Pandemic Uncertainty Perception, Unemployment Risk Perception, and Remigration Intention of Migrant Workers in China

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Abstract

Presently, despite the World Health Organization's declaration of the end to the global health emergency posed by the COVID-19 pandemic, research on the influence of the COVID-19 pandemic continues. Migrant workers constitute the majority of China's migrant population. Although the impact of the pandemic on their livelihoods is clear, the impact of the pandemic on their remigration intention remains unclear. This study, utilizing a sample of 321 Chinese migrant workers, employs a multivariate regression approach to examine the mechanisms through which the perceived uncertainty of the pandemic influences their remigration intention. The results demonstrate that the increased uncertainty caused by the pandemic heightens their unemployment risk perception and unemployment risk perception increases their remigration intention. Furthermore, it was found that human capital can mitigate both of these effects. However, this study did not find a direct impact of pandemic uncertainty on their remigration intention. This study explores unemployment risk perception of migrant workers under the influence of a major crisis and its impact on their remigration intentions, thus making predictions about their migration psychology and behavior under such circumstances. This study further enhances the theoretical framework surrounding research on remigration intention of migrant workers.

Keywords: *pandemic uncertainty perception; unemployment risk perception; remigration intention; migrant workers; human capital.*

1 Introduction

Migrant workers are an important group that has risen rapidly since the inception of China's reform and opening-up policy. In 2022, the number of migrant workers in China reached 292.51 million (National Bureau of Statistics, 2022). To access a better living environment and personal development opportunities, people migrate from rural to urban areas to work and only return to their hometowns for traditional festivals or the annual crop harvest. Some scholars contend that the rural-to-urban migration of laborers in China since the advent of reform and opening up stands as the most monumental internal migration in the annals of human history (Zhao, 2005; Akgüç et al., 2015).

In comparison to local urban labor, migrant workers exhibit a comparatively lower level of education and skill. They primarily engage in frontline labor within industries that demand intense physical exertion, thereby resulting in meager earnings and unfavorable working conditions (Wang et al., 2011; Li, 2020). Nevertheless, they persist in their

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commitment to urban employment due to the superior job prospects and income opportunities it affords, in stark contrast to the rural regions.

The global pandemic that arose in 2020 has had a profound impact on the urban labor and lifestyles of Chinese migrant workers (Lu, 2021). Given their limited human capital and employment within low-tier industries, this group falls within the vulnerable segment of society. Moreover, the pandemic-induced operational challenges faced by small and medium-sized enterprises, which had previously provided significant employment opportunities for migrant workers, have further exacerbated the adverse effects of the pandemic on them (Yang et al. 2021; Li, 2020).

This protracted and far-reaching pandemic has inflicted immense physical and psychological shocks and ramifications upon the general populace. Migrant workers, constituting a vital subset of the migrant population (National Bureau of Statistics, 2022), have predominantly been the focal point of existing research concerning the influence of economic and social transformation on their employment and migration. Although some studies have briefly touched upon the pandemic's impact on migration willingness (Deng, 2020; Cai et al., 2021), there is currently a dearth of specialized research delving into the psychology of secondary migration and remigration among migrant populations amidst a pandemic backdrop. In the throes of the pandemic outbreak, uncertainty has surged, and employment pressures have intensified (Lu, 2021). As an integral component of China's labor force, has the pandemic undermined the bedrock of migrant workers' local employment? These inquiries remain unanswered.

Despite the conclusion of the ongoing global pandemic, it is imperative to scrutinize the research concerning the migration of migrant workers throughout this crisis. From a theoretical standpoint, this endeavor aids in the exploration of the risk perception experienced by migrant workers in the face of a significant catastrophe and its ramifications on their propensity to migrate. It further enables us to forecast the psychological and behavioral patterns of migrant workers during such critical junctures. This, in turn, holds constructive implications for enhancing the existing framework for analyzing migration risks among migrant populations and augmenting the theory surrounding population migration. Hence, this study seeks to employ empirical data from the pandemic period, commencing with an examination of the uncertainty perceived by migrant workers, to ascertain its impact on their remigration intention.

2 Literature review

Research on uncertainty can be traced back to Knight (1921), who stated that uncertainty is unmeasurable and that the probability distribution of uncertain event states are unknown in advance. In another classic work, Alchian (1950) argued that uncertainty should be included among the axioms of economic analysis. Thus, uncertainty has established an important position in economic research.

From the perspective of economics, uncertainty has both macro- and microeconomic effects. Research on the macroeconomic impact of uncertainty has mainly concentrated on analysis and decision-making in macroeconomic activities such as industry development, investment, and employment (Merton, 1969; Samuelson, 1969; Lucas & Prescott, 1971; De Jong et al., 1983; Dixit, 1994; Nogle, 1994; Fajgelbaum et al., 2017; Liu al., 2022). Research on the micro-impact of uncertainty has primarily focused on enterprise investment and individual unemployment risk (Luo, 2004; Tian, 2005; Qian et al., 2013; Akgüç et al., 2015; Czaika et al., 2021).

The impact of uncertainty is relevant at both of these levels. Logically, the increase in uncertainty affects the demand side of society (Dai, 2021), leading to a decline in enterprise investment and a slowdown in recruitment activity (Bloom, 2009), which affect social employment and cause a decline in employment (Bloom, 2009; Caggiano et al.,

2014; Baker et al., 2016; Lu et al., 2017; Xin, 2018). At the same time, the impact of real unemployment and potential unemployment risk further affect the income and consumption of residents, and this effect is more severe among low-income countries than high-income countries (Bloom, 2014). To prevent the unemployment risk caused by uncertainty, residents tend to save more money to offset uncertainty risk (Sandmo, 1970; Wan et al., 2001; Luo, 2004; Qian et al., 2013).

In recent years, based on previous studies, the relationship between uncertainty and sociology and psychology has been strengthened. Some scholars have observed that uncertainty is closely related to the intention and decision to migrate. They discovered that although the purpose of migration is to reduce a certain kind of uncertainty, migration is also influenced by external uncertainties at its source, and migration itself possesses attributes of uncertainty (Williams et al., 2012). Scholars have suggested that migration decisions are made according to individual needs and aspirations. Because migrants have insufficient information about future opportunities (Nogle, 1994; Williams et al., 2012; Czaika et al., 2021), people making such decisions face uncertain outcomes (Czaika et al., 2021). Migrants cannot be sure whether they will reach their ideal destination, whether their wishes will be realized on reaching it (Jung, 2021), and whether they will encounter anti-immigrant sentiment and discrimination from local people after arrival (Akgüç et al., 2015). In short, the decision to migrate to an unknown environment requires considerable risk, so those who are more risk tolerant are more likely to migrate (Czaika et al., 2021).

The external environment is another important factor that affects labor migration. Scholars generally agree in theory that the vulnerability, dynamics, and uncertainty of the external environment affect population migration (Stark et al., 1988; Akgüç et al., 2016; Durán, 2022). In the current post-pandemic period, the impact of uncertainty tends to be more severe. Cheri (2021) and Anastasiou (2022) indicated that the social and economic uncertainty caused by the pandemic has directly affected migration intention and decision-making by migrants. Durán (2022) claimed that during the COVID-19 pandemic, the world's economic and social conditions deteriorated and that the increasingly fragile social conditions created a powerful driving force for migration. Migrant workers are a distinct group within the field of migration research, representing a unique segment of the domestic migration population. These individuals possess relatively limited human capital and face precarious urban living conditions (Wang et al., 2011; Li, 2020). As external uncertainties increase, the income and employment opportunities of the new generation of migrant workers are directly undermined, thereby eroding the material foundations of their urban lives (Zheng, 2019).

In China, some Chinese scholars have studied the impact of SARS on the movement of migrant workers. They found that SARS led to a large-scale migration of migrant workers and had a great impact on the employment pattern in cities (Che, 2003). The COVID-19 pandemic has had a wider impact than SARS in this regard. The prevention and control policies at the early stage of the pandemic suppressed the demand from migrant workers to migrate to cities (Deng, 2020; Cai et al., 2021).

Recently, research on uncertainty has become more systematic. There have been more in-depth studies of the impact of uncertainty on macro- and microeconomic factors, including unemployment and migration intention. In recent years, the relationship between uncertainty research and sociology and psychology has also strengthened. Some studies have explored the impact of the pandemic on the behavioral intention of the migrant population. However, research in this field have tended to focus on the initial migration decision, paying insufficient attention to remigration intention.

Chinese migrant workers, belonging to a particularly unique demographic, exhibit limited capabilities and access to urban resources, rendering them a vulnerable group within Chinese cities. In the face of external risks, their living conditions become exceedingly fragile. The global pandemic has now subsided; however, research on the impact of this

pandemic on migrant workers remains somewhat inadequate. Little is known about whether and how this pandemic uncertainty may be affecting the unemployment psychology and remigration intention of migrant workers.

3 Theoretical framework and research hypotheses

3.1 The influence of pandemic uncertainty on unemployment risk perception

According to the systems approach, the environment has an important effect on the development of a system. All systems exchange information, materials, and energy with their external environment, and uncertainty is one of the significant characteristics of the environment. The greater the uncertainty, the greater the risk (Sitkin, 1992; Xu et al., 2020).

Studies examining the repercussions of uncertainty from an economic standpoint have revealed that job instability and unemployment are significantly influenced by industrial recession and diminished investments stemming from uncertainty. Consequently, these factors have a profound impact on the behavior and psychology of workers, inducing feelings of depression, anxiety, fear, and other detrimental emotions and effects (Godini et al., 2021). The ongoing pandemic has, to some extent, exacerbated these consequences. It has intensified external uncertainty, leading to heightened macroeconomic uncertainty—an essential variable that results in reduced income, diminished employment prospects, and increased unemployment (Shammi et al., 2020; Li, 2020; Yang et al., 2021; Lu et al., 2021; Godini et al., 2021; Durán, 2022).

China boasts a vast population. When confronted with a pandemic, local governments in China typically respond by implementing stringent quarantine measures to swiftly impede its spread among the populace. However, this approach inevitably places additional strain on supply chain security, enterprise operations, and employee commuting (Li, 2020; Yang et al., 2020; Lu et al., 2021). Migrant workers and their labor-intensive enterprises are particularly affected by these circumstances (Yang et al., 2021). Faced with the uncertain implications of the pandemic, certain companies have postponed their investment plans to mitigate losses resulting from uncertainty. Meanwhile, other enterprises have proactively embraced technological innovations such as industrial robots or automated production lines to substitute labor with technology and diminish their reliance on low-skilled workers. As a subjective response to the risk of unemployment faced by workers, the perception of unemployment risk encapsulates their concerns and anxieties regarding potential job loss, their perception and comprehension of various objective risks that may precipitate unemployment, and the potential ramifications on the external realm (Zheng et al.,2021). Undoubtedly, these changes augment the risk of unemployment and the perception of unemployment risk among migrant workers. We thus propose the following hypothesis:

Hypothesis 1: Pandemic uncertainty has a positive and significant effect on the unemployment risk perception of migrant workers.

3.2 The influence of unemployment risk perception on remigration intention

Durán (2022) proposed that among the factors such as employment opportunities, wage levels, and unemployment risk that explain the willingness of workers to migrate, unemployment risk is the most important. Specific to the situation of Chinese migrant workers, unemployment risk masks the great uncertainty about the survival and development of migrant workers in the city. The higher the unemployment risk, the higher the uncertainty. Undoubtedly, this would undermine the very foundation of their migration and exert a significant influence on their intentions and decision-making processes.

Risk perception, as elucidated by Zheng et al. (2021), entails the subjective mapping of risk within an individual's psyche. In the context of unemployment, risk perception involves workers' comprehension and awareness of the various objective risks that can precipitate joblessness and the subsequent ramifications thereof. Naturally, given the divergence in individuals' risk assessment and opportunity evaluation, the perceived risk of unemployment exhibits considerable variation among different individuals (Czaika et al., 2021).

Notably, risk perception bears a close relationship with migration intentions and decision-making (Czaika et al., 2021). Perception plays a decisive role in shaping behavioral intentions, ultimately influencing individual choices and actions (Davis, 1989). This can be observed in the economic study of migration, which employs the human capital model and treats migration as a decision pertaining to human capital investment (Sjaastad, 1962). More specifically, within the decision-making process, the evaluation of risks, including the risk of unemployment within the current locale, is classified as an assessment of migration costs. When the unemployment risk faced by migrant workers in urban areas matches or exceeds the potential benefits of migration, their inclination to migrate to cities diminishes. Furthermore, when migrants find themselves confronted with ongoing conflict or peril, they are more likely to contemplate remigration, as doing so helps mitigate their exposure to risk. Thus, we anticipate a close association between unemployment risk perception and the remigration intentions of migrant workers. The stronger the unemployment risk perception, the stronger the remigration intention of migrant workers. Thus, the following hypothesis is proposed:

Hypothesis 2: Unemployment risk perception has a positive and significant effect on the remigration intention of migrant workers.

3.3 The influence of pandemic uncertainty on remigration intention

The external milieu constitutes a pivotal determinant of individual conduct and exerts a substantial influence on labor migration (Durán, 2022). Research on international migration has underscored the potency of precarious social circumstances as a compelling impetus for migratory movements (Durán, 2022), further affirming that the socio-economic uncertainty stemming from the ongoing pandemic directly impacts migration intentions and decision-making processes (Cheri, 2021). Regarding migration behavior, Nakamura (2021) ascertained a marked surge in labor market-related online searches since the advent of COVID-19, thereby indicating a correlation between the pandemic and migration intentions and behaviors.

Migrant workers, ensconced within the panorama of China's urbanization, find themselves ensnared within the ranks of a vulnerable cohort characterized by meager skills and income (Yang et al., 2021). The majority of these laborers grapple with the arduous task of establishing a semblance of stability within urban locales. They subsist in a state of "semi-urbanization," where their susceptibility to unemployment risk eclipses that of their native urban counterparts (Yang et al., 2021). Consequently, when confronted with a momentous pandemic, migrant workers exhibit a diminished resilience to risk, thereby rendering them more inclined to adopt defensive or protective measures (Zhen et al., 2020). In light of this predicament, Tian (2019) posited that remigration has emerged as a coping strategy to evade unemployment for non-urban laborers, particularly among the younger generation. Given that pandemic-induced uncertainty erodes the stability of migrant workers' livelihoods and careers, thereby detrimentally impacting their living environment, remigration assumes the guise of a survival choice for these laborers. In other words, the heightened perception of pandemic-induced uncertainty fosters a propitious environment for the emergence of remigration intentions among migrant workers. In view of this, the following hypothesis is proposed:

Hypothesis 3: Pandemic uncertainty has a positive and significant effect on the remigration intention of migrant workers.

3.4 The moderating effect of human capital

For an extended period, the collective human capital of Chinese migrant workers has remained subpar. When compared to the local urban workforce, the initial investment in the human capital of the latest generation of migrant workers remains deficient, and their vocational proficiencies are inadequate (Wang et al., 2011; Li, 2020). Primarily, they enter the secondary labor market to partake in low-value-added work of a less technologically advanced nature. These positions not only yield meager income and provide a destitute working environment but also render them easily replaceable (Wang et al., 2014). Of greater significance is the fact that, when the low human capital component is influenced by the compounding effects of urban employment competition and other factors, the employment relationship between migrant workers and their employers primarily assumes the form of informal labor contracts as a means to secure employment opportunities, thereby excluding the majority of them from the unemployment insurance system (Yao, 2001). Once unemployed, they encounter considerable difficulties in accessing the same unemployment social security benefits as their urban counterparts (Zhang, 2006).

During this pandemic, the traditional service industry in China has been the most severely impacted, followed by labor-intensive small and medium-sized manufacturing and construction sectors. These sectors also represent the primary fields of employment for migrant workers (Zeng et al., 2020). In contrast, industries such as information transmission, software, and information technology services have remained unaffected and have even exhibited some growth (Zeng et al., 2020).

In recent years, owing to the overall enhanced level of education among migrant workers, a portion of them has begun to transition into the information industries. Between 2019 and 2020, the proportion of new-generation migrant workers in these industries escalated from 4.2% to 7.9% (Beijing Survey Team of the National Bureau of Statistics, 2021).

This movement of migrant workers from traditional labor-intensive industries to technology-intensive industries can be attributed primarily to their enhanced human capital. Consequently, migrant workers possessing significant human capital are expected to exhibit greater professional confidence in the face of the unpredictable ramifications of external pandemics.

In simpler terms, the improved human capital of certain migrant workers has mitigated the effects of pandemic uncertainty on their perceived risk of unemployment. Thus, human capital can be deemed to exert a negative moderating influence on the relationship between pandemic uncertainty and the perception of unemployment risk among migrant workers. Specifically, the lower the human capital of migrant workers, the more pronounced the impact of pandemic uncertainty on their perception of unemployment risk. Conversely, the higher their human capital, the more attenuated the impact of pandemic uncertainty on their perception of unemployment risk. Thus, the following hypothesis is proposed:

Hypothesis 4: Human capital has a negative and significant moderating effect on the relationship between pandemic uncertainty and unemployment risk perception among migrant workers.

From the perspective of psychological perception, Appadurai (2004) expounded that human desire is shaped by individuality, socialization, and educational determinants, all of which impact an individual's "capacity to aspire." The inclination of migrant workers to migrate is similarly influenced by the aforementioned determinants.

In recent years, as rural areas have progressed and China's overall educational attainment has improved, the knowledge and expertise of migrant workers have witnessed augmentation. According to data from the latest generation migrant worker monitoring report, in 2020, 21.2% of new-generation migrant workers in Beijing possessed a

bachelor's degree or higher, signifying a rise of 7.9 percentage points compared to the previous year (Beijing Survey Team of National Bureau of Statistics, 2021). Among this cohort, 20% held undergraduate degrees, and 1.2% possessed post-graduate qualifications. This upward trajectory in the human capital of migrant workers is steadily reshaping their occupational milieu within China. Certain highly educated migrant workers have begun leveraging their professional skills to attain greater labor premiums. Simultaneously, their work environment and societal standing have experienced significant amelioration, thereby intensifying their desire to obtain local citizenship and deepening their inclination to integrate into the local urban fabric (Chen, 2016; Zhu, 2017). Synthesizing the above analysis, this paper posits that the enhancement of human capital curtails the remigration inclination of migrant workers and fortifies their resolve to remain in their present city. Thus, the following hypothesis is proposed:

Hypothesis 5: Human capital has a negative and significant moderating effect on the relationship between unemployment risk perception and remigration intention among migrant workers.

4 Materials and methods

4.1 Variable measurement

All scales in this study were based on existing domestic and foreign scales. To ensure the adaptability of the measurement scale, a few items on the scales were revised. Before the formal survey was conducted, experts were invited to evaluate the scale, focusing primarily on the content, expression of items and precision of selected terms. Second, a pre-test was conducted and respondents were invited to evaluate whether the items were easy to understand. After feedback from the experts and the pre-test, the items were adjusted and improved to produce the final scale. The details of the scale were as follows:

(1) Pandemic uncertainty. Based on the scale of Poortvliet et al. (2016) and Ma Chao (2020), it includes three items. Representative items are "Because infected people may be asymptomatic, I don't know whether there are infected people among those I have had contact with," "As the number of new cases in the country is still increasing, it is unknown when the pandemic will be completely controlled," and "Because the Omicron virus may mutate, I do not know how to prevent and deal with this virus in future." Cronbach's alpha for this scale was 0.728.

(2) Remigration intention. Based on the scale of Li et al. (2017), it includes four items. Representative items are "During the next year, I may leave this city to find a new job," "I often think about leaving this city," and "I intend to find a job in another city soon." Cronbach's alpha for this scale was 0.786.

(3) Unemployment risk perception. Using the scale of Zheng et al. (2021), it includes fifteen items. Representative items are "I am worried that I may lose my job," "I feel nervous and anxious when I think of losing my job," and "If I lose my job, I will be unable to meet my daily expenses." Cronbach's alpha for this scale was 0.840.

(4) Human capital. Using the scale of He et al. (2016) and Wang (2017) on the human capital of migrant workers in China, we measured education level, skill training, skill level, and health status. Cronbach's alpha was 0.661.

4.2 Questionnaire distribution and data collection

This paper reports on one of a series of studies of migrant workers' remigration psychology under environmental uncertainty. For this survey, the researchers selected enterprises in Jiangsu and Zhejiang provinces where migrant workers were employed through the scientific research and teaching relations of the university. Jiangsu and Zhejiang provinces are situated within the Yangtze River Delta region of China and hold

significant importance as target provinces for migrant workers. In the realm of research, migrant workers were predominantly selected from the manufacturing and service sectors. These two sectors employ nearly 80% of all migrant workers, as stated by the China Migrant workers Monitoring Report (2021), making them highly representative of the migrant population.

The survey spanned from 12th April 2022 to 29th May 2022. Stratified sampling was employed, ensuring that the distribution of questionnaires aligned with the proportion of migrant workers in Jiangsu and Zhejiang, as well as their distribution across the two aforementioned sectors. Consequently, out of the 360 questionnaires distributed, 203 were allocated to respondents in Jiangsu, with 76 in the manufacturing industry and 127 in the service industry. The remaining 157 questionnaires were distributed in Zhejiang, with 61 going to respondents in the manufacturing industry and 96 in the service industry. Out of the 343 questionnaires returned, 22 were deemed invalid, resulting in 321 valid questionnaires and an effective response rate of 93.59%. The number of questionnaires met the requirement proposed by Zhang (2002) of 5 to 10 times the number of questions each questionnaire contained.

To ensure the quality of questionnaire collection, prior to the distribution of the questionnaire, the Human Resources (HR) supervisor of each company effectively mobilized and informed the respondents about the survey's purpose. Once these preparations were completed, the questionnaires were distributed and collected on-site.

5 Data analysis and results

In this study, SPSS 19.0 was used to test the reliability and validity of the measurement model. On this basis, the model was constructed and the relationships between the variables were tested to verify the hypotheses.

5.1 Descriptive statistics

Table 1 presents the demographic characteristics of the sample. The main indicators such as gender, age, and marital status obtained from this survey sample were similar to those in the national migrant workers monitoring and investigation report of the National Bureau of Statistics (2021), indicating that the survey sample was strongly representative of the migrant worker population.

Table 1. Sample characteristics (N = 321)

	Classification	*n*	Percentage		Classification	*n*	Percentage
Gender	Male	218	67.9	Position lever(Grade)	Front-line Workers(Basic level workers)	127	39.6
	Female	103	32.1		First-line management	106	33.0
Age group (years)	16–20	3	.9		Middle management	66	20.6
	21–25	22	6.9		Top management	22	6.9
	26–30	60	18.7	Monthly income (yuan)	Below 2,500	7	2.2
	31–35	90	28.0		2,500–4,000	71	22.1
	36–40	69	21.5		4,000–6,000	90	28.0
	41–45	33	10.3		6,000–8,000	83	25.9
	46–50	26	8.1		8,000–10,000	39	12.1
	51–55	15	4.7		10,000–15,000	23	7.2
	56–60	3	.9		Above 15,000	8	2.5
Education level (highest level	Primary school and	10	3.1	Working experience(years)	Under 3 years	10	3.1

completed)	below							
	Middle school	102	31.8		3–5 years		51	15.9
	High school/ technical secondary school	90	28.0		5–8 years		73	22.7
	College	80	24.9		8–12 years		62	19.3
	University	35	10.9		12–20 years		82	25.5
	Post-graduate	4	1.2		Over 20 years		43	13.4
Marital status	Unmarried	74	23.1					
	Married	241	75.1		Total		321	100
	Divorced	6	1.9					

Table 2 reports the data for each variable (e.g., mean, standard deviation, and correlation coefficient). Significant correlations between pandemic uncertainty perception, unemployment risk perception, remigration intention and human capital were found. This statistical analysis provided a good basis for the subsequent hypothesis testing.

Table 2. Means, standard deviations, and correlation matrix

Variable	Mean	Standard deviation	Age	Gender	Working years	Monthly income	Pandemic uncertainty perception	Unemployment risk perception	Remigration intention	Human capital
Age	4.550	1.610	1							
Gender	1.320	0.468	-0.275**	1						
Working experience(years)	3.880	1.388	0.857**	-0.289**	1					
Position level	1.950	0.936	0.113*	-0.097	0.147**	1				
Pandemic uncertainty perception	4.077	0.531	0.075	0.001	-0.043	-0.003	1			
Unemployment risk perception	3.213	0.497	-0.067	0.119*	-0.098	-0.166**	0.057	1		
Remigration intention	2.062	0.613	0.120*	-0.046	-0.009	-0.327**	0.156**	0.328**	1	
Human capital	2.055	0.536	-0.338**	0.023	-0.274**	0.362**	-0.041	0.022	-0.317**	1

$*$ $p < 0.05$, $**p < 0.01$. Position level includes front-line workers, first-line management, middle management and top management.

5.2 Results

Table 3 shows the results of the multiple regression analysis on pandemic uncertainty, unemployment risk perception, human capital, and remigration intention. Model 1 tested the influence of the demographic control variables such as age, gender, working years, monthly income, and unemployment risk perception, which together explained 10.1% of the variance. The results of Model 2 indicate that pandemic uncertainty had a positive and significant effect on unemployment risk perception ($\beta = 0.414$, $p < 0.001$), supporting Hypothesis 1.

Model 3 tested the influence of each control variable on remigration intention. Model 4 added unemployment risk perception based on Model 3, and the results show that unemployment risk perception had a positive and significant effect on remigration intention ($\beta = 0.316$, $p < 0.001$), supporting Hypothesis 2. Model 5 tested the impact of pandemic uncertainty on remigration intention, and the results ($\beta = 0.061$, $p> 0.05$) indicate that H3 was not supported.

The proposed examination procedures and criteria put forth by Sharma and Durand (1981) were employed to assess the mediating impact. Model 6 added human capital as a moderating variable based on Model 2. The results show that human capital had a negative and significant impact on unemployment risk perception among migrant workers ($\beta = -0.221$, $p < 0.001$). Model 7 added the interaction term of human capital and pandemic uncertainty based on Model 6, and the results show a significant impact on unemployment risk perception ($\beta = -0.151$, $p < 0.01$), indicating that human capital had a negative and significant moderating effect on the relationship between pandemic uncertainty and unemployment risk perception, supporting Hypothesis 4.

Model 8 was based on Model 4 and added human capital as a moderating variable to test its moderating effect. The results show that human capital had a positive and significant effect on remigration intention ($\beta = 0.202$, $p < 0.01$). Model 9 added the interaction term of human capital and unemployment risk perception based on Model 8. The result shows that the interaction term had a significant impact on remigration intention ($\beta = -0.104$, $p < 0.05$), and Model 9 shows significant improvement over Model 8 ($\triangle R2 = 0.007$), meaning that human capital had a negative and significant moderating effect on the relationship between unemployment risk perception and remigration intention, supporting Hypothesis 5. The figure of moderating effect in this paper is shown in Figure 1.

Fig 1. Theoretical model

Table 3. Regression analysis results

Variable	Unemployment risk perception		Remigration intention		Remigration intention	Unemployment risk perception		Remigration intention	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	0.465***	0.414***	0.065	-0.082	-0.039	0.351***	0.346***	-0.036	-0.033
Gender	-0.051	-0.052	0.089	0.105*	0.089	-0.059	-0.043	0.114*	0.129*
Working experience(years)	-0.393***	-0.343***	-0.099	0.025	-0.073	-0.365***	-0.371***	0.054	0.060
Position level	0.465***	0.120*	-0.200**	-0.082	-0.204	0.106*	0.119*	-0.222**	-0.033
Pandemic uncertainty perception		0.414***			0.061**	0.351***	0.346***		
Unemployment risk perception				0.316***				0.352***	0.373***
Human capital						-0.221***	-0.203**	0.202**	0.183**
Human capital*pandemic uncertainty perception							-0.151**		
Human capital*unemployment risk perception									-0.104*
F	8.895	8.174	4.978	11.010	4.218	9.157	9.177	11.182	10.182
R^2	0.101	0.115	0.059	0.135	0.063	0.149	0.170	0.160	0.167

* $p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

6 Discussion and conclusions

6.1 Discussion

This study establishes an analytical framework for examining the perception of risk and remigration intention, with pandemic uncertainty as the logical starting point.

Firstly, this study reveals that the impact of perceived pandemic uncertainty on the risk perception and remigration intention of migrant workers differs significantly. Prior studies have indicated that uncertainty plays a significant role in generating risks (Sitkin, 1992; Xu, 2020), leading to unemployment and negative psychological states (Godini et al., 2021). Nevertheless, the influence of pandemic uncertainty on the perception of unemployment risk and remigration intention among migrant workers has yet to be explored.

Therefore, this study expands upon existing research in the context of the pandemic, demonstrating that pandemic uncertainty also shapes the perception of unemployment risk among migrant workers. Specifically, heightened pandemic uncertainty is associated with an increased perception of unemployment risk. Harwood (2020) has observed that uncertainty is an inherent characteristic of the rapidly evolving COVID-19 situation. This empirical study concludes that pandemic uncertainty positively affects the perception of unemployment risk among migrant workers. On one hand, pandemic uncertainty disrupts business operations, leading to a decline in labor income and demand (Cai et al., 2021; Yang & Shao, 2021; Zang, 2022). On the other hand, pandemic uncertainty hampers labor mobility, significantly impacting individuals psychologically and causing distress (Thomas et al., 2007; Chen et al., 2020). Consequently, this situation undeniably undermines employment confidence and intensifies the perception of unemployment risk. This hypothesis has been validated through the findings of this study.

Nonetheless, it was found that the remigration intention of migrant workers was not positively and significantly affected by pandemic uncertainty, despite its influence on their subjective perception of unemployment risk. This finding may be attributed to the fact that pandemic uncertainty pervades all regions within a specific country. Consequently, migrant workers cannot easily evade the potential risk to the labor force by migrating to cities or returning to their hometowns, where pandemic uncertainty is equally prevalent. Existing studies have primarily focused on how uncertainty in the economic and technological environment influences the labor force. Our findings, based on pandemic uncertainty, broaden our understanding of the role and impact of uncertainty on labor migration.

Secondly, this study also discovers that the perception of unemployment risk intensifies the remigration intention of migrant workers. Previous studies have indicated a close relationship between the external environment and its perception with migration decisions (Sjaastad, 1962; Cheri, 2021; Czaika et al., 2021; Durán, 2022). Building upon these studies, our research confirms the role of subjective unemployment risk perception in augmenting the remigration intention of migrant workers.

From a rationale standpoint, on the one hand, unemployment risk perception falls within the realm of subjective risk in the workers' world. The stronger the likelihood and severity of the risk event, the more inclined workers are to react negatively. In other words, heightened risk perception leads to a more negative psychological state (Su et al., 2020). Following this logic, the decision-making process regarding remigration among migrant workers and remigration intention can be seen as protective behaviors in the face of risk. On the other hand, considering the subjective decision-making objective of human capital investment by workers, they opt for urban migration to attain a certain net benefit, while unemployment risk perception represents the cost they must bear for this endeavor (Stark, 1991). In the decision-making process regarding human capital investment among migrant workers, when the cost incurred by their migration to a city gradually surpasses

the benefits obtained from said migration, the intrinsic value of local migration tends to diminish, thereby increasing the likelihood of remigration in search of new employment opportunities. Under such circumstances, as the perception of local unemployment risk intensifies, remigration can be regarded as the catalyst for a fresh cycle of human capital investment decisions.

Thirdly, we have incorporated the study of human capital into the realm of uncertainty surrounding migrant populations, thus examining its impact on the risk perception and remigration intention of rural migrant workers. Previous studies on rural migrant workers have generally assumed that their human capital is relatively low, with minimal differences observed among individuals (Wang et al., 2011; Li, 2020). Consequently, the role and influence of human capital in the context of rural migrant workers' migration have not been given due attention. However, our research has revealed that under varying levels of human capital, the uncertainty caused by the pandemic exerts distinct effects on the unemployment risk perception among migrant workers. Specifically, when the level of human capital is low, the uncertainty brought about by the pandemic has a more pronounced impact on the perception of unemployment risk among migrant workers. This finding indicates that low-skilled migrant workers are more susceptible to the influence of pandemic-induced uncertainty and display heightened concerns regarding unemployment. Conversely, migrant workers possessing a higher level of human capital perceive reduced unemployment risk and exhibit stronger subjective professional confidence. In other words, human capital serves as a mitigating factor in the perception of unemployment risk among migrant workers. This outcome underscores the consistency between the impact of human capital on the objective unemployment rate of migrant workers and its influence on their subjective perception of unemployment risk (Zeng et al., 2020). Hence, it can be inferred that the development and enhancement of human capital among migrant workers play a crucial role in mitigating both their unemployment and their perception of unemployment risk.

Finally, this study also unveiled the pivotal role of human capital in this mechanism. The greater their human capital, the lesser the influence of unemployment risk perception on their inclination to remigrate. However, for low-skilled migrant workers, unemployment risk perception exerted a relatively substantial impact on their inclination to remigrate. This effect could be attributed to the occupation and urban integration of migrant workers with varying levels of human capital. In comparison to migrant workers with limited human capital, those endowed with abundant human capital tend to secure a more favorable working environment, improved working conditions in the local vicinity, and higher income. Some migrant workers with elevated human capital even possess their own residences within the city, rather than sharing accommodations with others. They are progressively aligning with and, in certain cases, surpassing locals in terms of professional development and the quality of urban life (Xu, 2018). All these factors collectively fortify their inclination to remain in the city instead of remigrating. It is more rational for them to establish roots in the local area and abstain from remigration.

6.2 Conclusions

In this study, 321 survey questionnaires were empirically examined through multiple regression utilizing SPSS 19.0. The study ascertained that pandemic uncertainty had a positive impact on the perception of unemployment risk among migrant workers, yet it had no significant influence on their intention to remigrate. This reveals an incongruity between the risk perception and migration intention of migrant workers in the face of pandemic uncertainty. Simultaneously, the study discovered that the perception of unemployment risk significantly affected remigration intention among migrant workers.

Based on the aforementioned findings, we have identified a distinctive relationship among three pivotal variables: pandemic uncertainty, perception of unemployment risk, and intention to remigrate among migrant workers. Specifically, for migrant workers,

pandemic uncertainty influenced their perception of unemployment risk, which in turn affected their intention to remigrate. However, pandemic uncertainty had no direct impact on remigration intention. Simultaneously, this investigation revealed that the presence of human capital substantially mitigated the impact of perceiving the risk of unemployment on the inclination to remigrate. This observation underscores the significance of human capital as an internal determinant of whether migrant laborers choose to remigrate in the face of unemployment risk perception. Consequently, it is evident that individuals with varying levels of human capital exhibit divergent intentions regarding remigration. Furthermore, human capital also attenuated the influence of pandemic uncertainty on the perception of unemployment risk among migrant workers. Specifically, individuals with limited human capital exhibited a heightened perception of unemployment risk amidst the backdrop of pandemic uncertainty, whereas those with abundant human capital perceived a diminished level of unemployment risk.

7 Contribution and further directions

Unlike previous research on labor migration during the pre-pandemic period, this study takes the pandemic as its starting point and focuses on the impact mechanism of pandemic uncertainty perception on the migration psychology of migrant workers. It should be further clarified that this study was concerned with the remigration intention of migrant workers during the pandemic, rather than their initial migration intentions. This perspective also differed from traditional research. In terms of research design, this study elucidated, from a psychological perspective, whether and how the pandemic uncertainty perception affects the psychological state of unemployment and the intention for remigration among migrant workers. This perspective further deepens the theory of migration and expands the application of uncertainty theory.

This study revealed the unique relationships among four key variables: pandemic uncertainty perception, unemployment risk perception, remigration intention, and human capital among rural workers. The study found that the pandemic uncertainty perception influences the unemployment risk perception of migrant workers, and unemployment risk perception affects the remigration intention. However, the study also found that the pandemic uncertainty perception does not directly impact the intention for remigration. This indicates that, faced with the impact of pandemic uncertainty, the formation of migrant workers' perception of unemployment risk and remigration intention is not synchronized. Although the perception of pandemic uncertainty directly affects the perception of unemployment risk among migrant workers, it does not have a direct impact on their remigration intention. This is an important finding of this study. Another finding of this study is related to the variable of human capital. Due to the overall low level of human capital among Chinese migrant workers, the majority of studies have typically leveraged this as a theoretical premise for their examinations (Wang et al., 2011; Li, 2020). It is worth noting that human capital has been a significant, yet commonly overlooked, variable in previous research on Chinese migrant workers. By introducing this variable into the examination of migrant workers' risk perception and remigration intention, the current study has identified the negative moderating effect of human capital, representing another important and novel finding of this research.

This study has certain limitations. The sampling scope of this study is limited to the Yangtze River Delta region, including Jiangsu and Zhejiang provinces. Future research on the impact of secondary migration should expand the scope of the study area. This will contribute to confirming our research findings on a larger scale, enhancing the effectiveness of the model constructed, and improving the adaptability of the model. Furthermore, the present research focuses on the overall examination of manufacturing and service industries, where the majority of migrant workers are employed in China (China Migrant workers Monitoring Report, 2021). In the future, it may be worthwhile to

explore separate analysis for different industries, with a comparative approach, to address potential disparities.

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