

Article

Impact of Occupation and Family Burden on Psychological Adjustment in Returning Migrants

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ABSTRACT

Background: Recently, increasing returning migrants in China accompany the massive rural-urban migration, but little information on mental health is available.

Methods: A cross-sectional survey was conducted in 2,100 households from seven provinces to examine the effect of return migration on mental health and its association with entrepreneurial experience, occupation, and family burden compared with local rural non-migrants. The 12-item General Health Questionnaire (GHQ-12) was used to measure mental health status, and factor scores were extracted through factor analysis to gauge three sub-domains of loss of confidence, social dysfunction, and anxiety. A general linear regression model was used to analyze the data for the association.

Results: Returning migrants were more likely to have elevated levels of anxiety compared with rural non-migrants when adjusting for social and demographic variables. Entrepreneurial experiences reduced loss of confidence and social dysfunction but increased anxiety; started but not currently running a business, and having older adults at home to care seemed growing concern in returning migrants but not in the rural non-migrants.

Conclusion: Our study supports the salmon bias effect, but that occupation, entrepreneurship, and family burden may have non-negligible impacts on the anxiety in returning migrants. The findings may have implications for promoting social integration for returning migrants.

KEYWORDS

Return migration; mental health; occupational health; family burden; general health questionnaire-12

INTRODUCTION

China has experienced a massive migration over the past decades. With the rapid urbanization and industrialization, a large number of residents have moved from rural to urban areas for employment or a better opportunity. This large-scale labor movement contributes to a significant portion of the rapid urbanization. According to the State Bureau of Statistics of China in 2016, the overall urbanization

has reached 57.35% in China; the total number of migrant workers has reached at 282 million, of which 169 million work outside their hometown (e.g., county or district). However, the urbanization includes a dynamic cycle of "going into the city" and "returning to the home-town," and return migration is an integral part of the massive rural-urban movement in China (1).

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While return migration is a complex decision, the following reasons can explain the reasons for returning. *First*, Because of the existing urban-rural structure, hukou system, the segmentation of the urban labor market in China, migrants may have to experience various forms of social exclusion and social isolation, which makes it difficult for them to have a permanent living arrangement in the cities. Only a small number of migrants can eventually settle down in the city. As the migrants grow older, most of them have to return to the countryside (2, 3). *Second*, migration and returning are not only the result of decisions made by individuals to maximize personal income but also family decisions. Despite a recent trend that migrants tend to move with their family in China (4, 5), most of their children and parents have to remain at home in rural areas. Therefore, migrants may suffer from separation from their families. *In addition*, returning home is also a strategy to maximize family interests, including responding to care for older adults and children, family reunion, returning for marriage, or childbearing (6). Since the beginning of the rural-urban population movement in the 1980s, most of the migrants became old, the children left in the family have grown up, and their parents may need being taken care of. There will be an increasing number of returnees.

In addition, returning is an elastic strategy to deal with urban economic fluctuations. When the cities encounter a financial crisis or rise in unemployment, a large number of migrants had to temporarily or permanently return hometown. For example, previous studies in some provinces showed that due to the reform of state-owned enterprises in the 1990s, urban employment became difficult, and about one-third of the migrants had returned (6, 7). Further, affected by the 2008 financial crisis, a large number of manufacturers in the coastal cities were closed down, causing some migrants unemployed (8). Many migrants returned home as the state government provides policy support for entrepreneurship (9, 10). According to the Department of Floating Population Service Management of the former National Population and Family Planning Commission, as of December 20, 2008, the number of migrant workers returning home was 13.62 million, accounting for about 9% of the total rural migrant workers.

Previous studies have focused on migrants from rural to urban areas, but less attention has been paid to returning migrants. Even with a few studies of returning migrants, they have mainly focused on economic factors such as the reasons for returning (2, 3, 11, 12), and the occupational transition to examine if they are more inclined to be entrepreneurship, non-agricultural occupations as well as the impact on rural economic development (3, 13-15). However, there are lacking research on the mental health and its associated factors in returning migrants

This study was to examine the effect of return migration, occupation, entrepreneurship, and family burden on ment-

al health among returning migrants through a population-based survey. The data was from a survey on 2,100 households randomly sampled from seven provinces of Guangdong, Hubei, Hunan, Henan, Sichuan, Anhui and Guizhou. The study would help local government to understand the health status of returning migrants and provide health services and eventually promote social integration.

METHODS

Analytical framework

Migration and mental health may have a complicated relationship in human populations. Previous studies have examined the mental health among staying migrants, mainly from two theoretical perspectives. The first one emphasizes the mediating role of relative deprivation, which affects the mental health of migrants. The relative deprivation is created by the change in social conditions in comparing with urban residents, which in turn affects mental health. Jin analyzed data from the 2012 China Labor-force Dynamics Survey (CLDS, n=13,204) and found that urban migrants tend to feel institutional isolation and social discrimination due to that they are inclined to compare with urban residents(16), thus, they suffer from relative deprivation and have lower happiness and poorer mental health (but no difference in social dysfunction) than urban residents, as well as rural non-migrants, do. Relative deprivation may induce migration, as a response to relative deprivation (17, 18). The second perspective emphasizes that migration is selective in health, i.e., the migration decision is closely associated with the health status of migrants, which is known as "healthy migrant" effect or that migrants have better health is due to "salmon bias" effect¹

The "healthy migrant" effect² was defined as "immigrants are in better health upon arrival in the destination than their local counterparts but that this health advantage erodes over time" (19). It implies that people with better health are more likely to migrate out of the rural areas to face the challenges moving into a new environment, which requires a better health condition to adapt (20). Meanwhile, doubt about the validity of the "healthy migrant" effect leads to the development of the "salmon bias" hypothesis (20), which proposes that those migrants with relatively poor health may choose to return, while those with better health are more likely to stay (21). As a result, compared with urban residents, migrants tend to have better physical and mental health conditions in spite of poor socioeconomic status.

Qi et al. analyzed the data (n=2,794) from China's Migration and Health Surveys (CMHS) in 2008 (22) and found that there are likely both "healthy migrant" effects and "salmon bias" effects in the migrants in China. Urban migrants generally have better self-reported health and lower

¹Salmon is one type of fish that hatch in fresh water migrate to the ocean, then return to fresh water to reproduce. Scientists call healthy selective effect due to returning migrant as Salmon bias.

² It was originally defined for immigration, so we adopted it for domestic migration in this study.

risk of chronic diseases than those who have never migrated out of rural areas and urban residents, and they have a lower likelihood of suffering from chronic diseases and common physical ailments than those returning migrants do. However, there was no significant difference in mental health as measured by depressive symptoms among groups; a recent study of adult mortality risk (ages 30-90 years) between natives and internal migrants in the Netherlands supports the "healthy migrant" effect but does not support the "salmon bias" hypothesis (20).

Studies have focused on the mental health of migrants and their association with migration. However, the migration process may have a continuous or cumulative impact on an individual's mental health, even when they return home. Therefore, the mental health of returning migrants is worthy of study. By directly comparing the mental health status between returning migrants and rural non-migrants, one can examine the subsequent impact of the migration on mental health among returning migrants.

According to the health selection hypothesis, the "salmon bias" effect is a negative selection process for returning migrants, while the "healthy migrant" effect is a positive selective process for migrants. The positive selection of "healthy migrant" occurred first before the "salmon bias" adverse selection, so the mental health status of returning migrants should be better than that of rural non-migrants. This presupposes that the mental health of migrants is a fixed personality trait, and will not undergo qualitative changes with the migration experience and duration of returning. This hypothesis may need a further empirical study to validate. On the other hand, according to the mediating theory of relative deprivation, the impact of the migration experience on the individual's mental health is continuous. Returning migrants may have adopted an urban frame of reference; after returning, they are still inclined to refer to the urban residents, resulting in a stronger sense of relative deprivation and poorer mental health. Jin found that the relative deprivation of returning migrants is stronger than that of rural non-migrants, and this may reduce the levels of happiness in returning migrants compared with urban residents and rural non-migrants (16). The relative deprivation has been proposed as the psychosocial pathway that links the migration and psychosocial well-being in the migrants and therefore affects the function of social roles.

Therefore, we propose, that *the mental health status of returning migrants is worse than that in the rural non-migrants is.*

The view that the returning migrants tend to refer to the urban residents is worthy of further study. As time goes, the reference group of returning migrants is likely to change. They may choose non-migrants in their hometown as a reference group rather than urban residents. Thus, the returning migrants are more likely to compare with the surrounding non-migrants, and the mediating effect of relative deprivation is likely weakened or eventually diminished. In addition, when returning migrants use the rural

non-migrants as a reference, the type of occupation and the family burden will be important factors. The difference in occupation and family burden between returnees and rural non-migrants may have more impact that is significant on mental health. As far as the occupation is concerned, non-agricultural workers or entrepreneurship may affect the mental health status.

However, previous studies of both entrepreneurial experiences and family burdens have shown positive and negative impacts on mental health. The negative impact is because that entrepreneur may face more risk, pressure, and role conflicts, consuming more emotional energy, so that they have more significant psychological stress and poorer mental health (23, 24). In addition, the elderly and children who need care will increase the family burden and the psychological pressure of family caregivers (usually the family labor) (25). In contrast, the positive impact assumes that entrepreneurs may have higher job satisfaction and self-efficacy. As a result, entrepreneurship has a positive effect on mental health such as lower levels of depression and more job satisfaction (26, 27). Moreover, the elderly and children at home can give family labor emotional support, which may improve the mental health of family caregivers (28).

Whether the entrepreneurship and family burdens play a positive or negative role in the mental health of returning migrants remains to be tested. We further propose that: 1) There are differences in the mental health of returning migrants by occupation; 2) Entrepreneurship negatively impact on the mental health of returning migrants; 3) The family burden negatively impact on the mental health of returning migrants overall.

Study design and participants

The data used for analysis were from the survey of the research project, Impact of Urban-Rural Return Migration on Rural Economic Development in China – With Implications for Vietnam, conducted by the Center for Social Research of Peking University between April and August 2015 in Guangdong, Hubei, Hunan, Henan, Sichuan, Anhui, and Guizhou Provinces of China. These provinces are the central regions that contributed to labor migrants, and returning migrants have become increasingly common in the past few years. Geographically they present a spatially broad coverage, with one from coastal, three from inland, and two from the western area of China. They also represent different levels of economic development, with Guangdong being one of the most developed provinces, Guizhou, one of the least developed areas in China.

This survey was designed using multi-stage stratified random sampling and randomly selected three counties from each province according to economic indicators. Each county randomly selected five villages according to the geographical location and the distance from the urban center, and then each drew 15 households with at least one returning migrant for interview. Of 15 families within each village, five were selected as recommended by the village leader; the remaining ten households, in which five house-

holds without migrants, are randomly drawn according to a list of the roster provided by village or the snowball method (without the roster). Selected returning migrants to be interviewed must meet three criteria: 1) be a local rural resident before migrating out; 2) have been lived in the village consecutively for more than one year after leaving the original place of residence; 3) have settled down continuously in the hometown (including county towns or townships) for more than one year after returning. In total, 2,216 persons among 105 villages in 21 counties were interviewed face to face for the survey. Research participants of this study are returning migrants and rural non-migrants. We defined returning migrant as an individual who had migrated out to work for at least one year and have returned to hometowns (including county towns and townships) for at least one year. The non-migrants were defined as people who had worked in the local area for a long time, over 18 years old, and have no work experience out of the original residence.

Outcomes and measurements

General mental health

The psychosocial adjustment was measured by the general mental health of respondents in recent weeks using the 12-item General Health Questionnaire (GHQ-12), which is one of the most popular and widely used screening instruments for recognition and measurement of mental health (29). It was originally developed by Goldberg to screen subjects for psychiatric illness for case identification (30, 31). GHQ-12 has been validated in general population surveys of both younger and older Chinese populations (32, 33). The GHQ-12 consists of 12 items, including positive and negative elements, measuring the self-confidence, anxiety, and psychological aspects of daily social interactions (34). Each scale is based on a four-point Likert scale (0,1,2,3); the total score ranges from 0 to 36; a higher score indicates a lower level of mental health (34, 35).

The overall GHQ-12 is developed as a one-dimensional measurement (36). However, follow-up studies have shown that three dimensions underlying GHQ-12: loss of self-confidence, social dysfunction, and anxiety (37). Naturally treating GHQ-12 score as one-dimensional measure may hide the exact internal structure of general mental health. However, an empirical analysis of data from the 2008 wave of the Rural to Urban Migration in China (RUMiC) survey showed that GHQ-12 was a two dimension-coping/engagement and stress/depression model (38). Also Guan et al analyzed the large sample of 2009 RUMiC survey ($n > 32,171$) stratified by age, number of siblings and number of children and showed that 2-3 factor structure model have a good fit of GHQ-12 score, although the first factor explained much larger variation (39).

Factor analysis was performed to identify the internal structure of GHQ-12. Before factor analysis, KMO (Kaiser-Meyer-Olkin) and Bartley sphericity tests were performed to test for the reliability of items that also determine the suitability for factor analysis. KMO (Kaiser-Meyer-Olkin) was

used to determine whether the data is suitable for factor analysis; a larger KMO value indicates more common factors among these variables, suggesting more ideal for factor analysis. We used Graetz's maximum likelihood estimation with the oblique rotation method (37) to extract interpretable dimensions that underlie the data structure with minimal loss of information.

Explanatory variables

Explanatory variables were selected to test for the hypothesis and consisted of three dimensions. Specifically, they included the migration status, occupation, occupational and entrepreneurial experiences. The migration status was coded as a binary variable. Occupation was classified as agricultural and non-permanent employment (e.g. agriculture, forestry, animal husbandry, fishery, water conservancy production and non-permanent employees), high-tech company professional (e.g. management, clerks, professional and technical personnel), low-tech (commercial service, manufacturing, construction workers, transport equipment operators), self-employed (self-employed households, urban street vendors), other non-classified workers. Entrepreneurial experience is divided into never started a business, started a business but not currently running a business, and have started and now running a business. The family burden included whether have an older adult (aged over 65 years) at home to be taken care of and whether have a child of age under 15 years old at home.

Some other variables were selected to control for potential confounding effects. These include gender, age, years of education, marital status, annual household income per capita, self-assessment of general health, self-assessed economic situation at family, and county level. Age was grouped into an ordinal or categorical variable, with age below 30 years old as a reference group, 30 to 44 years, and 45 years and above. Years of education was coded as a continuous variable, no school (0 years), primary school (6 years), and junior high school (9 years), high school /vocational school (12 years), college (15 years), undergraduate (16 years), postgraduate or above (19 years). Marital status was a binary variable coded as 0 if no marriage (including unmarried, divorced, and widowed) and 1 if currently married (including married and remarried). Household income per capita last year was coded as an interval variable. The region is a dummy variable by 21 counties. Other control variables included gender (male=1), self-reported health status (coded as very poor or bad = 1; 0 otherwise), self-reported household economic status (coded as 1 if below the median; 0 otherwise).

Statistical analysis

The analysis strategy was divided into three steps. With rural non-migrants as a reference group, we first compared returning migrants with the reference to examine if there were any significant difference in the key demographic and socioeconomic variables, including individual characteristics, gender, age, education, marital status, self-reported general health, household income per capita last

year, self-reported family economic status, type of occupation, family burden such as having old adults or child to care at home, and entrepreneurial experience. Then, using the variance of analysis and regression analysis, we compared the differences in general mental health to assess the psychological adjustment in the returning migrants.

The modeling was divided into three steps. The Model 1 was an initial model with only returning migration as a binary variable, equivalent to a variance of analysis (1 if returning migrant; 0 otherwise); Model 2 is a regression model controlling for demographic and socioeconomic variables; Model 3 simultaneously controlled for demographic and socioeconomic variables, occupation, and family burden variables. Finally, we examined the determinants of the

general mental health in returning migrants and rural non-migrants, separately.

RESULTS

Descriptive statistics

Due to missing values in some variables, the valid sample size was 2,183, including 1,615 households with at least one returning migrant and 568 families without migrants (Table 1). Generally, the proportion of men is higher for both returning migrants and non-migrants than that of women in six provinces, excluding returning migrants in Hubei.

Table 1. Sample distribution by sex and region

	Combined		Returning migrants		Non-migrants	
	N	% of male	N	% of male	N	% of male
Anhui	340	57.4	248	60.1	92	50.0
Guangdong	286	68.9	212	65.1	74	79.7
Guizhou	303	79.5	226	81.9	77	72.7
Henan	303	68.3	225	69.3	78	65.4
Hubei	318	49.7	239	47.3	79	57.0
Hunan	327	60.9	240	58.3	87	67.8
Sichuan	306	59.5	225	62.7	81	50.6
Total	2,183	63.2	1,615	63.3	568	62.9

Table 2 presents the coding and descriptive statistics of individual independent variables and covariates of the survey participants. The mean age of returning migrants was 40 years old, which was younger than that in rural non-migrants (46 years). A slightly higher proportion (8.4%) of non-married individuals in the returning group compared with the rural non-migrant group (3.4%). Returning migrants reported a higher level of good health (90.7%) than rural non-migrants did (81.9%); 61% of returning migrants had a child to care at home, higher than those rural non-migrants did (44.7%). These all were likely due to younger age in the returning migrants.

We did not find any marked difference between returning migrants and rural non-migrants in other variables such as years of education (8.5 vs. 8.9 years), annual household income per capita (mean, 12,000 to 13,000 RMB), gender distribution, the self-assessed family economic status, type of occupation and entrepreneurial experience, and whether have an elderly at home to care.

GHQ-12 and factor analysis

We examined individual GHQ-12 item by returning status, province and proportion of individuals who reached at a cutoff (≥ 14) (Table S1, Table S2). The general GHQ-12 score is round 8.8; there is 9.8 percent of people with GHQ-12 score at 14 or more. The proportions of those with higher GHQ-12 score in Anhui, Hubei, Sichuan, and Guizhou are higher than average level. For returning migrants, the proportions over average occur in Hubei, Sichuan and Guizhou. For non-migrants, the proportions over average are Anhui, Hubei and Sichuan.

Analysis of the GHQ-12 score indicated that KMO was 0.84 and Bartlett's sphericity test was significant (Chi-square =

7244.42, degrees of freedom= 66, $p < 0.0001$), indicating that our GHQ-12 data were suitable for performing factor analysis.

Table 3 shows the factor analysis of GHQ-12. Three factors with eigenvalue greater than 1 explained 66.03% of the total variance in GHQ-12 items. According to the factor-loading matrix and the loading values of each item on individual factors, we defined the first factor as loss of confidence, the second factor as social dysfunction, and the third one as anxiety or depression. The factor score ranged from 0 to 1.

Differences in psychological adjustment by the status of returning migration

Table 4 shows the differences in the overall GHQ-12 score between returning migrants and rural non-migrants and by other covariates. It was shown that there were no significant differences in the GHQ-12 between groups by age, sex, marital status, self-assessed household economic status, and self-reported health, type of occupation, entrepreneurial experience, older adults, or child at home to care. These were mostly consistent with that in Table 2.

However, we did observe female returning migrants (Mean=9.82; SD=4.6) had a better general mental health than female rural non-migrants did ($p < 0.05$). Female returning migrants also tended to have a better health status if they were engaged in the agricultural sector, high-tech company professionals, or had elderly care at a nominal level of significance ($p < 0.1$).

Table 2. Descriptive statistics of independent variables

Coding	Returning migrant			Rural non-migrant		
	N	%/Mean	SD	N	%	SD
Age	1615	39.6	10	568	46	9.6
1=Less than 30 years	305	18.9		38	6.7	
2=30-44 years	770	47.7		184	32.4	
3=Above 44 years	540	33.4		346	60.9	
Education (years)	1615	8.9	3	568	8.5	3.4
Annual household income per capita (RMB)	1615	12,610	27,710	568	12,970	44,640
Gender						
0=Female	593	36.7		211	37.2	
1=Male	1022	63.3		357	62.8	
Marital status						
0=Unmarried, divorced/widowed	135	8.4		21	3.7	
1=Married or remarried	1480	91.6		547	96.3	
Self-assessed family economic status						
0=Median and above the median	1281	79.3		417	73.4	
1=Below the median	334	20.7		151	26.6	
Self-reported health						
0=Very good/good/median	1465	90.7		465	81.9	
1=Very poor/bad	150	9.3		103	18.1	
Occupation						
1=Agricultural/non-permanent employment	895	55.4		325	57.2	
2=High-tech company professional	143	8.9		38	6.7	
3=Low-tech company professional	220	13.6		60	10.6	
4=Self-employed	310	19.2		102	18	
5=Others	47	2.9		43	7.6	
Entrepreneurial experiences						
1=Never started a business	831	51.5		323	56.9	
2=Started but not currently running a business	719	44.5		202	35.6	
3=Started and currently running a business	65	4		43	7.6	
Having an elderly at home (aged 65 years or older)						
0=No	1237	76.6		444	78.2	
1=Yes	378	23.4		124	21.8	
Having a child at home (aged 15 years or under)						
0=No	629	39		314	55.3	
1=Yes	986	61		254	44.7	

Table 3. Description and summary statistics of three factor and GHQ-12 score

Factor	Factor meaning	Items	%	Mean	SD
Overall		Item 1-12		8.78	4.47
Loss of confidence	Loss of confidence, low self-esteem	Item 11.12. (Been losing confidence in yourself. Been thinking of yourself as a worthless person)	25.91	0.41	0.58
Social dysfunction	Social dysfunction, loss of pleasant	Item 3.4.5.6. (Been able to concentrate on whatever you are doing. Felt that you are playing a useful part in things. Be able to face up to your problems. Felt capable of making decisions about things.)	20.77	0.89	0.42
Anxiety	Anxiety, depression,	Item 1.2. (Lost much sleep over worry. Felt constantly under strain.)	19.35	0.96	0.77

%, the proportion of variation explained by the individual factor

Table 4. Descriptive statistics of total GHQ-12 score by migration, demographics and covariates

Coding	Returning migrants		Rural non-migrants		Sig.
	Mean	SD	Mean	SD	
Age					
1= Less than 30 years	9.42	4.21	9.18	4.11	
2= 30-44 years	9.53	4.32	9.51	4.55	
3= Above 44 years	9.79	5.10	10.14	5.52	
Gender					
0=Female	9.82	4.60	10.61	5.41	**
1=Male	9.47	4.56	9.44	4.93	
Marital Status					
0= Unmarried, divorced or widowed	10.13	4.63	11.48	5.27	
1= Married or remarried	9.55	4.57	9.87	5.13	
Self-assessed family household status					
0= Median and above the median	9.12	4.18	9.17	4.71	
1= Below the median	11.45	5.48	11.82	5.77	
Self-assessed health					
0= Very good/good/median	9.19	4.22	9.05	4.60	
1= Very poor/bad	13.61	5.84	13.61	5.77	
Occupation					
1=Agricultural/non-permanent employment	9.97	4.95	10.57	5.56	*
2=High-tech company professional	9.79	3.99	8.42	3.87	*
3=Low-tech company professional	8.98	3.80	9.68	4.14	
4=Self-employed	8.84	4.13	8.47	5.59	
5=Others	9.74	4.23	8.47	5.59	
Entrepreneurial experiences					
1=Never started a business	10.03	4.77	10.25	5.43	
2=Started but not currently running a business	9.20	4.22	9.28	4.42	
3=Started and currently running a business	8.57	5.25	9.84	5.88	
Having an elderly at home (aged 65 years or older)					
0=No	9.42	4.45	9.88	5.15	*
1=Yes	10.18	4.95	9.85	5.13	
Having a child at home(aged 15 years or under)					
0=No	9.72	4.75	9.91	5.24	
1=Yes	9.52	4.46	9.82	5.03	

*** P < 0.01, ** P < 0.05, * P < 0.1

We performed a regression analysis to examine the association of returning migrant status with the overall GHQ-12 score and three sub-domain scores: loss of confidence, social dysfunction, and anxiety (Table 5). It is interesting to note in Model 1, even when returning migrant status was not significantly associated with the overall GHQ-12 score, we found that returning migrants were less likely with loss of confidence ($p < 0.05$) and social dysfunction ($p < 0.05$), which might imply that returning migrants had more confidence and performed better in social function.

Controlling for general demographic and socioeconomic variables (Model 2), we found that returning migrants tend to show elevated levels of anxiety or depression (Coef. = 0.026; $p < 0.05$). Unfortunately, returning status was no longer associated with the loss of confidence ($p < 0.392$) and social dysfunction ($p = 0.881$). However, further when occupation, entrepreneurial experience, and family burden were controlled (Model 3), the effect of returning status on the levels of anxiety was reduced but still at a level close to significance (Coef.=0.023; $p = 0.066$). This might imply that the association of returning status with anxiety was parti-

ally due to occupation, entrepreneurial experience, and family burden.

Determinants of psychological adjustment by returning status

We examined the determinants of the general mental health in returning migrants and found that returning migrants with poor self-assessed health and lower self-assessed family socioeconomic status were significantly associated with all three sub-domains of loss of confidence, social dysfunction and anxiety (Table 6a).

Occupation had no effect on the loss of confidence and social dysfunction but significantly affected the level of anxiety in returning migrants. Compared with the returning migrants who were engaged in the agricultural/non-permanent employment, those who were high-tech company professionals were more likely associated with anxiety (Coef.=0.07; $p < 0.01$) but low-tech company professional was less likely associated with anxiety (Coef.= -0.049; $p < 0.01$).

Table 5. Regression analysis of GHQ-12 score by migration

	Model 1			Model 2			Model 3		
	Coef.	SE	P	Coef.	SE	P	Coef.	SE	P
GHQ-12 overall									
Returning migrant	-0.275	0.231	0.233	0.128	0.225	0.570	0.076	0.227	0.737
Observations	2,183			2,183			2,183		
R-squared	0.001			0.150			0.155		
Loss of confidence									
Returning migrant	-0.024	0.009	0.013	-0.008	0.009	0.392	-0.008	0.010	0.395
Observations	2,183			2,183			2,183		
R-squared	0.003			0.105			0.109		
Social dysfunction									
Returning migrant	-0.014	0.007	0.048	0.001	0.007	0.881	0.000	0.007	0.951
Observations	2,183			2,183			2,183		
R-squared	0.002			0.121			0.129		
Anxiety									
Returning migrant	0.017	0.013	0.166	0.026	0.012	0.037	0.023	0.013	0.066
Observations	2,183			2,183			2,183		
R-squared	0.001			0.120			0.132		

- Model 1 includes only migration status;
- Model 2 is a model that controlled for general demographic and socioeconomic variables, including gender, age, years of schooling, marital status, per capita yearly household income, self-assessment of general health status, self-assessment of family economic status, and regional social variables of the population;
- Model 3 is a model that further controlled for type of occupation, entrepreneurial experiences, and whether there are elderly and children at home based on Model 2.

Entrepreneurial experience affected mental health differently in sub-domains. Compared with those never started a business, returning migrants who had started but not currently running a business (Coef.=-0.025; $p<0.01$) and started but presently running a business (Coef.=-0.070; $p<0.01$) tend to have reduced likelihood of losing confidence. Similarly, returning migrants who had started but not currently running a business (Coef.=-0.023; $p<0.01$) and started but presently running a business (Coef.=-0.070; $p<0.01$) also tend to have reduced likelihood of social dysfunction. In contrast, returning migrants who had started but not currently running a business (Coef.=0.028; $p<0.1$) and started but presently running a business (Coef.=0.022; $p>0.05$) seemed increasing anxiety but not quite met the statistical significance.

Of note, family burden to some degree affected the mental health inconsistently in different sub-domains. Having an elderly at home to care seemed increasing the levels of social dysfunction (Coef.=0.11; $p<0.1$) and anxiety (Coef.=0.027; $p<0.1$).

Finally, we examined the association of entrepreneurial experience, occupation, and family burden with the GHQ-12 sub-domain scores in rural non-migrants (Table 6b). Poor self-assessed health and lower self-assessed family socioeconomic status were associated with higher levels of loss of confidence, social dysfunction, and anxiety. Of note, male non-migrants were associated with reduced levels of loss of confidence, social dysfunction, and anxiety compared with females.

DISCUSSION

In this study, based on a survey data of 2,100 households conducted in seven provinces where the majority of migrants were from in China, we found that returning migrants were more likely to be associated with elevated anxiety compared with rural non-migrants when adjusting for social and demographic variables. In addition, entrepreneurial experiences reduced the levels of loss-confidence and social dysfunction but increased the levels of anxiety, type of occupation was only associated with anxiety in returning migrants but not in the rural non-migrants.

Our study provided interesting findings on return migration and mental health. Returning migrants appeared to have elevated levels of anxiety when social and demographic variables were controlled. While this may not support the "healthy migrant" effect without a study of migrants and urban residents, our findings seemed supporting the "salmon bias" hypothesis. The "salmon bias" effect seemed being reduced when controlling for type of occupation, entrepreneurial experience, and family care burden, all which were associated with anxiety in the returning migrants but not in the rural non-migrants. However, the elevated levels of anxiety associated with return migration may be partly due to occupation, entrepreneurial experience or family burden. This is because that when these factors were controlled in the analysis, the effect of return migration on anxiety was reduced, and these variables were only associated with anxiety in returning migrants but not in the rural non-migrants. There may be other reasons given that return migration is highly selective and the reasons could be varied (11).

Table 6a. Regression models of mental health outcomes for returning migrants

	Loss of confidence			Social dysfunction			Anxiety		
	Coef.	SE	Sig	Coef.	SE	Sig	Coef.	SE	Sig
Individual characteristics									
Gender (male=1)	-0.004	0.010		-0.014	0.007	*	0.006	0.014	
Age (years)	0.000	0.001		0.001	0.000	*	-0.002	0.001	**
Education (years)	-0.003	0.002		-0.003	0.001	**	-0.001	0.002	
Marital status (married =1)	-0.025	0.019		-0.004	0.014		0.005	0.026	
Household income per capita	-0.002	0.002		-0.004	0.002	**	-0.004	0.003	
Self-assessed general health									
Very poor/bad=1 vs. none	0.104	0.016	***	0.090	0.012	***	0.147	0.022	***
Self-assessed family economic status									
Below the median=1 vs. none	0.035	0.012	***	0.016	0.009	*	0.063	0.016	***
Occupation situation									
Agricultural and non-permanent employment(ref)									
High-tech company professional	0.001	0.017		0.019	0.013		0.070	0.023	***
Low-tech company professional	-0.007	0.014		-0.012	0.010		-0.049	0.019	***
Self-employed	0.016	0.015		0.006	0.011		-0.012	0.020	
Others	0.015	0.027		0.040	0.020	**	0.005	0.037	
Entrepreneurial experiences									
Never started a business (ref)									
Started but not currently running a business	-0.025	0.011	**	-0.023	0.008	***	0.028	0.015	*
Started and currently running a business	-0.070	0.025	***	-0.070	0.019	***	0.022	0.034	
Family burden									
Having an elderly at home(Yes=1)	-0.003	0.011		0.011	0.008	*	0.027	0.015	*
Having a child at home (Yes=1)	-0.014	0.011		0.008	0.008		0.002	0.015	
Constant	0.258	0.044	***	0.324	0.032	***	0.466	0.058	***
Observations	1,615			1,615			1,615		
R-squared	0.102			0.135			0.128		

*** p<0.01, ** p<0.05, p<0.1.

Table 6b. Regression models of mental health outcomes in rural non-migrants

	Loss of confidence			Social dysfunction			Anxiety		
	Coef.	SE	Sig	Coef.	SE	Sig	Coef.	SE	Sig
Individual characteristics									
Gender (male=1)	-0.040	0.019	**	-0.017	0.013		-0.056	0.023	**
Age (years)	0.001	0.001		0.000	0.001		0.000	0.001	
Years of schooling	0.002	0.003		-0.002	0.002		-0.004	0.003	
Marital status (married =1)	-0.058	0.047		-0.008	0.032		0.026	0.057	
Household income per capita	-0.007	0.006		-0.001	0.004		0.011	0.007	
Self-assessed general health									
Very poor/bad=1 vs. None	0.096	0.025	***	0.075	0.016	***	0.186	0.030	***
Self-assessed family economic status									
Below the median=1 vs. none	0.050	0.021	**	0.034	0.014	**	0.102	0.025	***
Occupation situation									
Agriculture and non-permanent employment (ref)									
High-tech company professional	-0.010	0.037		-0.022	0.024		0.075	0.044	*
Low-tech company professional	0.019	0.030		0.027	0.020		-0.004	0.036	
Self-employed	-0.014	0.028		0.010	0.019		-0.010	0.034	
Others	-0.017	0.036		-0.019	0.024		0.013	0.044	
Entrepreneurial experiences									
Never-started a business									
Started but not currently running a business	0.008	0.022	*	-0.008	0.014		0.060	0.057	
Started and currently running a business	0.015	0.035		0.007	0.023		0.064	0.044	
Family burden									
Having an elderly at home (Yes=1)	0.015	0.021		-0.004	0.014		-0.016	0.025	
Having a child at home (Yes=1)	-0.013	0.019		0.016	0.012		0.039	0.022	*
Constant	0.128	0.097		0.272	0.064	***	0.152	0.116	
Observations	568			568			568		
R-squared	0.218			0.208			0.248		

*** p<0.01, ** p<0.05, * p<0.1;

Multiple regression analysis of returning migrants provide evidence for the other hypotheses we proposed. In returning migrants, occupation was significantly associated with levels of anxiety. We found that high-tech company profes-

ionals seemed having elevated levels of stress but low-tech company professionals seemed having reduced levels of anxiety, compared with agricultural employment. In addition, the entrepreneurship in returning migrants had gene-

rally reduced levels of loss of confidence and social dysfunction, but in contrast, it appeared increasing the levels of anxiety. This could be due to the selectivity (e.g., success or failure) and reasons for returning(6). In terms of family burden, returning migrants with the elderly at home to care did increase the levels of anxiety, this probably was the reason for some returnees.

Of note, we did not find significant evidence for association of occupation, entrepreneurship, and family burden with sub-domain scores in rural non-migrants. Poor self-assessed health and self-assessed family economic status were very significant factors that affect the mental health in all three domains of loss of confidence, social dysfunction and anxiety, in rural non-migrants as well as returning migrants.

About the dimensions of GHQ-12 item, Freidman analyzed the data from the 2008 wave of the Rural to Urban Migration in China (RUMiC) survey and indicated that GHQ-12 was two dimensions in Chinese migrants – coping /engagement and stress/depression (38), which represent the nature of the GHQ aimed to measure - positive or negative, but also fit the psychological theory. However, others (37) and the data from this study showed a three-dimensional measure. This would be caused by different definition for migration: the RUMiC is migrants only, and this study focused on both returning migrants (who ever migrated out but now live in original rural areas) and non-migrants.

Our study may have some implications for policy. The analysis of psychological adjustment among returning migrants may have some policy implications for local governments to promote social integration. As occupational stability and family burden have a significant impact on the psychological adjustment of returning migrants, local governments should assist in employment and creation of an entrepreneurial environment for returning migrants, providing supports that are more effective for the elderly to alleviate the worries and family burden of returnees.

Limitations

There are some limitations to this study. First, the study lacks participants of staying migrants, which would help test the "healthy migrant" effect. Second, the measurement of mental health was based on a simple GHQ-12, which may not measure the psychosocial well-being comprehensively. In addition, previous studies indicate that returning migration is selective and due to complicated reasons, we failed to include related information.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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APPENDIX

GHQ-12 Questionnaire

1. Lost much sleep over worry (N)
2. Felt constantly under strain (N)
3. Been able to concentrate on whatever you are doing (P)
4. Felt that you are playing a useful part in things (P)
5. Been able to face up to your problems (P)
6. Felt capable of making decisions about things (P)
7. Felt you couldn't overcome your difficulties (N)
8. Been feeling reasonably happy, all things considered (P)
9. Been able to enjoy your normal day to day activities (P)
10. Been feeling unhappy and depressed (N)
11. Been losing confidence in yourself (N)
12. Been thinking of yourself as a worthless person (N)

Notes:

- 1) The six positive questions are 3, 4, 5, 6, 8 and 9. They were coded from the most positive to the least positive: 0=Better than usual, 1=same as usual, 2= Less than usual, 3=Much less than usual;
- 2) The six negative questions are 1, 2, 7, 10, 11 and 12. They were coded from the least negative to the most negative: 0= Not at all, 1=No more than usual, 2=Rather more than usual, 3 = Much more than usual;
- 3) For an individual, the scores are usually added so that the total score ranges from 0 to 36 ; an individual with total score of 14 or more is often considered a cutoff for "caseness"(40).

SUPPLEMENTARY TABLES

Table S1, Table S2

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