrant work force is determined largely by immigration control practice (Miro, 1994). There is a significant relationship between migrant integration and suburban residential locations; suburban migrants may be spatially marginalized in disadvantaged suburban locations in China (Shen, 2017). In addition, some individual characteristics of migrants will lead to differences. The individual factors that have attracted more attention in China include level of education, type of household registration, duration of mobility, rural land ownership, and so on (Zhang, 2011; Rao, Yu, & Zhu, 2015). Further, the type of employment, such as employer, employee, or private owner (self-employed), and the employment sector (formal or informal sector) will also affect the income and integration of migrant workers (Li, 2004).

The stability of China's migrants still needs to be improved, and many migrants are still in a state of frequent movement. The choice of where to go and the decision to stay or return is a complex one with multiple factors to consider (Connelly, Kenneth, & Zheng, 2011; Poncet, 2006; Rabe & Taylor, 2012). In addition to age, education level, and other individual characteristics (Tang & Feng, 2015), the income level, sense of belonging, cultural context, and social integration of migrants also have a significant impact on their settlement intention (Yue, Li, & Feldman, 2010Yue, Li, & Feldman, 2010; Zhang, Druijven, & Strijker, 2017; De Vroome & Van Tubergen, 2014; Mohabir, Jiang, & Ma, 2016).

In summary, previous research has discussed the employment and living conditions of migrant workers, and the factors that influence them, from multiple perspectives, and it has been recognized that
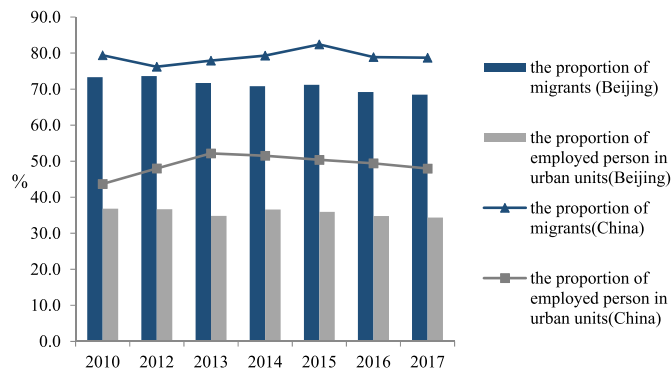
Fig. 1. Employment distribution of migrant workers in the top five industries compared to that of employed persons in urban units Data source: Chinese Statistical Yearbook 2011–2018, Beijing Statistical Yearbook 2011–2018, http://www.chinaldrk.org.cn.

Fig. 2. Employment distribution of migrant workers in declining industries compared to that of employed persons in urban units Data source: Chinese Statistical Yearbook 2011–2018, Beijing Statistical Yearbook 2011–2018, http://www.chinaldrk.org.cn.

industrial restructuring further aggravates the plight of this group. However, these studies do not reveal the relationship between the employment choice of migrant workers and the characteristics of the industries in which they are employed, especially the development trend of these industries, nor has previous research studied the effect of employment choice on the economic-social integration and stability of migrant workers.

2.2. Theoretical framework

Many studies have found that China's migrant workers tend to cluster in a few industries, which is verified by data analysis. From 2010 to 2017, about 80 percent of China's migrant workers concentrated in the top five industries,[1] while in the same period, the proportion of employed persons in urban units[2] in these five industries was only about 45 percent. The difference between the two is also very evident in Beijing. About 70 percent of migrant workers are concentrated in the top five industries, and the proportion of employed persons in urban units in these five industries was only about 35 percent (Fig. 1).

On the one hand, the industrial structure is constantly restructuring, but on the other hand, a large number of migrant workers are concentrated in a few industries. We believe that the matching between migrant employment and the trend of industrial growth will deviate and intensify. In recent years, the value-added share of some industries has continuously declined (we define these as declining industries, see the detail in 3.2). In 2017, the total-added of Beijing's declining industries accounted for about 45 percent, and the proportion of employed persons in urban units in these industries accounted for about 55 percent, while the employment proportion of migrant workers was as high as 77%. To further observe the changing trend, we find that since 2012, the proportion of employed persons in urban units in declining industries has gone down accordingly, while both in Beijing and the whole country, the proportion of migrant workers fluctuated and then rose significantly (Fig. 2).

As revealed in the literature, because of labor market segmentation, social system, identity factors, and low employability, migrant workers have gained less than local urban residents in the industrial evolution. Many of migrant workers transferred from agricultural work and cannot

meet the requirements of emerging and high-tech industries in terms of professional literacy and skills. It is more difficult for them to enter industries with good development prospects.

Thus, we put forward the first hypothesis.

Hypothesis 1. In the context of the continuous industrial restructuring, many migrant workers stay with or enter declining industries.

Even if they have the same level of education and skills, the literature has shown that immigrants face inequality in terms of unemployment risks, wages, and promotion opportunities. Moreover, working in different industries aggravates differentiations among migrants.

In the process of national and regional economic development, the industries whose share of value-added is declining are generally those with low value-added, high pollution, or are inconsistent with the regional industries policies. These industries generally have low wages and benefit less from regional public resources and policy support. For workers, this will affect their income, social status, and living conditions. For migrant workers, being employed in declining industries will affect their level of economic and social integration, which then affect their settlement intention and stability. For example, data analysis shows that migrant workers employed in declining industries earned less wages than those employed in non-declining industries in 2017. At the national level, the difference in average annual income between the two was 8194 yuan, while in Beijing, it was as high as 20484 yuan.

Therefore, we put forward the second hypothesis.

Hypothesis 2. Employment in declining industries has a negative impact on the economic and social integration and life stability of migrant workers.

Based on existing research results and China's reality, we propose a theoretical framework (Fig. 3).

3. Data and methods

3.1. Data source

The migrant worker data used in this paper are derived from the China Migrants Dynamic Survey (CMDS) of the National Health Commission. The data includes migrant workers who have lived in the place of entry for more than one month and are not registered in the district (county or city) as the survey object. The survey adopts the PPS sampling method of stratification, multi-stage and proportional to the scale. It covers many aspects of migrant workers, such as personal and family information, employment situation, and mobility and settlement intention.

From 2014 to 2017, the number of individuals surveyed in Beijing was 7998, 8000, 7000, and 6999, respectively. According to the research purpose of this paper, missing samples of key variables are

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[1] The top five industries were Wholesale and Retail Trades, Manufacturing, Household Service, Repair and Other Services, Hotels and Carting Services, Construction.

[2] Urban units refer to enterprises which have been registered at the departments of industrial and commercial administration for which the business operation is situated at a county town (i.e., a town where the county government is located), or at urban areas with administrative hierarchy higher than a county town. Private enterprises are not included here.
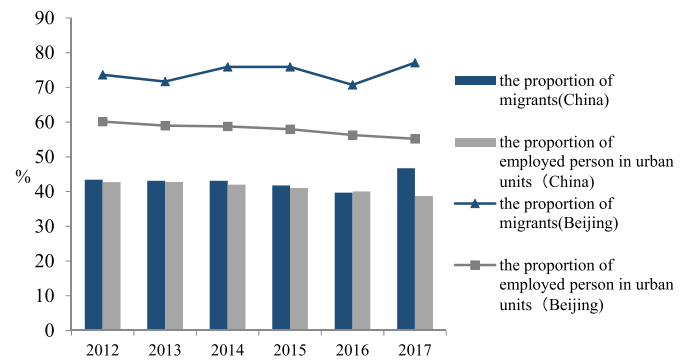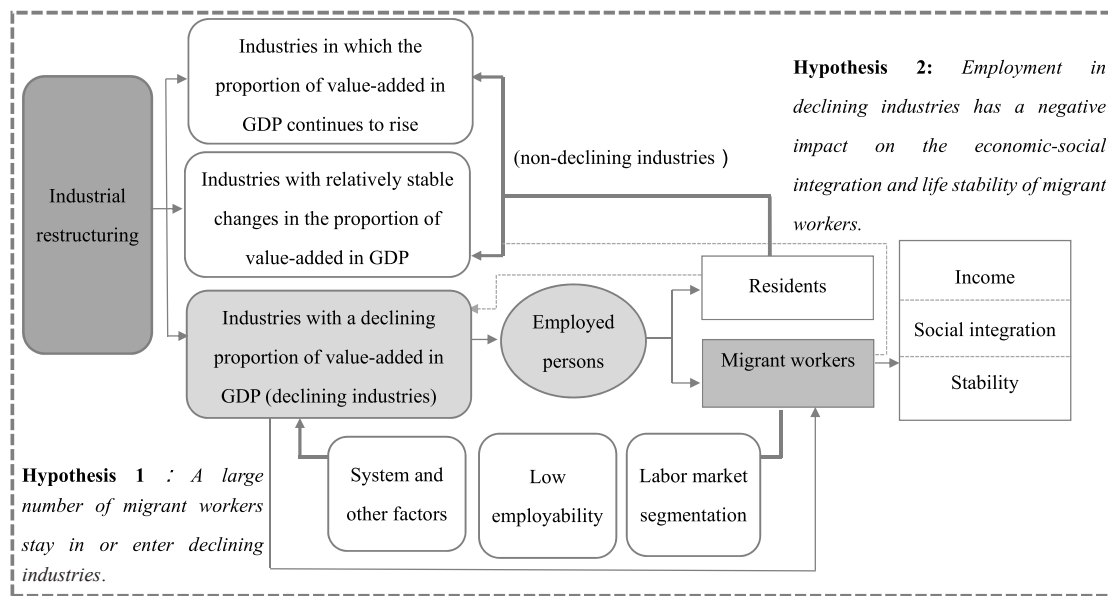
Fig. 3. Theoretical framework.

excluded, and 7242, 6693, 5694, and 5596 effective samples are obtained. The data on industry variables in Beijing come from the Beijing Regional Statistical Yearbook and Beijing Statistical Yearbook.

3.2. Variables

Declining industry (*declining*): This is the core variable in analyzing the industry characteristics of migrant workers' employment choices. If the proportion of value-added in GDP of an industry is in a continuous downward trend over a certain period, it will be defined as a declining industry. In this paper, we will identify declining industries in different periods separately according to the needs of the research.

Wage: The answer to the CMDS questionnaire, "what was your personal wage/net income last month?" is used to determine the monthly wage of the migrant worker, which does not include food or accommodation fees that provided by the work unit.

Social integration: In this study, social integration includes two dimensions, reflected by two questions in the CMDS questionnaire: "Have you participated in trade union activities locally since 2016?" (*trade union*), and "Do you agree with the statement that I am concerned about the changes in the city/place where I live now?" (*change*). When assigning values, members of a trade union are defined as 1, and the others are defined as 0. The answers to the second question are totally disagree, disagree, basically agree, and totally agree, with values of 0, 1, 2, and 3, respectively.

Settlement intention: There are two questions about settlement intention in the CMDS. One is "do you plan to stay here for some time to come?" Options include "yes," "no," and "not sure." The second is "how long do you expect to stay here if you plan to stay here?" Options include "1–2 years," "3–5 years," "6–10 years," "more than 10 years," and "settlement." According to the purpose of this paper, the residence intention of migrant workers is divided into four categories: no residence intention, low residence intention (intending to stay for 1–5 years), medium residence intention (intending to stay for 6–10 years), and high residence intention (intending to stay for more than 10 years and settling down). In the empirical analysis, the assignment values are 0, 1, 2, and 3, respectively.

Control variables: There are two groups of control variables. One group is industry characteristics, and the other is migrant workers' individual characteristics. Generally, industry characteristics, such as

wage, position in the economy, and employment opportunities, will have an impact on the industry choice of migrant workers. Therefore, in this paper, industry characteristics, including the average wage (*wage$_{ind}$*), proportion of value -added in GDP (*pro$_{gdp}$*), and proportion of employed persons (*pro$_{emp}$*) in the industry, are controlled. According to the conclusions of previous studies, gender, age, *hukou* type,[3] education level, and residence time all have an impact on the wage, social integration, and settlement intention of the migrant workers, so in this paper, these variables are controlled.

Table 1 shows the descriptive statistics of the variables. The sample included migrant workers aged 16–60 years, with a mean age of 35.39 years. 53.8% migrant workers were man and 30.2% had non-agricultural *hukou*. Moreover, the mean length of education was 12 years, and the mean length of residence time in Beijing was 8.66 years. Table 2 shows the changes in value-added of industries and employment distribution of migrant workers.

3.3. Models

Conditional Logistic Model (McFadden, 1974) is used to estimate the probability of the migrant choosing industry *j*, the formula is as follows:

$$Prob(choice = 1) = \frac{\exp(\beta_1 declining_{ij} + \theta Z_{ij})}{\sum_{j=1}^{J} \exp(\beta_1 declining_{ij} + \theta Z_{ij})}$$

$$(i = 1, 2, \ldots\ldots N)(j = 1, 2, \ldots\ldots, J) \tag{1}$$

In equation (1), *i* represents the individual migrant worker, and *j* indicates the industry that migrant workers can choose. if the migrant worker chooses to work in industry *j*, the value of *choice$_{ij}$* is 1; otherwise the value is 0. *Declining$_{ij}$* is a dummy variable, defined as 1 if industry *j* is identified as the declining industry in the observation period, and 0 otherwise. *Z$_{ij}$* represents the other feature vectors of industry *j*. The parameter value represents the influence degree of industry characteristics; that is, the larger the parameter value, the greater the probability of the industry being selected, and vice versa.

The least square method is used to estimate the impact of employ-

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[3] The *hukou* type refers to whether the migrant worker have an agricultural *hukou* or a non-agricultural *hukou*.

Table 1
Descriptive statistics of variables.

Variables	Observed quantity	Mean Value	Standard Deviation	Minimum Value	Maximum Value
declining	76	0.461	0.502	0	1
wage$_{ind}$	76	9.143	4.398	3.647	26.552
pro$_{gdp}$	76	5.263	4.329	0.553	15.747
pro$_{emp}$	76	5.263	3.681	0.376	14.607
wage (*Logarithm*)	5596	8.546	0.675	5.193	11.513
trade union	5596	0.146	0.353	0	1
change	5596	2.460	0.581	0	3
stay	5596	1.890	1.227	0	3
*declining₁**	19	0.701	0.458	0	1
gender	5596	0.538	0.499	0	1
hukou type	5596	0.302	0.459	0	1
age	5596	35.391	8.957	16	60
education	5596	11.965	3.555	0	19
residence time	5596	8.659	6.440	1	37

Data source: CMDS, http://www.chinaldrk.org.cn. Beijing Regional Statistical Yearbook, and Beijing Statistical Yearbook.
Note:* Limited by the availability of data such as the social integration of the migrant workers, this paper only selects one of the three-year cycles in the research period when studying the impact of employment in a declining industry on the social integration and residence intention of migrant workers. A declining industry in this cycle is identified according to the growth trend of the industry in terms of the proportion of value-added from 2013 to 2016, so it is recorded as declining₁.

Table 2
The changes in the value-added of industries and employment distribution of migrant workers in Beijing (unit: percent).

sector	The first period		The second period		The third period		The fourth period	
	2010–2013	2014	2011–2014	2015	2012–2015	2016	2013–2016	2017
	incre$_{ind}$	em$_{mig}$	incre$_{ind}$	em$_{mig}$	incre$_{ind}$	em$_{mig}$	incre$_{ind}$	em$_{mig}$
Agriculture, Forestry, Animal Husbandry and Fishery	−0.05	1.06	−0.10	0.85	−0.24	0.83	−0.31	1.10
Mining	0.03	0.33	−0.87	0.57	−0.81	0.14	−0.85	0.10
Manufacturing	−2.34	8.57	−0.51	7.96	−1.03	6.25	−0.55	19.78
Production and Supply of Electricity, Heat, Gas and Water	0.86	0.76	0.21	0.55	−0.41	0.72	−1.04	0.57
Construction	−0.24	6.74	−0.18	6.47	−0.22	6.16	−0.19	7.52
Wholesale and Retail Trades	−1.21	17.65	−2.18	23.43	−2.54	17.33	−2.92	17.44
Transport, Storage and Post	−0.51	2.76	−0.66	2.99	−0.41	3.32	−0.40	4.44
Hotels and Carting Services	−0.33	14.31	−0.49	11.68	−0.41	12.73	−0.37	9.57
Information Transmission, Software and Information Technology	0.37	9.87	0.55	9.59	1.24	13.24	1.96	6.68
Financial Intermediation	1.27	1.95	1.67	2.33	2.39	2.74	2.17	3.53
Real Estate	−0.26	2.57	−0.56	1.52	−0.89	2.23	−0.35	2.01
Leasing and Business Services	1.13	1.49	0.62	1.85	−0.02	2.09	−0.72	0.98
Scientific Research and Technical Services	0.74	2.84	2.23	3.20	2.30	3.02	2.38	1.22
Management of Water Conservancy, Environment and Public Facilities	0.05	0.62	0.10	0.75	0.20	0.93	0.22	0.57
Household Service, Repair and Other Services	−0.02	20.42	0.02	18.56	−0.09	19.63	−0.06	14.17
Education	0.23	2.32	0.51	2.51	0.60	2.69	0.68	4.17
Health and Social Service	0.33	2.75	0.22	2.08	0.41	2.69	0.35	2.81
Culture, Sports and Entertainment	0.20	2.00	0.06	2.48	−0.02	2.18	−0.08	2.32
Public Management, Social Security and Social Organization	−0.23	0.98	−0.63	0.55	−0.06	1.00	0.10	0.72

Data source: http://www.chinaldrk.org.cn. Beijing Regional Statistical Yearbook, Beijing Statistical Yearbook.
Note: (1) In the table, "incre$_{ind}$" refers to the increment of the proportion of value-added in GDP. "em$_{mig}$" refers to the employment proportion of migrant workers in industries. (2) Industries with negative value of incre$_{ind}$ are defined as declining industries. (except those the range of change during the study period is very small and fluctuating, such as Culture, Sports and Entertainment, Public Management, Social Security and Social Organizations).

ment in declining industries on the wages of migrant workers.

$$\ln(wage) = \alpha + \beta X + \theta_1 Z_1 + \ldots + \theta_k Z_k \quad (2)$$

In equation (2), *wage* is the employment earnings of migrant workers, and *X* is a dummy variable of employment in the declining industries, defined as 1 in the declining group, and 0 otherwise. Z are control variables. α is a constant term, and β is the coefficient of effect of employment in the declining industries on the migrant workers' wages. θ is the coefficient to be estimated for each control variable.

The binary classification and sequential logistic models are used to estimate the impact of employment in declining industries on the related variables of social integration and settlement intention of migrant workers.

$$\ln\left(\frac{p_i}{1 - p_i}\right) = \alpha + \beta X + \theta_1 Z_1 + \ldots + \theta_k Z_k \quad (3)$$

In equation (3), *P* is the probability of participating in trade union activities, and $1 - P$ is the probability of not participating in trade union

activities. *X* is a dummy variable, defined as 1 in the declining group, and 0 otherwise. *Z* are control variables. α is a constant term, and β is the coefficient of the effect of employment in declining industries on migrant worker participation in trade union activities. θ is the coefficient to be estimated for each control variable.

$$\ln\left(\frac{p_i}{1 - p_i}\right) = \alpha + \beta X + \theta_1 Z_1 + \ldots + \theta_k Z_k \quad (i = 0, 1, 2, 3) \quad (4)$$

In equation (4), *P* is the occurrence probability of an event. $1 - P$ is the probability that an event does not occur, $i = 0,1,2,3$. *X* is a dummy variable, defined as 1 in the declining group, 0 otherwise. *Z* are control variables. α is a constant term, and β is the coefficient of the effect of employment in the declining industries on concern about changes in where they live or settlement intention. θ is the coefficient to be estimated for each control variable.

4. Results

4.1. The influence of industry characteristics on migrant employment choices

The logistic model examines the influence of industry characteristics on the employment choice of migrant workers. In the basic regression, we divide the research period from 2010 to 2016 into four cycles, each with an interval of three years (2010–2013, 2011–2014, 2012–2015, 2013–2016). This is done to examine the changing trend of industry value-added and identify declining industries in this period by respectively matching the intervals with the industry selection data of migrant workers in 2014–2017. The reason we choose every 3 years as a cycle is that changes in the development trend of industry over three years can generally get the attention of employees, and they will make corresponding behavioral choices.

In Table 3, Model 1 only examines whether the declining industry increases the possibility of employment choices for migrant workers, while Model 2 reports the result after controlling all other variables. Model 3 is the result of standardization. It is found that the coefficient of *declining* in both cases is significantly positive. That is, if an industry belongs to the declining industry, the possibility of migrant worker entering its workforce will rise significantly.

The regression results also show that among the other industry characteristic variables, an increase in the proportion of value-added in GDP increases the possibility of migrant workers entering, while industries with high wages and more jobs do not attract many migrant workers to enter. This choice preference should be the result of many factors, such as industrial structure, labor market segmentation, and employability. Specifically, although Beijing's industrial structure has been adjusting in recent years, and the proportion of value in some traditional industries has been declining. The total amount and proportion of these is still high, such as manufacturing, wholesale, and retail, which are precisely the industries with many migrant workers. Moreover, Beijing's industrial structure is more advanced; industries with higher wages are mostly knowledge-intensive industries, and few migrant workers work in these industries. Among industries with a higher proportion of employed persons, there are some industries with high skill requirements, such as scientific research and technical services, which restrict the entry of migrant workers. Although the quality threshold of some other industries is not high, the local collective economic operation accounts for a relatively high proportion, such as leasing and business services. As such, there are more locals employed, and the proportion of migrant workers entering is not high either.

4.2. Robustness test

To verify the robustness of the relationship between *declining* and the employment choice of migrant workers, we further change the sample size and lag period of employment choice of migrant workers. We then carry out a regression analysis.

In Model 4, we excluded the sample of migrant workers who did not come to Beijing in the survey year. Comparatively, the industry choices of the migrant workers who entered Beijing in the current year of the survey are less affected by stickiness factors, so we test the robustness of the results by only discussing the industry choice tendency of this group. In addition, considering that there may be a certain lag in the judgment of migrant workers, which is a group composed mostly of rural surplus labor, with regard to industry development trend, in Model 5, we lag the industry selection time of migrant workers by one year and do another regression analysis.

Table 4 shows that both the results of the core explanatory variable and control variables are consistent with that of the above study, which proves the robustness of the results.

4.3. The influence of migrants' employment choice on their economic-social integration and stability

The empirical results have confirmed the first hypothesis. Consequently, we are concerned with another question: whether this employment choice will have a negative impact on their economic-social integration and stability.

First, we examine the impact of employment in declining industries on the wages of migrant workers. Table 5 reports that several individual characteristics, including gender, age, educational level, *hukou* type, and residence time, all have significant effects on the wages of migrant workers. In general, male, younger, and highly educated migrant workers receive higher wages. In addition, migrant workers with non-agricultural *hukou* and longer residence time also earn higher wages. These are basically consistent with the conclusions of previous studies. After controlling individual characteristic variables, there is a negative correlation between the wages of migrant workers and employment in declining industries. That is, even if the level of education, age, gender, *hukou* type, and other individual characteristics are the same, migrant workers who work in declining industries will get lower wages than those in non-declining industries. This provides a clear answer to our previous questions.

Second, Table 6 reports the impact of employment in declining industries on migrant workers' social integration. In this paper, two options in the CMDS 2017, including participating in trade union activities and paying attention to changes of the current city of residence, are used to reflect the degree of social integration of migrant workers. Most of the individual characteristics of migrant workers have a significant effect on their social integration. In general, migrant workers with higher education levels and longer residence times are more likely to participate in local management and development. Older migrant workers and those with non-agricultural *hukou* have a relatively high level of social integration. The difference in social integration caused by gender is not evident. Similarly, after controlling the main individual characteristics of the migrant workers, there are differences in social integration

Table 3
Logistic regression on the industry choice of migrant workers.

Variable	Model1	Model2	Model3 (standardization)
declining	0.926***	0.278***	0.138***
	(0.014)	(0.019)	(0.009)
$wage_{ind}$		−0.148***	−0.643***
		(0.003)	(0.014)
pro_{gdp}		0.160***	0.688***
		(0.003)	(0.013)
pro_{emp}		−0.065***	−0.238***
		(0.003)	(0.011)
LR chi^2	5103.98	9172.16	9172.16
Pseudo R^2	0.034	0.0613	0.061
Sample size	483094	483094	483094

Note: Standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.

Table 4
Robustness test.

Variable	Model 4	Model 5
declining	0.456***	0.276***
	(0.077)	(0.024)
$wage_{ind}$	−0.237***	−0.147***
	(0.017)	(0.004)
pro_{gdp}	0.101***	0.180***
	(0.011)	(0.004)
pro_{emp}	−0.006	−0.074***
	(0.010)	(0.004)
LR chi^2	1083.73	7110.16
Pseudo R^2	0.100	0.067
Sample size	34941	345496

Note: Standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.

Table 5
Linear regression on the logged wage of migrant workers.

Variables	B	SE
declining1	−0.107***	0.017
gender	0.280***	0.015
age	−0.003***	0.001
education	0.077***	0.003
hukou type	0.213***	0.021
residence time	0.010***	0.001
constant term	7.507***	0.057
sample size	5596	
R²	0.319	

Note: Standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.

Table 6
Logistic regression on the social integration of migrant workers.

	trade union			change		
	B	SE	Exp (B)	B	SE	Exp (B)
declining1	−0.178**	0.085	0.837	−0.150**	0.062	0.861
gender	0.119	0.080	1.126	0.054	0.054	1.055
age	0.010*	0.006	1.010	0.010***	0.004	1.010
education	0.180***	0.016	1.197	0.052***	0.010	1.053
hukou type	0.174*	0.096	1.190	0.186***	0.071	1.204
residence time	0.038***	0.007	1.038	0.034***	0.005	1.035
constant term	−4.768***	0.329	0.008			
sample size	5596			5596		
LR chi²	336.59			179.22		
Pseudo R²	0.0723			0.0195		

Note: Standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.

between the groups employed in declining industries and in non-declining industries. For the declining group, both coefficients of the two variables are significantly negative. That is, compared with migrant workers employed in non-declining industries, those employed in declining industries are less likely to participate in trade union activities and to pay less attention to the development of the place where they live.

Table 7 shows that the regression coefficient between declining1 and stay is significantly negative. That is to say, the settlement intention of migrant workers employed in declining industries is also evidently lower than that of the control group. According to previous studies, the willingness of migrant workers to stay is affected by many factors, including individual characteristics, wages, and social integration. In this paper, the regression results show that older and higher educated migrant workers as well as those with non-agricultural hukou are more willing to stay. In addition, those who have lived for a long time in the current city are more willing to stay. Comparatively speaking, females are more willing to stay than males. This is basically consistent with the conclusions of previous research. Moreover, this paper adds the interaction of employment in declining industries and wage as well as employment in declining industries and social integration to reveal how wage and social

Table 7
Logistic regression on the settlement intention of migrant workers.

	B	SE	Exp (B)
declining1	−4.565***	0.498	0.010
declining1*wage	0.348***	0.056	1.416
declining1*trade union	0.251**	0.101	1.286
declining1*change	0.605***	0.054	1.831
Gender	−0.207***	0.054	0.813
Age	0.020***	0.003	1.020
education	0.114***	0.010	1.121
hukou type	0.674***	0.071	1.963
residence time	0.071***	0.005	1.073
sample size	5596		
LR chi²	1256.28		
Pseudo R²	0.0929		

Note: Standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.

integration affect the settlement intention of the migrant workers employed in the declining group. The coefficients of the three interaction items are all significantly positive, indicating that with an increase in wages and social integration, enhances the settlement intention of migrant workers employed in declining industries. This result is also consistent with the existing understanding; that is, income and social integration have an impact on settlement intention.

5. Conclusion and discussion

Based on the dynamic monitoring data of migrant workers in Beijing, this study examined the preference of migrant workers' employment industry choices, and it further revealed the effect of migrant worker employment in declining industries on their wages, social integration, and settlement intention.

There are four empirical findings. First, migrant workers tend to settle in declining industries. Second, after controlling the main individual characteristics, migrant workers employed in declining industries generally receive lower wages than their counterparts in non-declining industries. Third, after controlling the main individual characteristics, the degree of social integration of migrant workers employed in declining industries is lower than that of the control group. Fourth, after controlling the main individual characteristics, migrant workers employed in declining industries show a lower settlement intention. Overall, migrant workers cluster in declining industries, which has an evident deleterious impact on their economic-social integration and stability. This will further aggravate the challenge of helping migrant workers achieve citizenship.

Institution, identity (especially the type of hukou in China), residential location, ethnic identity and other factors have all been proved by the literature to be obstacles that affect migrant workers' access to high wages, deep integration into society, and high settlement intention. Moreover, the employment industry choice of migrant workers revealed in this paper is also an important factor that should not be ignored. At the present stage, China has changed from high-speed growth to high-quality development, and industrial restructuring will be the norm, which will inevitably lead to changes in urban employment demand for migrant workers. Whether migrant workers can respond actively and realize the need to adjust the industry in which they are employed or to change locations is very important to their economic-social integration and stability. As employees, it is a rational response to adjust employment in response to changes in the industrial structure. However, the results of this study show that most migrant workers in China cannot do so; many of them stays in specific industries. With the industrial restructuring, more and more industries that migrant workers cluster in will continue to decline. Some of these industries have transformed into informal employment groups or operators that only serve migrant workers, which is disadvantageous to the long-term development of the city and the migrant workers themselves.

Through a simple comparative analysis of the level of education, it is found that the migrant workers employed in declining industries are less educated. In 2017, 48.7 percent of migrant workers in declining industries in Beijing had a junior high school education or below, while in non-declining industries, the proportion was only 21.6 percent. Low competitiveness may be one of the main reasons why China's migrant workers cannot adjust their employment choices as the industrial structure changes. This then affects their wages, social integration, and stability in the city. At present, China is carrying out a series of policy measures, including relaxing the hukou restrictions, to improve the citizenization level of the migrant workers. In this process, we cannot ignore the need to improve the employment competitiveness of migrant workers and their ability to cope with changes in the industrial structure. Otherwise, it will be difficult for them to improve their living conditions, even if they have a hukou. Of course, at the same time, supporting measures are needed to give them reasonable guidance.

Migrant workers in other countries are very similar to China's

migrant workers in terms of industry distribution and living conditions. Therefore, the conclusion of this paper can also be used as a reference for other countries. There is a cyclic and cumulative causal relationship between the industry choice of migrant workers and their economic and social status. We plan to further reveal the deep-seated mechanism of this relationship in future research.

CRediT authorship contribution statement

Yu Liu: Conceptualization, Formal analysis, Investigation, Writing - original draft, Funding acquisition. **Xue Zhang:** Methodology, Investigation, Data curation. **Jian Feng:** Validation, Writing - review & editing, Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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