The "Great Migration" and Mental Health of the Left-behind Elderly: Bringing in Urbanization and Community Perspectives

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Abstract

More than ever intensified rural-urban labor migration coupled with prolonged life expectancy in developing countries poses serious threat to the welfare of the elderly in rural China. Utilizing a nationally representative survey covering a wide range of information on social relationships, daily activities of older adult population and community characteristics, results show that having migrant children, especially an inter-provincial one, is negatively associated with mental wellbeing of the elderly, and this possible adverse effect is even stronger in rural communities below the poverty line. Community services and facilities cannot explain the disparity between the psychological wellbeing of the left-behind elderly across communities of different wealth. Some tentative explanations are further proposed.

Aging and rural-urban migration in China

Of over 1.3 billion total population, around 180 million are aged over 60 in China in 2010, surpassing the total population in the same age group in all of Europe. This number is set to reach around 240 million by 2020 and 360 million by 2030 (Wang 2012). Among all the elders, the scale of rural elderly has far passed urban elderly: according to a report (Chen 2010), by 2009, the rural elderly constitutes about 18.3% of the total rural population, whereas in urban areas, the number is 7.97%. Policy wise, current Chinese policy is also highly unbalanced and divided along the rural\urban line defined by *hukou* status with a major favor over the urbanites (Bartlett and Phillips 1997, Chow 1999, Zimmer et al. 2010). While the recent introduction of a new community based rural health financing scheme has greatly increased the coverage, due to financial constraints of local government in some areas, it may still be inadequate to meet the needs of eldercare for the older and poorer households, and thus is questioned in its sustainability (Zeng 2011, Pei and Tang 2012). By 2030, the projected old age dependency ratio in rural areas is 34 percent in China, suggesting that the support of the elderly is likely to be an increasing burden on China's families, mainly elder's adult children (Cai et al. 2012).

Second, in addition to the eldercare burden, which is implicitly the task of adult children, the sweeping trend of rural-urban migration has further aggravated such adverse situation for the elderly. As of 2010, the number of floating population amounts to over 221million (China Statistics Press 2012), about the size of the total population of Russia and Britain combined. And the share of the floating population of the total population increased from about 6% in 2000 to about 17% in 2010 (Liang and Ma 2004, Liang et al. 2014). These young migrants, furthermore, are increasingly expected to stay in the cities. Despite of the barrier of household registration systems (hukou status), a regional survey found that an overwhelming proportion of migrants (90%) have reported to adapt well or very well to urban life currently (Wang and Fan 2012). Policy-wise, the year 2014 also witnessed a sweeping plan carried out by the Chinese government to incorporate these migrants in urban areas (Johnson 2014). With migrants' growing tendency to stay in cities, more elders left behind in the rural areas might have to face the fact that their children would not return.

Background

Family arrangement and mental health of the rural elderly

The pervious literature on family arrangement and mental health of the elderly has provided basis for understanding the elderly's psychological wellbeing as a function of adult children's support in China. In the literature on the wellbeing of Chinese elders, household living arrangements and how they might influence informal\family care provided for the elderly remain central to the analyses of elderly health achievement (Chow 2006). Instrumental and emotional support from residing or proximate adult children is widely found to have stress-buffering effect and beneficial to the wellbeing of the Chinese elderly (Chen and Silverstein 2000, Chi and Chou 2001, Leung et al. 2007), as the absence of such support may not only fall short of needs, but also induce feelings of helplessness and hopelessness (Krause 2001). In the Chinese context, the benefits of adhering to traditional norms may have an independent effect. Particularly, certain

manifestations of filial piety, such as perceived family respect and emotional cohesion with children have improved life satisfaction /mental health of the elderly (He 2002, Silverstein et al. 2006, Yu et al. 1997). Adherence to tradition, as shown by a number of scales measuring traditional relationships, beliefs, values and behaviors, is also protective of elders from depression. And the elderly realized their self-worth through well-established commitments and responsibilities toward their younger generations, which contribute to their mental health (Mjelde-Mossey 2006as Chen and Silverstein (2000) found that benefits of receiving support from children are fully mediated by parents' satisfaction with their children. Leung et al. (2007) further found that elderly people with mental symptoms and chronic medical diseases benefit more from family involvement. In addition to sons and daughters, more specifically, residing with daughter-in-law is also found to reduce elder's depression symptoms (Cong and Silverstein 2008). As a way of providing network-family arrangements in rural China, living in the same village with the elderly has also been found to be an alternative way of providing eldercare (Giles and Mu 2007), though some literature also argues that such arrangement was not as significant as previously had conceptualized in this regard (Silverstein et al. 2006.)

Although it in general points to the benefits of living with adult children, evidence is accumulating in the other direction as well. Same social roles may not invariably indicate the same quality of social ties, and these ties may not be assumed to be uniformly supportive (Rook 1984). Families can also be sources of distress, and abuse or neglect of family members may also take a toll in elderly's health (Cooper et al. 2008). Case studies reveal that elderly who were living with married sons had limited or no access to their sons' household income and having many sons did not seem to improve elder's economic status (Goldstein and Ku 1993), which did not help with alleviating the elderly in poverty from economic strain. More children or sons did not improve elder's health either (He 2002, Cong and Silverstein 2008); nonaccommodation or criticism from the younger family members may put more mental distress to the elders and thus is associated with greater depression of the elderly (Cai et al. 2009, Chen 2009, Leung et al. 2007).

Coresidence with grandchildren may also take the elderly into uncharted water. On the one hand, as manifested by filial piety, traditional family system still persists in contemporary China, especially in rural China, and grandparents are still allowed and expected to take care of the children (Zheng and Xie 2014, Chu, Xie and Yu 2011). It has thus been found that older parents living in three-generation households or with grandchildren in skipped-generation households had better psychological well-being than those living in single-generation households, and such relations might be a result of "the fulfillment of cultural ideal" and those elderly may "have a greater sense of purpose by virtue of occupying a culturally sanctioned role within the family" (Silverstein et al. 2006: 263).On the other hand, taking care of grandchildren may also put a stress both physically and mentally on the health of elderly, such as increased household chores, and conflicts with these children.

Bringing in the perspective of rural-urban migration

While the body of literature on the role of living arrangements in elder's health achievement can inform the current study, it should be noted that adult children's migration into urban areas for employment takes an independent effect from simply separating a household

from the elderly. It is thus necessary and important to disentangle and set apart the role of living arrangement and the effect of adult children's migration.

One of the major characteristics that set migration apart from typical living arrangement is the long-term and long distance separation. As migration is usually defined as those who migrate to a different county, adult children's migration into urban areas has caused long-distance separation from their elderly kin. And long distance usually means long-term separation as a visit involves more economic and time input. As a result, a large proportion of the migrants only afford to pay visits back home several times a year. This is in stark difference from the traditionally conceived separate children households where married children live in a separate household, which is usually nearby in the village or in a nearby village. This may cause more sense of helplessness for the elderly when the migrant children are not conceived to be of help for a hypothetical physical emergency. In addition, as the number of inter-provincial migrants constitutes about 50% of the total migrant population, the psychological distress of the left-behind elderly caused by this long distance and long-term separation from their migrant children might be especially pronounced.

Second, these young migrants are increasingly expected to stay in the cities. Despite of the barrier of household registration systems (hukou status), a regional survey found that an overwhelming proportion of migrants (90%) have reported to adapt well or very well to urban life currently (Wang and Fan 2012). Policy-wise, in order to expedite the process of urbanization, the year 2014 also witnessed a sweeping plan carried out by the Chinese government to incorporate these migrants in urban areas (Johnson 2014). With migrants' growing tendency to stay in cities, more elders left behind in the rural areas might have to eliminate the anticipation of receiving instrumental and emotional support from the migrant children. As found by Krause (1997), anticipated support gives hope to individuals, and loss of hope plays a central role in developing depressive symptoms. The loss of anticipated support from their migrant children is one more possible aftermath of this rapid urbanization process in China.

Third, with the exodus of both genders seeking employment in urban areas, there is a significant rise of single generation and skipped generation households, with the elderly taken on full-time household chores, childcare task, and possibly farm works (Chen? Lu 2012b, Taylor et al. 1996). While the traditional family arrangement may also create these types of elder households, the scale of these households is never this prominent, and the absent adult children are never this far away. The consequent psychological effects of these changes for the left-behind elders still remain contentious though, as both positive and negative effect has been observed.

Fourth, rural-urban migration can be seen as a channel through which certain rural and urban resources flow. On the side of rural areas, for one thing, with substantially more income with working in urban areas, migrants are able to send more financial remittances to their rural elderly kin than their rural counterparts. Remittances not only promote the elder's living standards significantly, but could also enhance the elder's ability to mobilize stress-buffering resources. For another, social capitals, or "social remittances" regarding health-enhancing

knowledge or practices might be brought back from urban areas with their children, thus a stress-buffering reservoir is expanded.

Bringing in the role of rural community and broader socioeconomic context

In the recent years, there is an emerging literature on migration and mental health of left-behind elderly in other developing countries, such as Indonesia, Thailand, Mexico ().. The heat in the debate has just begun. Abas et al. (2009) found that in rural Thailand, elderly depression is the lowest among those with all children migrated out of the district, followed by having some of children migrated, and those with no migrant children sit in the highest probability of having depression. Such an advantage is suspected to be attributed to pre-existing advantageous situations that migrant households maintained, remittances, and/or reverse causation on return migration or nonmigration. Conversely, using another data in Thailand, poor mental health was found to be more commonly occurred among those elderly (60+) that have at least one migrant child in than those have no migrant children (Adhikari et al. 2011). The lack of constant face-to-face interaction between the elderly and the migrant children were suspected to be the reason. In addition, as suggested by the strong association between skipped-generation household and amount of remittances in rural Thailand, some argue that the remittances the rural elderly received may be spent mostly for the grandchildren they were taking care of, rather than of direct benefit to the elder parents (Knodel et al. 2010). In the case of international migration from Mexico, Antman (N.d., 2010, 2012) showed some suggestive evidence that adult children's migration is negatively associated with elderly's mental health, which also largely attributed to their deteriorating physical health, with the possibility that social isolation is the mediating factor. Using a longitudinal survey in Indonesia, Lu (2012) found that adults left-behind, including both spouses and elderly, are more susceptible hypertension and to psychological distress such as depressive symptoms, demonstrating the psychosocial costs of family disruption.

These studies have all made meaningful contributions to the understanding of this issue in developing countries. However, most of previous studies have used children's migration status as one binary variable, and overlooked one important dimension of adult children's migration: distance individuals have travelled. As illustrated earlier, distance travelled is one key factor that distinguishes migration of adult children from forms of living arrangement for the elders. Although in the data I use, the measure of specific distance is only for a proportion of the migrants, every migrant is recorded regarding whether their migration is an inter-provincial one or intra-provincial one. The distinction of inter-provincial and intra-provincial migration has been a major indicator in roughly capturing distance traveled in the literature on internal migration in China. I thus use this indicator as a crude measure of travel distance.

Albeit in the literature on the role of community characteristics in effecting the health of elderly has been widely discussed in developed countries, very little has been done for elders in developing countries, especially in rural areas where community resources were usually extremely inadequate (Joseph and Philips 1999, Mjelde-Mossey, 2006 Yu et al. 1997). In contemporary China, there exists a high economic disparity across regions even within rural communities themselves, and inequality also exists in terms of their ability to provide resources for rural elders (Pei and Tang 2012). While some villages may provide very limited resources, in

some parts of eastern region in China, modernized and resourceful rural communities are able to provide villagers with physical and social infrastructure and recreation facilities, such as swimming pools, theatres, schools, health clinics and even nursery (Joseph and Philips 1999).

While receiving little attention in this area, community characteristics should be particularly essential in moderating possible influences of elderly's health after their adult children's departure. First, with the absence of adult children and possible reduced function of families in elder care, one might witness an enhanced role of community environment as an important part of social support, or the emergence of new roles communities begin to take onto the health achievement of the elderly. With possible reduced household size because of migration, elders may tend to reach out to seek out-of-household comfort. This could be especially true when adult migration becomes a norm in the rural community and elders in general share similar life experiences with each other.

Second, the relationship between migration and left-behind elderly may vary across different community contexts. The relatively poor communities, for instance, may bear disparate impacts from the migration of their young labors from the wealthy ones for their own ability to support the elderly. Specifically regarding outmigration of labors in rural communities, community characteristics are possibly modifying the pathways from adult children's migration towards elder's health achievements. Exposure to a larger pool of neighbors or friends in the village may offset the possible adverse effects of children's absence in the households both psychologically and cognitively. Neighborhood support may also be a source of instrumental support for the needed elderly. Remittances the elders have received may interact with community characteristics in various ways. For instance, to what extent the idea of exercising would benefit the elderly is depending on the ability of the community to provide entertainment facilities and exercising grounds etc. Overall, bringing in community structure and establishments into perspective could advance our understanding of the migration effect from a refreshed view, and inform how a family related process is bound to and operating in a broader social process. This paper will be among one of the first efforts to explore this community effect.

Third, with adult outmigration, various dimensions of rural community dynamics might be changed, which may in turn impact the wellbeing of the elderly. For instance, when a stressful event happened to a number of people in the community over an extended period of time, social influence may affect individual's stress levels through social norms developed over the years in the network or community. When certain coping strategies become normative behaviors, the particular stressors can be buffered through internalization of these coping strategies (Cohen 1988, Cohen and Wills 1985, Schwarzer and Leppin 1989). As individual's migration might be seen as a deviant behavior to filial piety in traditional values. Through longer history and increasing prevalence of migration, left-behind elders in rural communities may have suffered less social stigma.

Hypothesis

My hypotheses are around the two themes: migration of adult children as a mental stressor, especially when it involves a long distance separation with the elders, and the role of community as a moderator for migration and elder parents' psychological wellbeing. A continuous measure of elderly psychological wellbeing and a binary cutoff of clinical concerning depressive symptoms are used to assess the mental health outcome. I expect that after controlling for other demographic and economic characteristics, especially remittances, the long-term absence of support from the migrant children may give more psychological distress to the elders, leading to worse psychological conditions and more depressive symptoms. This adverse effect is more prominent in cases where the elder's nearest migrant child lives outside the province.

H1: Adult children's migration is negatively associated with the mental wellbeing of rural elders (H1.1), and the negative association is especially stronger for elders having the nearest migrant child engaging in an inter-provincial migration (H1.2).

In the role of community characteristics, I am especially interested in the indicator that captures the general community wealth – the net income of individuals in the community, specifically, contrasting community net income below and above the poverty line. I expect that left-behind elderly in poverty communities suffer more mentally from their children's migration, mainly because of the lack of community resources such as community services, facilities and medical clinics. Thus I derive my second and third hypotheses:

H2: left-behind elderly in communities below the poverty line suffer more depressive symptoms than that in communities above the poverty line.

H3: The adverse condition of mental health of left-behind elders in poverty communities is partially mediated by facilities that the community is able to organize.

Data and methods

The data I employ is the baseline of China Health and Retirement Longitudinal Study (CHARLS), which is the product of one of the earliest efforts to bridge social sciences and scientific health measurements in China. CHARLS is based on the Health and Retirement Study (HRS) in the U.S. and other similar aging surveys such as the English Longitudinal Study of Aging (ELSA) and the Survey of Health, Aging and Retirement in Europe (SHARE). It is a high quality nationally representative sample of Chinese residents for those who aged 45 and older. Adopting multi-stage stratified PPS sampling, the baseline national wave was fielded in 2011 and includes about 10,000 households and 17,500 individuals in 150 counties/districts and 450 villages/resident committees in 28 provinces. In each sampled household, a screening form was used to identify if the household had a member meeting the age eligibility (45+). If an eligible respondent is too frail to answer questions, a proxy respondent is then identified to help with answering the questions, and this person is usually a spouse or knowledgeable adult child. Besides collecting individual and household characteristics, it also has a community questionnaire for the local cadres to fill out. To my knowledge, it is the first national

representative survey that addresses the elderly population while providing a detailed community context.

Importantly, CHALRS contains a detailed household roster, a family roster, a broad range of health questions, and a community questionnaire. Household members are defined as those who live in the same residence, or who have migrated to other places but live in dormitories. The household roster questioned information about each household member with regard to his/her demographic characteristics, whether s/he left the residence for over a month in the past year and where they had gone. The family roster asked about each non-resident/nonhousehold member's current residence, and the elder's various interactions with each of the non-resident child. In the community questionnaire, local cadres provide information on the communities regarding their basic socioeconomic characteristics, labor, migration and histories of policy changes.

Dependent variables

A short version of the Center for Epidemiologic Studies Depression Scale (CES-D 10) is provided in CHARLS. CES-D is a widely used measure across many societies (Radloff 1977, Weissman, Sholomskas, Pottenger, Prusoff, & Locke 1977), and different types of shorter forms are also tested to be reliable (Kohout, Berkman, Evans, and Cornoni-Huntley 1993). In this shorter form, 10 questions are asked with each inventory in a four-point Likert scale, ranging from 0 to 3 with the higher scores demonstrating more depression. The first method I used is an average score for all the questions elders answered. I reversed the score for each question such that a higher average score indicates better mental health status. This measure examines the psychological wellbeing of the elderly in a full range and captures more nuanced variations of elder's mental conditions. As an extension of the first method, I also created a dichotomous indicator by summing up all the scores. I used the cutoff of 12, as tested by Chang and Chan (2005) as the optimal threshold for predicting depression, in a Chinese elderly population. While indicating depression symptoms of the elders, this second measure addresses the more clinically concerning mental problems for the elderly.

Analytical strategy

The analytical sample is elders (60+) who lived in the rural areas at the time of survey. The strategy is to contrast the mental health of elders who had migrant children and that of those who did not have migrant children. The individual effect of migration status of elders is firstly examined, the possible moderating effect of community poverty status is explored, and eventually, facilities offered by rural communities are added for the mediating effect.

In the first step, simple Ordinary Least Square (OLS) regressions or logit regressions are performed for demographic characteristics only, and for all the individual and household characteristics. In the second step, the poverty status of rural communities is added, which requires a multi-level structure. For the third step, the cross-level interaction between children's migration status and the community's poverty status is incorporated. Eventually, facilities offered by the rural community are added. The continuous measure of mental wellbeing is

performed for each step, and the binary measure of depressive symptoms is estimated later, following the same steps. The final equation is the following:

$$Mental_{ij}=\gamma_{00}+\sum\gamma_{0p}\,PS_{pj}++\sum\gamma_{0f}\,Facility_{fj}+(\gamma_{m,0}+\sum\gamma_{m,p}\,PS_{pj}+u_{m,j})\,HMC_{ij,m}+\sum\beta_{kj}\,HMC_{ijk}+u_{m,j}+u_{0j}+r_{ij}$$

Where γ_{00} is the adjusted mean of mental health outcome, or the adjusted logged probability of the occurrences of depression symptoms; PS stands for poverty status of the community and HMC stands for having migrant children; γ_{0p} is the direct effect of village characteristic – poverty status and the feature *poverty* of *j*th village; γ_{0f} is the direct effect of village characteristic – facility, and the feature *facility* of *j*th village; $\gamma_{m,0}$ is the adjusted effect of individual characteristic of *m* on health; $\gamma_{m,p}$ is the moderating effect of the community feature poverty; $u_{m,j}$ is the random effect of m across communities. This model shows that individual elderly mental health outcome is a function of the joint effect of having migrant children, poverty status of the community, the interaction between the two factors, and facility offered by the community.

Independent variables

Left-behind elderly is defined as those who had at least one adult child being a migrant. Migrants are composed of two groups of people, conditional on their status in the parents' households. Usually, a child is regarded as a household member if s/he had not married or started his/her own household before or during migration. Therefore, the household migrants are individuals who resided away from this county for more than one month and lived in a dormitory. The nonhousehold migrants are individuals who are considered nonhousehold members of their elder parents and resided away from this county for more than six month. Although there are some discrepancies in the operationalization of the two kinds of migrants, in reality, they are likely to capture all the migrants in the elder parents' family.

ADL impairment has been widely found to put a strain on general elder's psychological health (Clark et al. 2011, Revicki and Mitchell 1990), including rural elders in China (Cong and Silverstein 2008). Due to large attrition in the basic ADL measures in the data, such as difficulties in bathing or eating, 15 measures of instrumental activities of daily living (IADL) are instead generated as a composite measure. In these survey questions, respondents were asked to rate the extent of difficulties in doing a set of daily issues, such as walking 100 meters, climbing several flights of stairs, picking up a coin from a table, doing household chores, and preparing meals. A mean score of these indicators is taken for each individual where 0=no difficulty in every indicator and 4= cannot do any of these at all. Spousal status is further divided into three categories: spouse absent (reference), spouse in good health and spouse in bad or fair health.

Household characteristics include total number of children and living arrangement for the elderly. Three kinds of living arrangements for the elders are developed: those coresiding with adult children or children in law, those having the nearest children or children in law residing in the same village, and those having the nearest children or children in law outside the village

(reference). In addition, the role of taking care of grandchildren is tested as well, as measured by hours taking care of grandchildren in the past year.

Possible social support is captured by two aspects of elder's life: their social activity and interaction with children. Social activity is measured by self-reported activity in the last month, including interaction with friends, going to any kind of club, provided help for family, friends or neighborhoods etc. If the elder engaged in any of the activities a daily bases, s/he is regarded as having daily interaction with people, and the same criterion applies to the weekly interaction. Others are defined as rarely interacting with people. Face-to-face contact with children and other types of contacts with children are recorded on a scale where 1= almost never, and 9= almost every day. A score of 4, for example, approximates a frequency of about one to two times of interaction per month.

Two household economic characteristics are included – household income, and financial transfer from all nonresident (non-household) adult children. It should be noted that household income also includes income of migrated adult children, if this migrant was still considered part of the household. Remittances are reasonably to be a large part of financial transfer from all non-household children, and they also contain financial support from other nonresident children that live within the same county. And yet, this amount did not include the remittances sent from migrant children that are considered to be members of elder's households. As complicated as they can be in the definitions, household income and financial transfer from nonresident adult children are able to jointly pick up the economic status of the elderly household.

Per capita income for the village is obtained by asking village cadres on the average income of residents in the village in 2010. The Chinese national poverty line in 2010 is 1274 yuan, and the village average income that is lower than this sum is considered as below this line. The variety of community services is a summation of a total of 15 types facilities that the community is able to offer, including basketball court, swimming pool, outside exercising facilities, table tennis tables, room for card games and chess games, room for Ping Pong, association for calligraphy and painting, dancing team or other exercise organizations, organizations for helping the elderly and the handicapped, activity center for the elderly, elderly association, nursing home, and other entertainment facilities.

Drawbacks of the current study

With the cross-sectional nature of the survey, there are some drawbacks of this study: mainly being reverse causation and the inability to capture elders who had moved out of the village permanently. The main direction of reverse causation is an overstatement of a positive effect, or an understatement of a negative effect. First of all, declining health of the elderly could directly impinge on adult child's migration decision, and keep them around the elders. Second, poor health of the elderly parents could also drive the migrants back home, causing return migration (Giles and Mu 2007). Third, there may be an existence of "healthy migrant effect" where migrants were foremost positively selected on their health status, such that parents of migrants might also share a latent genetic disposition for good health (Palloni and Arias 2004), or some shared intergenerational traits, such as determination and optimism. I argue that the first

two possible scenarios are hardly present in this study in that in traditional Chinese values, apart from physical impairment depressive symptoms were not regarded as a serious health issue or a condition for the adult children to constantly attend to, especially in the case of a general condition of psychological wellbeing. Migration selectivity may only moderately exist in our context as well. According to cumulative causation theory, migration is less selective when there is a high migration prevalence in the community, and rural China could be an exemplar of such case (citation about less migration selectivity in rural china).

On the other hand, it can also be conceived that more depressive symptoms of the elderly parents may also drive their adult children to leave the household, and possibly migrate, which leads to a more negative effect of children's migration than the actual case. Yet, this scenario is more likely to happen in the change in living arrangement, such as moving out of the parent households, and does not necessarily involve a migration behavior (ie. living outside the county). Further, the major factors that drive migration are household economic demands, the economic gap along the rural-urban line, existing migration networks in the community etc. The second drawback is that the elderly households who had moved out of the community by the time of survey could not be tracked. However, according to the community reports from rural cadres, over half of the villages surveyed had not had any household moved out over the past 10 years, and about 97% of them had less than 50 households moved out. Thus, this potential bias should not make a particular concern in this context.

Descriptive statistics

The sample consists of 5584 adults aged 60 and older living in 3749 households and 290 rural communities. Table1: Table 2 shows the characteristics of all rural communities and a comparison of characteristics for rural communities with income per capita sitting above and below the poverty line. Overall, the average age of the respondents were about 68 years old, and a large percentage of them did not receive any formal education (100-22.25-23.25-8.78-2.33=43.39%). Over half of them reside with their spouse who was in good health. They had an average of 3.50 children in their life. As to their living arrangement, a large percentage of them had their children or children in law residing with them (41.13%), and another large percent had their nearest children or children in law residing in the same village (36.65%). Regarding their adult children's migration status, nearly half of them (49.50%) have one or more of their children participated in inter-county migration. As to the travel distance of their migrant children, about half of the elders (25.25% out of 49.50%) had the nearest migrant child outside the province, meaning all of their children were participating inter-provincial migration; and another half had at least one migrant child participated in intra-provincial migration. For the rural elderly, it seems that on average, the majority of them did not interact much with friends or neighbors. And yet there is a large variation within them, which might suggest variations across communities in terms of their resources and dynamics. The average frequencies of face-to-face contact and other contacts with non-resided child sit in about the middle of the spectrum. A mean score of 4 or 5 means one or a few times of interaction each month. The average household income was 4433 rmb. Consistent with previous findings (Ye and He 2009), the financial transfer from nonresident children to the elderly household was moderate in amount – about 871 rmb. Overall, the average

income in the community is about 4120 rmb, with about 18.47% respondents living in communities below the poverty line.

Table 1 also displays a comparison between characteristics of left-behind elders and elders without any migrant child. The left-behind elders are slightly younger, tend to be female, tend to have more children, and their spouse is also more likely to be in good health. The left-behind elderly themselves also have less ADL impairment.s As to living arrangement, they are also significantly less likely to coreside with adult children or children in law, or live in proximity with them. Not surprisingly, the left-behind have less face to face communication, but more other types of contacts with nonresident children. They are also more likely to come from western region of China, and come from communities with lower income per capita and fewer community facilities.

There are also differences between individuals living in communities below poverty and the relatively wealthy ones, as shown in Table 2. T-test with assumption of unequal variances was used in the analysis. In wealthier villages, the elders were less likely to have difficulties in daily activities. At the same time, these elders were also more likely to have spouse in fair or bad health, which might be a result of mortality selection: The physically fragile elders in poorer villages might have higher probability to experience mortality. Elders living in poorer villages tended to have more children, more likely to take the arrangement of residing with their children or children in law, and less likely to have children living nearby in the village. More importantly, while both kinds of communities did not differ in terms of their propensity to send migrants, the poorer communities tended to send more inter-provincial migrants (28.20% vs. 23.36%) than the others. In terms of social support, the wealthier communities tended to have more frequent communication with other people in the community, as well as non-face-to-face contact with children. This might be a reflection of community and household resources these elders maintained. Interestingly, although the mean household income in wealthier communities were higher than that of the others (4528.34 vs.4021.56), due to the large variation in income within each kind of communities, especially the wealthier ones, the difference in household income was only marginally significant. The financial transfer from non-resided children in the relative well-off communities were significantly higher. This is not surprising considering that migrants from these communities may have obtained larger financial return in that these rural communities were more likely to locate in the more developed east/coastal region and migrants from these communities were more likely to travel within provinces. Eventually, at community level, the average income for communities in poverty was much lower (690.95 vs.4933.78).

Table 3 shows the impact of migration in a set of stepwise models. Model 1a in Table 2 uses the binary distinction of whether having a migrant child, and controls all the demographic characteristics of the elders, their households and the geographic regions they resided. Model 1b uses inter-provincial migration and intra-provincial migration of adult children against the reference group of having no migrant child. First of all, having migrant children has a significant detrimental impact on the mental health of the rural elderly, net of the basic demographic factors and basic household and physical conditions. Moreover, as shown by Model 1b, an inter-provincial migration from the nearest migrant child is associated with a more adverse mental

wellbeing status, though the difference in the effect sizes is quite small (p=0.21). In general, Model 1a and Model1b show that controlling for other characteristics, especially their own ADL, age has a slight positive effect on their mental health. Consistent with previous findings, elderly females felt less healthy mentally. Education only has a significant positive effect when the elder graduated from middle school or higher.

Model 2a and 2b in Table 3 progressively add factors relating to the elder's living arrangement, social support and household economic characteristics. The effect size of having migrant children is slightly attenuated (Model 1a), and interestingly, the slight difference is majorly from the reduction of effect size from inter-provincial migration. This suggests that the possible positive effect of remittances, or interactions with children mainly benefits elders with inter-provincial migrant children. As to family arrangements, having a spouse living with them, regardless the health status of the spouse, benefits the mental health of the elderly; moreover, while having the nearest child or child in law living in the same village did not show a significant effect, residing with an adult child or child in law are shown to be beneficial to the elder's mental health. Frequent interaction with other people is beneficial, and regarding interactions with non-coresiding children, only the kind of non-facial contact can significantly improve the elder's mental health. Time spent taking care of grandchildren seems to negatively affect the mental health of the elders. In terms of economic characteristics, not surprisingly, higher economic status and larger amount of financial transfer from non-coresiding children help to improve elders' self-perceived mental welfare.

Along the line of communities of poverty status, Table 4 incorporates the binary division of community income, with the average income in the community above poverty line in 2010 (1274 rmb) as the reference category. Model 3a and 3b show the independent effect of community's poverty status. Being in a community in poverty is associated with a decreased average mental score of 0.077. Model 4a and 4b further include the interaction with whether elder's children being migrated. Consistent with my hypothesis, while in communities above the poverty line, elder parents of migrants are penalized for a point of 0.061 in their average mental scores as compared to other elders, such a penalization is even 0.095 heavier in communities in poverty. That is to say, in communities in poverty, the left-behind elderly suffered more mentally as a result of their adult children's migration than that in the wealthier communities. However, according to Model 5a, after incorporating community facility, although the main negative association has been abated, the effect size of the interaction term is not weakened. This finding suggests that the left-behind elderly in relatively well-off communities did not benefit more from those community services than those in the poverty communities.

Table 5 and 6 replicate the models in Table 3 and 4, but with a cutoff measure to capture more serious depressive symptoms. The results are generally in line with what I found previously. There are a few things worth noting though. First of all, the difference in the positive association between inter-provincial migration and intra-provincial migration of individuals and elderly parents' depressive symptoms is significantly larger, and the coefficient is significant at .10 level. Secondly, from Model 4 to 5 in table 5, the positive association between depressive symptoms and children's intra-provincial migration is not statistically significant anymore. This finding

also suggests the stronger adverse effect of inter-provincial migration, and further demonstrates the significant role of children's travel distance has played in affecting depressions for the left-behind elderly in rural China.

Conclusion

In many developing countries, intensified rural-urban migration and globalization has brought about profound influences in life that contribute to the changes in psychological wellbeing of the elderly, including intergenerational caretaking, the weakening of traditional values etc. These changes were mostly extensively studied in the context of shifting patterns of living arrangement for the rural elderly (Chen and Liu 2012, Ku et al. 2013, Patel and Prince 2001). Specifically , the impacts of rural-urban migration on elder's mental health are mostly only seen as a function of altered stress that working through factors related to family disruptions and shifting family roles, such as social capitals, remittances and grandchildren caring. In fact, the reach of urbanization and broader socioeconomic environment may travel beyond the realm of families, and reach to a broader socioeconomic context. This paper takes one of the first steps to look at rural community's poverty status and the possible mediating effect of community facilities and services. The results have confirmed my first and second hypothesis that adult children's migration is negatively associated with elder's psychological wellbeing, and more conducive to depressive symptoms where inter-provincial migration has a stronger effect size than the usually shorter travelled intra-provincial migration; moreover, the left-behind elders residing in poverty communities fared even worse compared to their counterparts living in relatively well-off communities. However, the third hypothesis is not confirmed in that community facilities and services, as an essential part of resources communities can offer, do not particularly favor the left-behind in the relatively wealthy rural communities.

There possible other pathways are proposed to explain the disparity within the mental health of left-behind elderly across communities of poverty lines. First of all, there might be other resources that the community itself is able to offer but is not picked up in this study. For instance, only the quantity of community services is controlled, and the quality of these services is not observed in this survey. And different organizations may give the elderly differentiated satisfactions and comforts in life. Second, as migration could be an effective way to alleviate one from poverty, those communities in poverty might have a shorter history of sending migrants compared to others. Thus, the social norms in these villages are still trying to catch up with de-stigmatizing the adult children who went far away and left their parents at home. The elderly parents in these areas are thus facing more stressors from social norms. Third, the recent decade has seen a return migration to places closer to the migration origins in China, and most of them involve self-employ businesses in the nearby towns or counties. The poverty communities usually lack the suitable economic structure for such return. This perceived lack of support in the future, or the hopelessness, from the left-behind elderly in these poor areas may cause more depressive symptoms. Future research should address these issues, if data allowed.

References (incomplete)

Chu CY, Xie Y, Yu RR. Coresidence with elderly parents: A comparative study of southeast China and Taiwan. *Journal of Marriage and Family*. 2011;73(1):120–135.

Revicki, D. A., & Mitchell, J. P. (1990). Strain, social support, and mental health in rural elderly individuals. *Journal of Gerontology*, *45*(6), S267-S274.

Zeng, Z., & Xie, Y. (2014). The effects of grandparents on children's schooling: evidence from rural China. *Demography*, 51(2), 599-617.

Kohout, F. J., Berkman, L. F., Evans, D. A., & Cornoni-Huntley, J. (1993). Two shorter forms of the CES-D depression symptoms index. *Journal of Aging and Health*, *5*(2), 179-193.

Weissman, M. M., Sholomskas, D., Pottenger, M., Prusoff, B. A., & Locke, B. Z. (1977). Assessing depressive symptoms in five psychiatric populations: a validation study. *American Journal of Epidemiology*, *106*(3), 203-214.

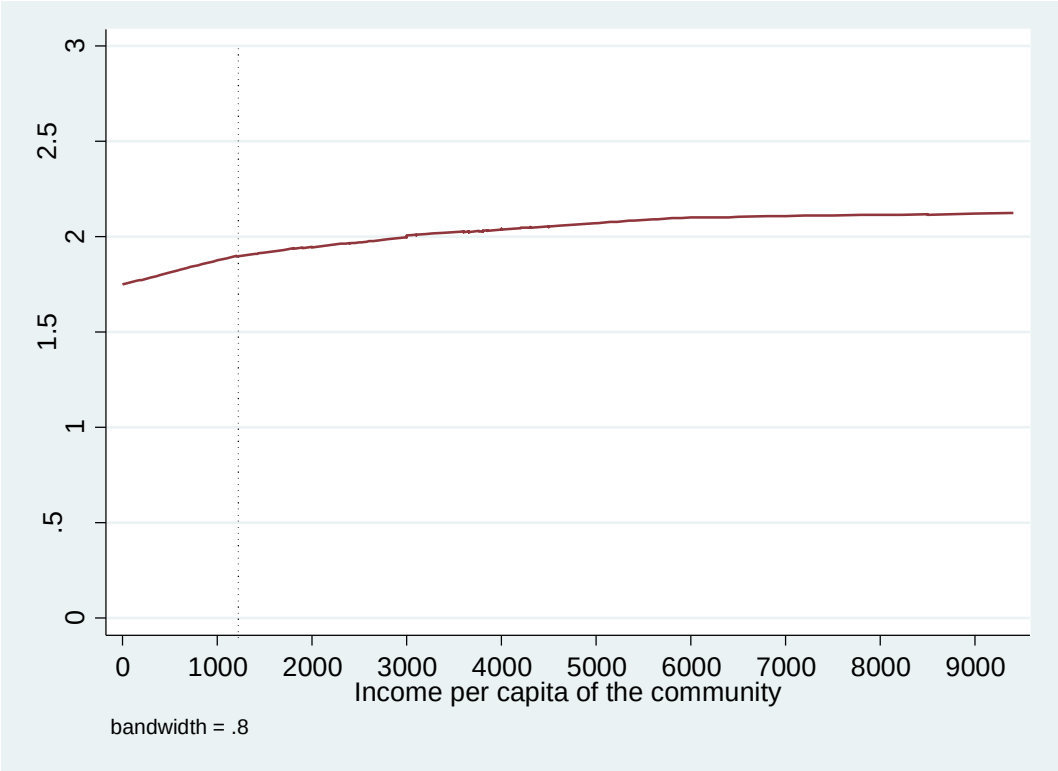
Chen, X., & Silverstein, M. (2000). Intergenerational social support and the psychological well-being of older parents in China. *Research on aging*, *22*(1), 43-65.

Krause, N., & Liang, J. (1993). Stress, social support, and psychological distress among the Chinese elderly. *Journal of Gerontology*, *48*(6), P282-P291.

Chi, I., & Chou, K. L. (2001). Social support and depression among elderly Chinese people in Hong Kong. *International Journal of Aging and Human Development*, *52*(3), 231-252.

Leung, K. K., Chen, C. Y., Lue, B. H., & Hsu, S. T. (2007). Social support and family functioning on psychological symptoms in elderly Chinese. *Archives of Gerontology and Geriatrics*, *44*(2), 203-213.

Graph 1. Lowess line for average mental scores by income per capital of communities (<10000rmb) *



*the vertical dotted line indicates the proximate poverty line in 2010 (1274 rmb).

Table 1 Variable	All older adults Mean or Percent	Std. Dev.	Left-behind elders Mean or Percent	Std. Dev.	Other elders Mean or Percent	Std. Dev.	
Demographic Characteristics							
Age	68.38	7.02	67.90	6.65	68.84	7.34	***
Female	49.32		47.72		51.00		*
Education (ref: no formal education)							
Some education	22.25		23.28		21.24		+
Elementary school	23.25		23.52		22.98		
Middle school	8.78		9.79		7.79		**
High School and Above	2.33		2.33		2.32		
Activity of daily living	1.51	0.59	1.50	0.56	1.53	0.61	*
Spousal conditions (ref: spouse in good health)							
Spouse in good health	63.07		67.63		58.61		***
Spouse in fair or bad health	13.49		12.93		14.04		
Total number of children	3.50	1.62	3.80	1.50	3.21	1.68	***
Living arrangement (ref: having the nearest child residing outside the village)							
Living with adult child or child in law	41.13		35.78		46.38		***
Having the nearest child or child in law residing in the village	36.65		32.72		40.51		***
Time spent with grandchildren (hours/year)	686.21	3005.87	971.41	3793.55	405.62	1900.10	***
Social Support							
Interaction with people (ref: rarely interacting with people)							
Having daily interaction with people	20.83		20.73		20.77		
Having weekly interaction with people	11.28		11.99		10.55		*
Frequency of face-to-face contact with nonresident child	5.10	2.97	4.72	2.90	5.47	2.99	***
Frequency of other types of contact with nonresident child	4.21	2.90	4.75	2.48	3.68	3.16	***
Economic Characteristics							
Household Income	4433.74	11440.00	4399.89	10078.71	4467.46	12652.88	
Financial transfer from nonresident children	871.08	3605.34	1177.56	4504.69	570.68	2381.43	***
Months of farmwork in the past year	3.65	4.66	4.15	4.79	3.14	4.47	***
Region (ref: western region)							
East	16.56		13.24		19.81		***
Central	17.83		15.37		20.25		***
Community Characteristics							
Income per capita in the community	4120.01	4563.69	3778.99	4618.72	4452.59	4485.28	***
Income per capita in the community below national poverty	18.47		0.19		0.18		

line							
Number of community programs	2.35	2.70	1.94	2.38	2.77	2.92	***
# of elders	5584						
# of households	3824		1862			1963	
# of communities	290						

Table 2	Below Poverty line		Above Poverty line		
Variable	Mean or Percent	Std. Dev.	Mean or Percent	Std. Dev.	
Having at least one migrant child:	51.07		49.14		
1. having the nearest migrant child outside the province	28.20		23.36		***
2. having the nearest migrant child within province	22.88		25.79		*
Demographic Characteristics					
Age	68.13	6.59	68.43	7.12	
Female	50.14		49.13		
Education (ref: no formal education)					
Some education	20.92		22.55		
Elementary school	23.06		23.29		
Middle school	9.90		8.53		
High School and Above	2.33		2.33		
Activity of daily living	1.59	0.64	1.50	0.57	***
Spousal conditions (ref: spouse in good health)					
Not living with spouse	24.00		23.31		
Spouse in fair or bad health	10.36		14.20		***
Total number of children	3.67	1.62	3.46	1.61	***
Living arrangement (ref: having the nearest child residing outside the village)					
Living with adult child or child in law	44.72		40.32		**
Having the nearest child or child in law residing in the village	33.05	47.06	37.47		**
Time spent with grandchildren (hours/year)	618.98	2910.34	701.50	3027.27	
Social Support					
Interaction with people (ref: rarely interacting with people)					
Having daily interaction with people	17.65		21.45		**
Having weekly interaction with people	11.11		11.30		
Frequency of face-to-face contact with nonresident child	4.96	2.99	5.13	2.96	+
Frequency of other types of contact with nonresident child	3.97	2.87	4.26	2.90	**
Economic Characteristics					
Household Income	4021.56	6125.82	4528.34	12339.41	+
Financial transfer from nonresident children	660.26	3229.71	918.85	3683.76	*
Months of farmwork in the past year	3.81	4.54	3.63	4.70	
Region (ref: western region)					
East	12.89		17.39		***
Central	30.16		15.04		***
Community Characteristics					

Income per capita in the community	690.95	365.64	4933.78	4720.79	***
Number of community programs	1.58	2.03	2.58	2.82	
# of elders	1071		4513		
# of households	719		3105		
# of communities	53		237		

Table 3

	Model 1a			Model 1b			Model 2a			Model 2b		
Having at least one migrant child	-0.101	0.017	***				-0.097	0.018	***			
Having the nearest migrant child in the province				-0.087	0.020	***				-0.087	0.021	***
Having the nearest migrant child outside the province				-0.115	0.021	***				-0.108	0.022	***
Demographic Characteristics												
Age	0.009	0.001		0.009	0.001	***	0.009	0.002	***	0.009	0.002	***
Female	-0.116	0.018	***	-0.116	0.018	***	-0.126	0.019	***	-0.127	0.019	***
Education (ref: no formal education)												
Some education	-0.033	0.022	**	-0.034	0.022		-0.045	0.023	+	-0.045	0.023	+
Elementary school	0.017	0.023	***	0.016	0.023		0.005	0.023		0.004	0.023	
Middle school	0.114	0.030	**	0.112	0.030	***	0.090	0.031	**	0.089	0.031	**
High School or higher	0.160	0.050	***	0.158	0.050	**	0.110	0.051	*	0.109	0.051	*
Activity of daily living	-0.538	0.018		-0.538	0.018	***	-0.545	0.018	***	-0.544	0.018	***
Spousal conditions (ref: spouse absent)												
Spouse in good health	0.067	0.022	+	0.067	0.022	**	0.080	0.023	**	0.080	0.023	**
Spouse in fair health	0.231	0.029	***	0.230	0.029	***	0.230	0.030	***	0.229	0.030	***
Total number of children	0.006	0.006	***	0.006	0.006		0.000	0.006		0.000	0.006	
Living arrangement (ref: having the nearest child residing outside the village)												
Living with adult child or child in law							0.052	0.023	*	0.052	0.023	*
Having the nearest child or child in law residing in the village							-0.016	0.025		-0.016	0.025	
Time spent with grandchildren (hours/year)							0.068	0.016	***	0.067	0.016	***
Social support												
Interaction with people (ref: rarely interacting with people)												
Having daily interaction with people							0.028	0.020		0.028	0.020	
Having weekly interaction with people							######	######	*	######	2.77E-06	*
Frequency of face-to-face contact with nonresident child							0.004	0.003		0.004	0.003	
Frequency of other types of contact with nonresident child							0.010	0.003	**	0.010	0.003	**
Economic Characteristics												
Household Income (in thousands)							0.002	0.001	**	0.002	0.001	***
Financial transfer from nonresident children (in thousands)							0.005	0.002	**	0.005	0.002	**
Months of farmwork in the past year							-0.008	0.002	***	-0.008	0.002	***
Region (ref: western region)												
East	0.041	0.023	+	0.041	0.023	+	0.026	0.023		0.026	0.023	
Central	-0.107	0.022	***	-0.108	0.022	***	-0.118	0.023	***	-0.119	0.023	***

Constant	2.820	0.039	***	2.821	0.039	***	2.781	0.045	***	2.782	0.045	***
R-Square	0.232			0.232			0.249			0.249		
# of older adults	5288			5288			5075			5075		

Community Characteristics

Average income in the community below poverty line

Having at least one migrant child×Average income below poverty

predict mental health score: above/below poverty line

next: 1. run models with vil_inc respectively for the two;
2. run models with all dependent mental healths.

Table 4

	Model 3a			Model 3b			Model 4a			Model 4b			Model 5a			Model 5b		
Having at least one migrant child	-0.077	0.020	***				-0.061	0.023	**				-0.055	0.023	*			
Having the nearest migrant child in the province				-0.071	0.025	**				-0.054	0.027	*				-0.050	0.027	+
Having the nearest migrant child outside the province				-0.085	0.024	***				-0.068	0.027	*				-0.060	0.027	*
Demographic Characteristics																		
Age	0.008	0.002	***	0.008	0.002	***	0.008	0.002	***	0.008	0.002	***	0.008	0.002	***	0.008	0.002	***
Female	-0.121	0.017	***	-0.121	0.017	***	-0.121	0.017	***	-0.121	0.017	***	-0.123	0.017	***	-0.123	0.017	***
Education (ref: no formal education)																		
Some education	-0.043	0.023	+	-0.042	0.023	+	-0.042	0.023	+	-0.042	0.023	+	-0.046	0.023	*	-0.046	0.023	*
Elementary school	0.005	0.023		0.005	0.023		0.007	0.023		0.006	0.024		0.003	0.023		0.003	0.023	
Middle school	0.100	0.034	**	0.099	0.034	**	0.100	0.034	**	0.100	0.034	**	0.098	0.033	**	0.098	0.033	**
High School or higher	0.132	0.054	*	0.131	0.054	*	0.135	0.054	*	0.135	0.054	*	0.132	0.054	*	0.132	0.054	*
Activity of daily living	-0.531	0.020	***	-0.531	0.020	***	-0.531	0.020	***	-0.531	0.020	***	-0.527	0.020	***	-0.527	0.020	***
Spousal conditions (ref: spouse absent)																		
Spouse in good health	0.079	0.025	**	0.079	0.025	**	0.081	0.025	**	0.081	0.025	**	0.080	0.025	**	0.080	0.025	**
Spouse in fair health	0.201	0.031	***	0.200	0.031	***	0.204	0.031	***	0.203	0.031	***	0.199	0.031	***	0.199	0.031	***
Total number of children	0.005	0.007		0.005	0.007		0.005	0.007		0.005	0.007		0.006	0.007		0.006	0.007	
Living arrangement (ref: having the nearest child residing outside the village)																		
Living with adult child or child in law	0.033	0.027		0.034	0.027		0.032	0.027		0.033	0.027		0.030	0.026		0.030	0.026	
Having the nearest child or child in law residing in the village	-0.033	0.028		-0.033	0.028		-0.035	0.028		-0.035	0.028		-0.035	0.028		-0.035	0.028	
Time spent with grandchildren (hours/year)	0.055	0.018	**	0.054	0.018	**	0.055	0.018	**	0.055	0.018	**	0.053	0.018	**	0.053	0.018	**
Social support																		

Interaction with people (ref: rarely interacting with people)																	
Having daily interaction with people	0.028	0.021		0.027	0.021		0.029	0.021		0.028	0.021		0.025	0.021		0.025	0.021	
Having weekly interaction with people	0.000	0.000	**	0.000	0.000	**	0.000	0.000	**	0.000	0.000	**	0.000	0.000	**	0.000	0.000	**
Frequency of face-to-face contact with nonresident child	0.001	0.004		0.001	0.004		0.001	0.004		0.001	0.004		0.001	0.004		0.001	0.004	
Frequency of other types of contact with nonresident child	0.009	0.003	**	0.009	0.003	**	0.009	0.003	**	0.009	0.003	**	0.009	0.003	**	0.009	0.003	**
Economic Characteristics																		
Household Income (in thousands)	0.001	0.001	*	0.001	0.001	*	0.001	0.001	**	0.001	0.001	**	0.001	0.001	**	0.001	0.001	**
Financial transfer from nonresident children (in thousands)	0.003	0.001	**	0.003	0.001	*	0.003	0.001	*	0.003	0.001	*	0.003	0.001	*	0.003	0.001	*
Months of farmwork in the past year	-0.006	0.002	*	-0.006	0.002	**	-0.006	0.002	**	-0.006	0.002	**	-0.006	0.002	**	-0.006	0.002	**
Region (ref: western region)																		
East	0.033	0.039		0.033	0.039		0.033	0.039		0.033	0.039		0.023	0.039		0.023	0.039	
Central	-0.094	0.034	**	-0.094	0.034	**	-0.092	0.034	**	-0.092	0.034	**	-0.095	0.033	**	-0.095	0.033	**
Community Characteristics																		
Average income in the community below poverty line	-0.153	0.029	***	-0.152	0.029	***	-0.104	0.034	**	-0.104	0.034	**	-0.087	0.035	*	-0.087	0.035	*
Having at least one migrant child×Average income below poverty							-0.095	0.045	*				-0.101	0.045	*			
Intra-prov migration×Average income below poverty										-0.101	0.056	+				-0.105	0.056	+
Inter-prov migration×Average income below poverty										-0.088	0.055					-0.095	0.055	+
Number of community													0.015	0.004	***	0.015	0.004	***

programs																	
Constant	2.791	0.049	***	2.792	0.049	***	2.781	0.049	***	2.781	0.049	***	2.740	0.052	***	2.740	0.052	***
R-Square																	
Within	0.217			0.217			0.217			0.217			0.217			1		
Between	0.442			0.442			0.447			0.447			0.454			16.8		
Overall	0.257			0.257			0.257			0.258			0.261			36		
# of older adults	4984																	

Table 5

	Model 1a			Model 1b			Model 2a			Model 2b		
Having at least one migrant child	0.374	0.065	***				0.307	0.071	***			
Having the nearest migrant child in the province				0.303	0.078	***				0.249	0.083	**
Having the nearest migrant child outside the province				0.445	0.077	***				0.369	0.084	***
Demographic Characteristics												
Age	-0.028	0.006	***	-0.027	0.006	***	-0.024	0.006	***	-0.024	0.006	***
Female	0.408	0.071	***	0.409	0.071	+	0.458	0.074	***	0.458	0.074	***
Education (ref: no formal education)												
Some education	0.150	0.084	+	0.152	0.084		0.175	0.087	*	0.175	0.087	*
Elementary school	0.017	0.088		0.020	0.088	*	0.047	0.091		0.049	0.092	
Middle school	-0.287	0.129	*	-0.279	0.130		-0.224	0.134	+	-0.217	0.134	
High School or higher	-0.400	0.244		-0.392	0.244	***	-0.324	0.257		-0.318	0.257	
Activity of daily living	1.614	0.081	***	1.612	0.081	**	1.688	0.085	***	1.686	0.085	***
Spousal conditions (ref: spouse absent)												
Spouse in good health	-0.217	0.080	**	-0.217	0.080	***	-0.283	0.085	**	-0.283	0.085	**
Spouse in fair health	-0.726	0.115	***	-0.722	0.115		-0.746	0.120	***	-0.742	0.120	***
Total number of children	-0.004	0.022		-0.004	0.022		0.039	0.025		0.039	0.025	
Living arrangement (ref: having the nearest child residing outside the village)												
Living with adult child or child in law				-0.096	0.088	***	-0.186	0.090	*	-0.185	0.090	*
Having the nearest child or child in law residing in the village				0.347	0.082	***	-0.002	0.096		-0.004	0.096	
Time spent with grandchildren (hours/year)				-3.148	0.168		-0.141	0.069	*	-0.140	0.069	*
Social support												
Interaction with people (ref: rarely interacting with people)												
Having daily interaction with people							0.088	0.086		0.092	0.086	
Having weekly interaction with people							0.000	0.000	+	0.000	0.000	+
Frequency of face-to-face contact with nonresident child							-0.035	0.014	*	-0.034	0.014	*
Frequency of other types of contact with nonresident child							-0.019	0.013		-0.019	0.013	
Economic Characteristics												
Household Income (in thousands)							-0.011	0.004	**	-0.011	0.004	**
Financial transfer from nonresident children (in thousands)							-0.037	0.014	*	-0.037	0.014	*
Months of farmwork in the past year							0.038	0.007	***	0.038	0.007	***

Region (ref: western region)											
East	-0.097	0.088			0.001	0.092		0.000	0.092		
Central	0.343	0.082	***		0.388	0.086	***	0.391	0.086	***	
Constant	-3.144	0.168	***		-3.124	0.189	***	-3.129	0.189	***	
Pseudo R-Square	0.1311			0.1314	0.1452			0.1455			
# of older adults	5288			5288	5075		5075				

Table 6

	Model 3a			Model 3b			Model 4a			Model 4b			Model 5a			Model 5b		
Having at least one migrant child	0.252	0.078	**				0.178	0.086	*				0.152	0.086	+			
Having the nearest migrant child in the province				0.190	0.091	*				0.129	0.100					0.112	0.100	
Having the nearest migrant child outside the province				0.320	0.093	**				0.236	0.104	*				0.198	0.104	+
Demographic Characteristics																		
Age	-0.022	0.006	***	-0.022	0.006	***	-0.023	0.006	***	-0.023	0.006	***	-0.021	0.006	**	-0.021	0.006	**
Female	0.484	0.077	***	0.485	0.077	***	0.483	0.077	***	0.484	0.077	***	0.493	0.077	***	0.493	0.077	***
Education (ref: no formal education)																		
Some education	0.164	0.093	+	0.163	0.093	+	0.161	0.093	+	0.160	0.093	+	0.182	0.093	+	0.181	0.093	+
Elementary school	0.059	0.097		0.060	0.097		0.052	0.098		0.053	0.098		0.069	0.097		0.069	0.098	
Middle school	-0.247	0.144	+	-0.240	0.144	+	-0.249	0.144	+	-0.243	0.144	+	-0.236	0.144		-0.231	0.144	
High School or higher	-0.402	0.283		-0.399	0.283		-0.418	0.283		-0.414	0.283		-0.405	0.284		-0.401	0.283	
Activity of daily living	1.743	0.082	***	1.742	0.082	***	1.744	0.082	***	1.743	0.082	***	1.723	0.082	***	1.723	0.082	***
Spousal conditions (ref: spouse absent)																		
Spouse in good health	-0.301	0.090	**	-0.301	0.090	**	-0.309	0.090	**	-0.309	0.090	**	-0.306	0.090	**	-0.306	0.090	**
Spouse in fair health	-0.688	0.127	***	-0.685	0.127	***	-0.702	0.127	***	-0.699	0.127	***	-0.687	0.127	***	-0.684	0.127	***
Total number of children	0.014	0.027		0.014	0.027		0.014	0.027		0.014	0.027		0.008	0.027		0.008	0.027	
Living arrangement (ref: having the nearest child residing outside the village)																		
Living with adult child or child in law	-0.147	0.100		-0.148	0.100		-0.142	0.100		-0.144	0.100		-0.126	0.100		-0.128	0.100	
Having the nearest child or child in law residing in the village	0.050	0.106		0.048	0.106		0.057	0.107		0.054	0.107		0.054	0.106		0.051	0.106	

Time spent with grandchildren (hours/year)	-0.105	0.074		-0.105	0.074		-0.109	0.075		-0.109	0.075		-0.100	0.074		-0.100	0.074	
Social support																		
Interaction with people (ref: rarely interacting with people)																		
Having daily interaction with people	0.084	0.093		0.087	0.093		0.079	0.093		0.083	0.093		0.100	0.093		0.103	0.093	
Having weekly interaction with people	0.000	0.000	*	0.000	0.000	*	0.000	0.000	*	0.000	0.000	*	0.000	0.000	*	0.000	0.000	*
Frequency of face-to-face contact with nonresident child	-0.026	0.015	+	-0.025	0.015	+	-0.026	0.015	+	-0.025	0.015	+	-0.023	0.015		-0.022	0.015	
Frequency of other types of contact with nonresident child	-0.016	0.014		-0.016	0.014		-0.016	0.014		-0.016	0.014		-0.016	0.014		-0.016	0.014	
Economic Characteristics																		
Household Income (in thousands)	-0.010	0.004	*	-0.010	0.004	*	-0.010	0.004	*	-0.011	0.004	*	-0.011	0.005	*	-0.011	0.005	*
Financial transfer from nonresident children (in thousands)	-0.028	0.015	+	-0.028	0.015	+	-0.028	0.015	+	-0.028	0.015	+	-0.026	0.015	+	-0.026	0.015	+
Months of farmwork in the past year	0.035	0.008	***	0.035	0.008	***	0.035	0.008	***	0.035	0.008	***	0.033	0.008	***	0.033	0.008	***
Region (ref: western region)																		
East	-0.035	0.129		-0.035	0.130		-0.037	0.129		-0.038	0.129		0.010	0.127		0.009	0.127	
Central	0.325	0.122	**	0.329	0.122	**	0.317	0.122	**	0.322	0.122	**	0.333	0.119	**	0.337	0.119	**
Community Characteristics																		
Average income in the community below	0.519	0.120	***	0.512	0.120	***	0.319	0.152	*	0.319	0.152	*	0.242	0.150		0.243	0.150	

poverty line																	
Having at least one migrant							0.387	0.181	*				0.417	0.180	*		
child×Average income below poverty																	
Intra-prov migration×Average income below poverty										0.341	0.224					0.362	0.223
Inter-prov migration×Average income below poverty										0.404	0.213	+				0.446	0.212	*
Number of community programs													-0.067	0.018	***	-0.066	0.018	***
Constant	-3.333	0.203	***	-3.337	0.203	***	-3.287	0.204	***	-3.292	0.204	***	-3.100	0.207	***	-3.106	0.208	***
Log likelihood	-2771			-2770			-2768			-2768			-2762					
Overall # of older adults																		