The Impact of Adult Children's Out-Migration on the Elders' Psychological Well-Being in Rural China: Does Gender Matter?

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Abstract: This study examined the impact of adult children's out-migration on the psychological well-being of older Chinese parents left behind in their rural villages. Using data from two waves of the Longitudinal Study of Older Adults in Anhui Province, China, analyses showed that, controlling for personal characteristics and resources, the out-migration of children reduced the psychological well-being of their parents, particularly among older fathers. However, the transition to coresidence with an adult child buffered the negative impact of daughters' out-migration on the psychological well-being of older mothers. These results suggest ambivalent feelings on the part of older parents when their adult children migrate out of their home villages for work or marriage. However, there is an important gender division in the adaptation to the out-migration of children. Mothers benefited from entering into a traditional multi-generational living arrangement when their daughters migrated; comparable fathers suffered from worse psychological well-being following entry into such an arrangement, presumably because living with children increased their dependence. It is concluded that a complex gender interaction needs to be considered when examining the consequences of dynamic intergenerational family processes in China.

Key words: out-migration, psychological well-being, living arrangement, gender

Introduction

China is now facing a profound social and economic transformation, of which the outstanding characteristics are urbanization and migration. The population of urban-rural migration in China rise from 34 million in 1989 to 221 million in 2010 (Cai, 2002; National Statistics Bureaus of China 2010), most of whom are young adult labor, which have greatly changed the demographic characteristics and family structure. Especially, as to the lack of social and medical security in rural areas, families are still the main resource of old-age support for the rural elderly, and adult children are the primary providers giving basic financial and instrumental support to their older parents (Ikels, 1997; Lee and Xiao, 1998; Logan and Bian, 1998; Shi, 1993). Thus the more dispersion of adult children as a result of massive rural-urban migration may undermine the old-age support arrangement, and then affect the well-being of the elderly left behind in village.

Although migration has become a widespread social and demographic phenomenon in developing countries, the subjective well-being consequences of migration are often overlooked before. Firstly, the determinants of migration are generally focused on, while relatively little attention to the consequences of migration (Bilsborrow, 1993; Kritz, Lin and Zlotnik, 1992; Massey et al, 1993). Secondly, most studies, no matter macro or micro ones on the consequences of migration, stress the subjective consequences, such as the income and other material returns for the individuals and families, neglecting the subjective consequences (LeClere and McLaughlin, 1997; Lichter, 1983; Lucas, 1997). Thirdly, few studies focus fully on the impact of migration on the elderly left behind, especially in China.

As to the lack of theoretical and empirical studies on migration and its consequences, and to the inconsistent finding on this topic, this study will focus on the effect of the migration of young labor on their older parents' psychological well-being left behind in villages.

The former studies on the effect of migration of adult children on their older parents are mostly based on cross-sectional data, which may cause possible confusion of the causes and consequences of the migration of adult children – the migration of adult children have effects on the well-being of older parents, or the needs of older parents affect the decision-making of their adult children's migration. Additionally, the mechanism to the extent how adult children's out-migration affects their parent left behind is not clear yet. This study will examine, employing the follow-up data, the longitudinal effect of children's out-migration on the psychological well-being of the rural elderly. And in the context of traditional paternal living arrangement and son preference in rural China (Zeng and Wang, 2003; Zhan, 2004; Zhan and Montgomery, 2003), this paper also studies the difference in effect of the sons' migration or daughters' migration on the older parents by gender, and how the extent of the traditional living arrangement affect this relationship.

Theoretical Model

Theoretical perspective on consequence of out-migration

According to the reviews, there are two mechanisms to explain how the migration of children affects the well-being of older parents. The first is modernization and vulnerability assumption (Aboderin, 2004; Greenwell and Bengston, 1997), which address that, no matter

in the history of the West or in the developing countries currently, urbanization and industrialization cause the transform of families from extended families to nuclear families, the spatial dispersion of family, damage of family function (including old-age support), as well as the decline in elders' status and role in families (Goode, 1960). From the perspective based on the studies on community and public opinion, more and more older people are abandoned in rural area by their migrated children, that is consistent with the long-term view of the Western sociologists (Aboderin, 2004). However, many researchers holding the opposite view propose that, as to the Asian culture valuing the family collectivism and filial piety in families and society, it is impossible for migration to destroy the family support system (Knodel and Saengtienchai, 2007; Secondi, 1997; Velkoff, 2001). According to the economics of labor migration theory, migration is not considered as an individual rationale, but an economic strategy jointly made by the migrants and stayer to pursue maximum household interest and to diversify the family economic risks, benefitting both the migrants and those left behind (Massey and Espinosa, 1997; Stark and Bloom, 1985; Castles, 1998). Thus the migration may even contribute to the family collectivism, as a result of extending the economic output of the families, increasing the household income and remittances, and benefitting the elderly with the goods which can not be obtained from household agriculture production.

Although micro-economic model on migration have been adopted as the theoretical model in the study of geography and economics, there is lack of the theoretical explanation for subjective consequences of migration. Generally speaking, the situation of the elderly left in

village are not worse than the ones living with their family members, but the former usually suffer the loneliness, the most serious problem (Xiang, 2006), which suggest that, considering the particularities of subjective psychological well-being, economics of labor migration theory, applying the economic consequences of migration, can not fully explain the mechanism of the effect of migration on the subjective psychological well-being of the elderly left in village. Many theories and researches have studies the negative effect of both life events and stressor on the individuals' psychological well-being (Kaplan, 1996), which is generally based on the stress–health outcome frame evolved out of the work by Holmes and Rahe (1967) on the effect of stressful life events on health outcomes. Life events, whether positive or negative, can be stressful because they require adjustment (Holmes and Rahe, 1967; Wheaton, 1996). Family members' migration is one example of a commonly life event that may have effects on psychological well-being. And the events may not have a discrete ending point, but may occur on a continuum, and thus become chronic stressors that impede an individual's ability to enact roles and identities (Wheaton, 1996). Therefore, the stress companying the event of children's out-migration may be present during an extended period following a migration event. So we address that the out-migration of adult children have negative effect on the psychological well-being of the elderly left behind in village.

The effect of traditional living arrangement

Traditionally, especially in rural areas, multigenerational coresidence is considered as an important symbol of respectable status in families and happiness in old-age. Although as market economy and migration of labor reduce the possibility of traditional living

arrangement, coresidence with adult children did not prevail as the past decades years, living with children in old-age is still common in China and other Asian societies (Frankenberg, Chan, and Ofstedal, 2002; Ofstedal, Knodel, and Chayovan, 1999). The concept that is children's primary responsibility is to take care of their older parents remains widespread in China, which is also consistence with the upward flow of intergenerational support (Lee et al., 1994; Lillard andWillis, 1997). Zimmer and Kwong (2003) have found that living with offspring increase greatly the possibility of receiving the instrumental assistances from children, but decrease the likelihood of receiving financial support, which also illustrates the alternative between financial support and instrumental support.

Especially in Chinese rural areas having population diversion and inconvenient traffic, proximity to children is the key for the elderly to get assistance and frequent social contact, so that the elderly living with their adult children and grandchildren are usually in good position (Chen, Short and Entwistle, 2000). The former studies have found that coresidence with adult children is positively related to the life satisfaction of the elderly, protecting directly the latters' psychological well-being (Chen and Silverstein, 2000; Xu, 2001). Silverstein et al. (2006) further test how family structure affect the psychological well-being of Chinese rural elderly, and have found that the older parents living in multigenerational families have better psychological well-being than the ones alone. Living arrangement is an important factor that affect the available needs of older persons. However, the studies in Asian societies including China have found that coresidence with children is most likely to be a result of increased needs of older parents because of economic or physical health

deterioration (Hermalin et al., 1996; Rogers, 1996). Thus we deduce that, as a basic way to meet the needs of older parents, coresidence with children can protect the older parents' psychological well-being, and when out-migration of children make a stress on the psychological well-being of the elderly, coresidence with children may buffer the stress.

Rural elderly families from gender perspective

In the case of out-migration, we can expect several role-related gender differences in stressors. Due to the gender role and division in family, women are traditional caregivers (Hu, 1995; Zhang, 2001) and spend more time on housework than men do (Blair & Lichter, 1991). The role of caregivers make women to involve more in the families, maintaining and strengthening ties with other family members in extended families (Coward and Dwyer, 1990; Spitze and Logan, 1990), which enhance the advantages of older women in intergenerational relationship (Ghuman and Ofstedal, 2004). The out-migration of adult children is likely to change the role and identity of the older parents in families by requiring them to care for grandchildren, perform extra domestic chores, and so no. because of gender roles and division in families, older mother needs to make less adjustment, while older father not. Thus the same stressors have more effects on older fathers. We deduce that children's out-migration have more effect on the psychological well-being of older father than older mother's.

Additionally, in traditional family support system in China, sons rather than daughters provide essential support to their older parents. The sons are expected to assume old-age

support obligations by the form of providing food, care, and financial support, while the daughters are more likely to provide personal care, doing housework and other chores (Xu, 2001). Although daughter are expected to contribute to their parents before marriage, they are not supposed to provide financially to their natal families, instead of their husbands' parents (Whyte and Qin, 2003; Xie and Zhu, 2006). Therefore, even if daughter-in-law provides a variety of support for her in-laws, the support is also seen as part of the responsibility and contribution of the son. Thus, owing to the different expectation for support from sons and daughters, there is a gender difference in the effect of sons' out-migration and daughters' out-migration, as stressors, on the psychological well-being of older parents. Comparing with the sons, the lack of daughters directly decrease the resource of caregiver for older parents, and the older mothers who are close more with their daughters are likely to need adjustment to their children's out-migration. Thus we deduce that the out-migration of daughters have more effect on the psychological well-being of older mothers.

Research questions

The empirical studies on the rural-urban migration and its effect on the elderly in developing countries are still limited, and most of what pay attention on the effect of migration on the economic and social well-being of the elderly, such as living arrangement, economic well-being (e.g. remittance), and intergenerational support (for example, Du et al., 2004a; Knodel and Saengtienchai, 2007; Qin et al., 2008; Wolff and Dimova, 2005; Zhang and Wu, 2003; Zimmer et al., 2008). Although some researches show that the elderly left behind

feeling lost, loneliness, isolation, depressed and abandoned increased (Baldock, 2000; Kuhn, 1999; Miltiades, 2002; Du et al., 2004), the inconsistent results of the former studies suggest that the characteristics and needs of elderly parents, characteristics of children, and local family support culture may affect the out-migration of children and its consequences. The mechanism of psychological well-being of the elderly left behind in village has not been tested enough by empirical researches.

According to the former study, the relationship between living arrangements and psychological well-being is mediated by the capacity of household structure to enable or inhibit the financial, instrumental, and emotional support (Silverstein et al., 2006). The family structure is key factor distributing or integrating the resource of family support. Thus we assume that coresidence with children, that is the traditional living arrangement in rural China, can buffer the effect of children's outmigration on the psychological well-being of the elderly left in village. Additionally, as responses to stress vary by social status, that is social role and status as well as stress exposure interact to produce different levels of psychological distress (Aneshensel, 1992; Gore and Colten, 1991), older men and older women may suffer different psychologically due to the same stressor, outmigration of children. Thus it is necessary to analyze separating older father and older mother.

Based on the analysis above, the main research questions of this study as followed:

(1) Do outmigration of children have negative effect on the older parents' psychological well-being?

(2) Is there gender difference on the effect of sons' outmigration or daughters' outmigration on the psychological well-being of older parent?

(3) Does the coresidence have effect on the link of children's outmigration and older parents' psychological well-being? And is there gender difference?

Methods

Data

The data were taken from "Well-being of Elderly in Anhui Province", a longitudinal study conducted respectively in 2001 and in 2003, by the Institute for Population and Development Studies at Xi'an Jiaotong University, in conjunction with the University of Southern California. Because of the relatively high proportion of the older population and rural migrants (Chaohu Statistical Bureau, 2001), the survey location, Anhui Province, is a desired is a desired setting to study the effect of out-migration on the well-being of the elderly (Silverstein, Cong, & Li, 2006).

A stratified multistage method was used to select the sample of older people aged 60 and older in 2001. Of 1,800 eligible respondents in baseline survey, 1,715 completed the survey, a response rate of 95.3 per cent, and 1,391 respondents completed the follow-up survey in 2003, the response rate of 81.1 per cent. After deleting cases without children and with missing values, 1,307 respondents were included in our analyses.

Measure

Dependent variable

We measured psychological well-being by using the scale depression, which assesses depressive symptoms (negative affect, lack of positive affect, feelings of marginalization, and somatic problems). We measured depression by using nine questions based on the Center for Epidemiologic Studies–Depression scale (Radloff, 1977), of which three items indicated feelings of positive affect (feeling happy, enjoying life, feeling pleasure), two items indicated feelings of negative affect (feeling lonely, feeling upset), two items indicated feelings of marginalization (feeling useless, having nothing to do), and two items indicated somatic symptoms (having poor appetite, having trouble sleeping). We coded the frequency with which the participant experienced each symptom in the last week as 0 (rarely or none of the time), 1 (some of the time), or 2 (most of the time). After reversing the coding of positive affect items, we summed the nine variables, which resulted in a depression score ranging from 0 to 18, with a higher score indicating greater depression. The reliability coefficient for the nine items was .78. We took the level of depression in follow-up survey as the dependent variable. Because the follow-up level was affected by the level at the baseline survey, the latter one was also included in the analysis.

Independent variables

Migrant children were defined as those who lived in different counties or cities from their parents (Goodkind and West 2002). As the migration status of children may change between the baseline survey and follow-up survey, two represented the presence of outmigrant children. The first variable is a count of the number of the respondent's sons or daughters

who were migrants at baseline survey. The second indicated the change number of migrant sons or migrant daughters during the survey interval. As outmigration bring about the change of spatial dispersion of the children, we also included the number of sons and daughters in village of each respondent at baseline survey as a control variable.

Living arrangement is the key variable affecting the need available of the elderly. The change of living arrangement during the survey interval (1=changing to living with children; 0= others) was included in the analysis.

Control variables

Variables describing the characteristics of the elderly included age, sex, marital status, SES (occupation and income), health status, living arrangement, and intergenerational support. As cross-sectional variable, occupation (0=agricultural, 1=non-agricultural) did not change between baseline and follow-up survey, while the characteristics of the elderly changing between baseline survey in 2001 and follow-up survey in 2003 included: (a) married→ unmarried; (b) income decreased; (c) functional status declined. Beside the level in baseline survey, the changes of characteristics variables between two surveys also were included in the analysis.

Functional status was measured by the difficulties in performing two types of tasks: (a) personal activities of daily living (PADL), including bathing, dressing or undressing, walking around the room, getting out of bed, going to the toilet, and eating (Katz et al., 1963), and (b)

instrumental activities of daily living (IADL), including preparing meals, shopping, doing housework, taking the bus or train, managing money. Both the PADL and IADL scale items were reliable at the two survey waves: alpha = .88 and alpha = .96, respectively. As the health status in 2003 was compared with the status in 2001, both the change in functional health during the survey interval and the level in 2001 were included in our analysis.

We also considered three types of intergenerational support: financial transfers, instrumental support, and emotional cohesion. Differences between 2001 and 2003 support for the same older person measured the changes in intergenerational support. Because these changes are affected by the level at the baseline survey in 2001, this level was also included in the analysis. Financial support was measured as the total amount of material support (e.g. cash, food, gifts) that was received from each child during the 12 months before the survey. If the respondents did not answer with an exact amount, they could also choose from the following categories based on Chinese RMB currency: 0 = none, 1 = less than 50, 2 = 50-99, 3 = 100–199, 4 = 200–499, 5 = 500–999, 6 = 1,000–2,999, 7 = 3,000–4,999, 8 = 5,000–9,999, 9 = 10,000 and above. Comparing the amounts in 2001 and in 2003, the change in financial support was coded as 0 if no increase (including decrease), 1 if there was an increase. We measured instrumental support reported as two kinds: household work and personal care, each of which was recorded as four values: 1 = Seldom or None , 2 = Several times per month, 3 = At least once per week, 4 = daily. Comparing 2001 and 2003, the change in instrumental support was coded as 0 if there was no increase (including decrease), 1 if there was an increase.

Emotional support was measured from the three following dimensions: (a) feeling close to this child; (b) getting along well with this child; (c) this child listens to your difficulties and troubles. The responses were coded as follows: 1 = Not close/not at all well/not at all, 2 = Somewhat close/somewhat well/sometimes, 3= Very close/very well/most of the time. A scale was computed by these three items (alpha=.86 and .96, respectively in 2001 and 2003), ranging from 3-9. Comparing 2001 and 2003, the change in emotional support was coded as 0 if there was no increase (including decrease), 1 if there was an increase.

Statistical methods

Firstly, we used two waves sample to examine the differences in the change of psychological well-being between the elderly with and without migration children at baseline survey. We further compared the level in the baseline survey and change during survey interval of living arrangement and intergenerational support, especially examine the gender differences in the psychological well-being, living arrangement and intergenerational support between the elderly with and without migration children at baseline survey. Secondly, we carried out three groups of multiple regression analyses to predict the change of depression of the elderly during the survey interval. The first group regression included all variable to examine the effect of migration of sons or daughters on the older fathers and older mothers by gender. The second group of regression included the interaction of outmigration of sons or daughters and living arrangement to examine the extent of how sex of migrant children and traditional living arrangement have effect on the psychological well-being of the older parents.

Results

Sample description

Table 1 showed the sample statistics. The mean age of the elderly in baseline survey was 70.63. of this group, 54.55% were female, 59.98% were married, of which three fourth of male were married, while only less than a half of female were married (47.41%). Most elderly performed agriculture (93.34%), and earn average 976 Chinese yuan (equl to $157 USD) from work or pension, of which older male 1295 Chinese yuan (equl to $208 USD), while older female 710 Chinese yuan (equl to $114 USD). The average number of functional difficulties of the elderly was more than three, and the functional status of older female was much worse than that of older male (respectively, 4.882 for older female and 1.988 for older male). More than a half of respondents lived with their children, of which 56.66% of older female lived with their children, while 44.78% of older male lived with their children. On the intergenerational support, older parents received on average 1132 Chinese yuan (equl to $182 USD) from all their children. Nearly a half (49%) of the elderly received instrumental support from their offspring. The elderly reported high emotional cohesion score (8 out of 9) with their children.

----------Insert Table 1 about here----------

During the survey interval between the baseline survey in 2001 and the follow-up survey in 2003, about 5% of respondents bereft of their spouse, 37.49% reported decreased functional

status, and about 10% changed to live with their children. Except that older male received less instrumental support from their children, the elderly received more all types of intergenerational support.

Comparing the elderly with migrant children and without migrant children in the baseline survey, Table 2 showed that the older parents with migrant children had better psychological well-being (15.200 vs. 16.285), more financial support (4.864 vs. 3.287) and more emotional support (8.132 vs. 7.508) than those without migrant children, but the formers had less likely to receive instrumental support (49.28% vs. 68.85%) and live with children (48.02% vs. 82.79%) than the latters. In the follow-up survey, the psychological well-being of the older parents with migrant children were also better than that of those without migrant children (15.151 vs. 16.313). However, during the survey interval, the increase of financial support received by the elderly without migrant children in baseline survey was more than that of the elderly with migrant children.

----------Insert Table 2 about here----------

Furthermore, by comparing separately for older male and older female, we found that there was no difference in psychological well-being in baseline survey or in follow-up survey between older female with migrant children and those without migrant children. Although older female with migrant children in baseline survey had less likely of living with children than those without migrant children (53.57% vs. 80.49%), the latters had more likely to

change to live with children than the latters (12.52% vs. 4.88%). There was no difference in the change of living arrangement between the older male with migrant children and those without migrant children.

To answer the research questions, we conducted three groups regression analysis to predict the depression of the elderly in 2003. Controlling the depression in 2001, socio-demographic characteristics, health status and intergenerational support, model A1 showed that the number of sons in village in the baseline survey was negatively related to the depression of the elderly, while the change of daughters migrating during the survey interval was positively associated with the depression of the elderly. In addition, the elderly bereaved or having decease functional status suffered worse depression, while the elderly having more income in baseline survey, increased income during survey interval, or changing to live with children had better psychological well-being. And financial support in baseline survey and its change during survey interval, as well as the emotional support and its change all decreased the depression of the elderly. However, the sex of the elderly was not significantly related to the depression of the eldely.

----------Insert Table 3 about here----------

Model A2 showed that there was significant interaction between change of migrant sons and elderly's gender. This suggested that increased number of migrant sons increased the risk of depression of the older male, but older female not. And introduced the interaction between

change of migrant children and change of living arrangement, the results showed the interaction between change of migrant daughters and change to living with children was negatively related to the depression of the elderly, which suggested that the elderly changing to living with children benefited psychologically from the change of migrant daughters than those not changing to living with children.

----------Insert Graph 1 about here----------

Secondly, Model M1 and M2 presented the regression coefficients predicting the depression of older male at follow-up. Model M1 showed that the more sons in village, income, financial support received at baseline, or increased migrant sons, financial and emotional support during survey interval, the better psychological well-being of older males, while functional difficulties at baseline and its change during survey interval decreased depression of the older males. Introduced the interaction, there was significant interaction between change of migrant sons and change to living with children in Model M2. Graph 2 showed that the increase of migrant sons made the psychological well-being of the older male not changing to living with children better, while worsened the older male changing to living with children.

----------Insert Graph 2 about here----------

Thirdly, Model F1 and F2 presented the regressions for older female. Model F1 showed that

performing non-agriculture, having more income and better emotional cohesion at baseline, or increased income and emotional support during the survey interval, the older female had better psychological well-being. And functional status, increased functional difficulties, and widowhood were negatively associated with the psychological well-being of older females. Unlike the older male, changing to live with children in survey improved the psychological well-being, and increased migrant daughters worsened depression of older females. Model M2 showed that there was significant interaction between change of migrant daughters and change to living with children. In Graph 3, the increase of migrant daughters worsened the depression of the older female not changing to living with children, but improved the psychological well-being of older female changing to living with children.

----------Insert Graph 3 about here----------

Discussion

In this investigation we studied how out-migration of young labor affected the psychological well-being of the elderly left in villages, and the effect of traditional living arrangement on this relationship. The results showed that, owing to the gendered family support in Chinese rural, there was gender different in the effect of sons' or daughters' migration on the psychological well-being of the elderly. Controlling the characteristics of the elderly, the change of sons' migration decreased the psychological well-being of elderly, especially for older male. Further, we found the moderate effect of traditional living arrangement. The increase of migrant sons had a negative effect on the psychological well-being of older men,

while older women were more sensitive to daughters' out-migration, however, changing to living with children buffered this negative effect on the psychological well-being of older women, which suggested that, due to the gender role and division, older mother were more dependent on their children and families, and thus the traditional family support and living arrangement could buffer the negative effect of children's migration. For older father, who were more independent in families, living with children means the increased needs, which worsened their psychological well-being.

In general, we found that out-migration of children, as a stressor/life event had negative effect on the psychological well-being of the elderly, which was consistent with the stress–health outcome frame. Although comparing the elderly with migrant children and those without migrant children, the result of *t* test showed that the psychological well-being of the elderly with migrant children were better than those without migrant children, the regression results found that, controlling the related variables, increased migrant children are negatively associated with psychological welling at follow-up, which suggested that well-being consequence is interacted between stressor (migration of children), individual resource, and social resource. And the result of longitudinal study also suggested that, as a life event affecting negatively the elderly's psychological well-being, out-migration of children triggered a pressure persisting within a longer time.

We also found that, in rural China where prevailed the Confucian tradition and patriarchal family system, due to the gender role and division in families, there was gender difference in

the effect of children's migration on the psychological well-being of the elderly. The regression included the interaction of the elderly's gender and children's migration showed that the increased migrant sons decreased significantly the psychological well-being of older men at follow-up, but not for that of older women. This negative effect of sons' migration may be associated with the traditional living arrangement and the role of children in families, that is, although married sons take the primary responsibilities of caring older parents, their spouse are actually main contributors of care-giving (Liu and Kendig, 2000). Older mother preferred to live with daughter-in-law, receiving the caring from daughter-in-law, even their sons left from village. However, because of the gender taboos in care-giving (Huang et al., 2003), the older fathers were more likely to reduce the source of care-giving and ties with other family members, and consequently become isolated themselves.

Furthermore, we found the effect of traditional family form on the psychological well-being of the elderly, to some extent which was determined by the gender of migrant children and the elderly. Increased migrant sons had negative effect on the psychological well-being of the elderly changing to living with their children. The former studies found that coresidence with children were more based on the needs of the older parents (Logan et al., 1998), thus changing to living with children may imply more dependence of the elderly, which would make more pressure on older fathers that were generally relative independent in families. Apparently, it seemed that traditional living arrangement moderated the positive effect of sons' migration on psychological well-being, which suggested that psychological well-being of older wen were more determined by the needs and resource available of the elderly.

Regarding to the older women, increase migrant daughter immediately decrease the psychological well-being of the older mother, but the traditional living arrangement protected the latters, which suggest that, with the alternative resources of care-giving, traditional living arrangement and old-age support system could buffer the negative effect of daughters' outmigration on the psychological well-being of the older women.

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Table 1 Description of Analytic Variables

Variables	All		Older Men		Older Women	
	Mean/Percentage	SD	Mean/Percentage	SD	Mean/Percentage	SD
Baseline in 2001						
Depression	15.301	3.909	14.644	3.880	15.850	3.851
Age	70.63	7.016	69.06	6.249	71.93	7.348
Sex: *Male=0*	45.45%	--	--	--	--	--
Female=1	54.55%	--	--	--	--	--
Occupation: *Agriculture=0*	93.34%	--	90.91%	--	95.37%	--
Non-agriculture=1	6.66%	--	9.09%	--	4.63%	--
Marital status: *Unmarried=0*	40.02%	--	24.92%	--	52.59%	--
Married=1	59.98%	--	75.08%	--	47.41%	--
Income (Log+1)	2.759	1.517	3.278	1.384	2.328	1.489
Functional status	3.567	4.327	1.988	3.375	4.882	4.587
Living arrangement: *Others=0*	48.74%	--	55.22%	--	43.34%	--
Living with children=1	51.26%	--	44.78%	--	56.66%	--
Financial support	4.717	1.619	4.779	1.703	4.665	1.546
Instrumental support: None=0	51.11%	--	55.56%	--	43.34%	--
Some=1	48.89%	--	44.44%	--	56.66%	--
Emotional support	8.074	1.260	8.017	1.297	8.122	1.227
Number of sons in village	0.804	1.002	0.742	0.995	0.856	1.006
Number of migrant sons	0.340	0.612	0.328	0.57	0.351	0.645
Number of daughters in village	1.059	1.037	1.177	1.093	0.961	0.978
Number of migrant daughters	1.501	1.177	1.547	1.184	1.463	1.170
Follow-up in 2003						
Depression	15.260	4.027	14.328	3.799	16.037	4.050
Change of marital status: *Other=0*	94.87%	--	95.96%	--	93.97%	--
Changing to be widowed=1	5.13%	--	4.04%	--	6.03%	--
Change of income	-0.169	1.296	-0.169	1.288	-0.168	1.305
Change of functional status: *No decline=0*	62.51%	--	68.69%	--	57.36%	--
Decline=1	37.49%	--	31.31%	--	42.64%	--
Change of living arrangement: *Others=0*	89.14%	--	90.07%	--	88.36%	--
Changing to live with children=1	10.86%	--	9.93%	--	11.64%	--
Change of financial support	0.335	1.725	0.360	1.674	0.314	1.768
Change of instrumental support	0.092	7.873	-0.372	7.917	0.478	7.821
Change of emotional support	0.169	1.407	0.185	1.426	0.155	1.392
Change of migrant sons	0.070	0.751	0.096	0.794	0.049	0.714
Change of migrant daughters	0.010	0.539	0.002	0.546	0.017	0.532
样本	1307		594		713	

Table 2 Psychological well-being and living arrangement of the elderly with migrant children and without migrant children in 2001 and in 2003

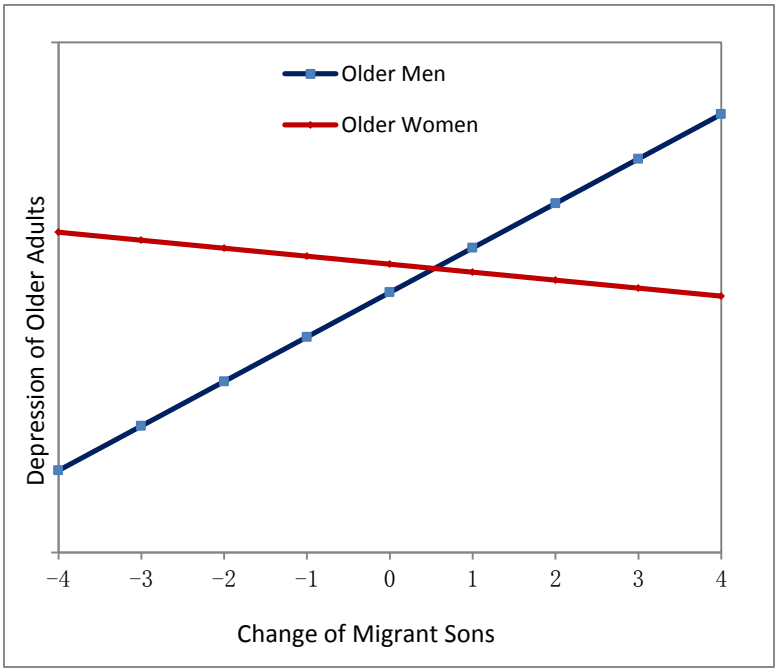
	All			Older Men			Older Women		
	Without migrant children (N=122)	With migrant children (N=1185)	*t test* /χ^2 *test*	Without migrant children (N=40)	With migrant children (N=554)	*t test* /χ^2 *test*	Without migrant children (N=82)	With migrant children (N=631)	*t test* /χ^2 *test*
Baseline in 2001									
Depression	16.285	15.200	2.926**	15.921	14.551	2.163*	16.462	15.770	NS
Living arrangement (%Living with children	82.79 %	48.02%	53.524***	87.50%	41.70%	31.651***	80.49%	53.57%	21.420***
Follow-up in 2003									
Depression	16.313	15.151	3.043**	15.560	14.239	2.131*	16.681	15.953	NS
Change of Living arrangement (%Changing to living with children)	5.74%	11.39%	3.652+	7.50%	10.11%	NS	4.88%	12.52%	4.120*

*** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.1.

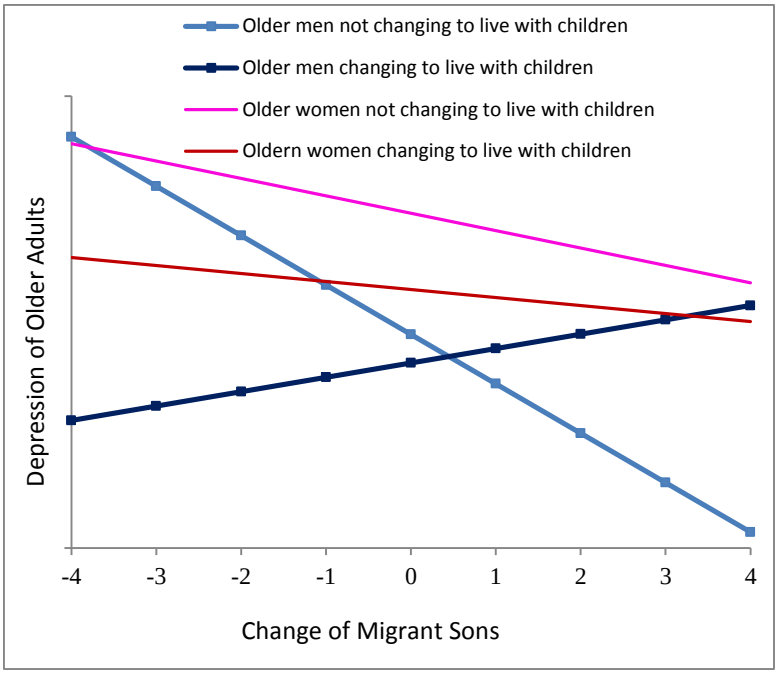
Table 3 Regression coefficients predicating the depression of the Chinese rural elderly in 2003 (N=1307)

Variables	All N=1307		Older Men N=59		Older Women N=71	
	Model A1	Model A2	Model M1	Model M2	Model F1	Model F2
Constant	15.294***	15.217***	18.439***	18.052***	14.046***	13.961***
Depression at baseline	0.211***	0.213***	0.159***	0.163***	0.245***	0.248***
Socio-demographic variables:						
Age at baseline	0.008	0.009	-0.031	-0.026	0.038	0.038
Sex: Female *(Male)*	0.287	0.332				
Occupation at baseline: Non-agriculture (*Agriculture*)	-0.542	-0.520	0.129	0.149	-1.632**	-1.649**
Marital status at baseling: Married (*Unmarried*)	-0.225	-0.232	-0.594	-0.513	0.021	0.047
Change of marital status: Changing to be widowed (*Others*)	1.331**	1.434**	0.766	0.712	1.713**	1.772**
Income at baseline (log+1)	-0.365***	-0.368***	-0.416**	-0.427**	-0.404**	-0.417**
Change of income	-0.253**	-0.265**	-0.130	-0.130	-0.357**	-0.367**
Functional status at baseline	0.194***	0.193***	0.232***	0.228***	0.159***	0.157***
Change of functional status: Decline (*No decline*)	2.190***	2.183***	2.511***	2.469***	2.083***	2.102***
Living arrangement at baseline: Living with children (*Others*)	-0.188	-0.200	-0.206	-0.228	-0.243	-0.233
Change of living arrangement: Changing to living with childre (*Others*)	-0.997***	-0.911**	-0.524	-0.441	-1.185**	-1.182**
Intergenerational support:						
Financial support at baseline	-0.202*	-0.195*	-0.350**	-0.364**	-0.059	-0.055
Change of financial support	-0.185**	-0.181*	-0.274**	-0.284**	-0.098	-0.092
Instrumental support at baseline	-0.388+	-0.393+	-0.275	-0.237	-0.422	-0.425
Change of instrumental support	-0.008	-0.008	0.014	0.014	-0.022	-0.023
Emotional support at baseline	-0.361***	-0.364***	-0.210	-0.216	-0.537***	-0.538***
Change of emotional support	-0.512***	-0.522***	-0.507***	-0.513***	-0.545***	-0.548***
Migrant children:						
Number of sons in village at baseline	-0.217*	-0.232*	-0.417**	-0.412**	-0.140	-0.159
Number of migrant sons at baseline	0.051	0.062	0.156	0.180	-0.036	-0.031
Change of migrant sons	0.161	0.524**	-0.629***	-0.765***	-0.230	-0.269
Number of daughters in village at baseline	0.044	0.060	0.368	0.382+	-0.116	-0.087
Number of migrant daughters at baseline	0.042	0.030	-0.014	-0.006	0.037	0.048
Change of migrant daughters	0.369*	0.352	-0.144	-0.173	0.472*	0.635**
Interaction						
Change of migrant sons × Changing to living with children		-0.271		0.988*		0.145
Change of migrant daughters × Changing to living with children		-0.995*		0.305		-1.245*
Change of migrant sons × sex of the elderly		-0.618**				
Change of migrant daughters × sex of the elderly		0.196				
-2LL	-3419.484	-3414.258	-1519.595	-1517.517	-1879.600	-1877.940

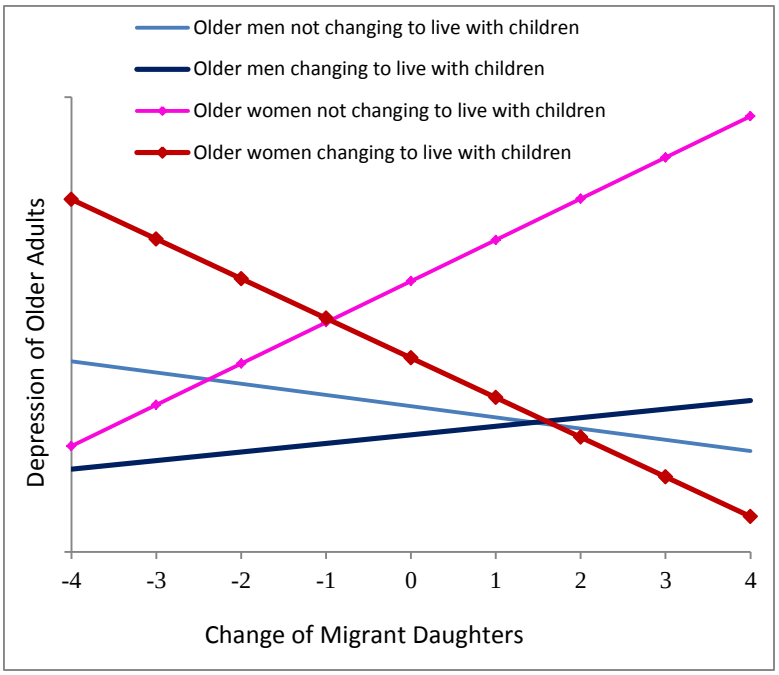
*** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.1



Graph 1 The effect of change of migrant sons on depression of older adults



Graph 2 Change of migrant sons on depression of older adults: The effect of change of living arrangement



Graph 3 Change of migrant daughters on depression of older adults: The effect of change of living arrangement