Alone but Better Off?
Adult Child Migration and Health of Elderly Parents in Moldova

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Abstract

Increasing labor migration and simultaneous aging of societies are two important demographic developments many poor countries face. Elderly people who are left behind may experience a decrease in welfare when their children migrate. This paper investigates the effect of migration on various dimensions of elderly health using unique data from Moldova, which has one of the highest emigration rates in the world. We find positive migration effects on body mass index (BMI), mobility and self-reported health. No effects are found on depression and cognitive capacity. We find evidence that these positive outcomes are linked to an income effect which leads to improvements in diet and identify a reallocation of time use from subsistence farming to leisure and sleep which may have further beneficial effects. These positive effects seem to compensate the elderly for decreasing social contact with their migrant family members.

Keywords: international migration, elderly health

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1 Introduction

Demographic trends such as decreasing fertility and falling mortality rates have increased the population share of elderly people drastically in many countries. In the absence of adequate social security systems and institutionalized care, pensioners rely primarily on kin-based social support networks. The United Nations forecast that the elderly-dependency ratio will double to reach 20 percent in 2050 in less developed countries. In Eastern Europe the ratio will reach 45 percent in 2050 (constant fertility scenario, UN, 2011). Social security systems have largely not been adjusted to this trend. As limited resources will have to be distributed over a larger group of beneficiaries, available per capita government budgets will further dilute. Already, pensions in developing countries and transitions economies are often insufficient to lift elderly people above the poverty line.

Labor migration is one of the most promising ways for poor families in developing and emerging countries to escape poverty (Clemens, 2011). If family members leave a country to work abroad this can however cause considerable disruptions to families' informal security networks. Whether migration benefits or harms the population left behind – often children and elderly – has therefore been of increasing interest in the literature. So far the literature has mostly concentrated on children of migrants who stay behind (Antman, 2013a). Research on the consequences for the well-being of elderly people is still scarce and somewhat inconclusive. On the one hand, migration of working-age children of the elderly can affect traditional intra-family care arrangements and the allocation of responsibilities, which potentially decreases the welfare of the elderly left-behind. On the other hand, increased income might allow families access to health- and welfare-improving resources. So far, empirical evidence on the impact of adult children's migration on their parents' physical and mental health which accounts for self-selection into migration can be found only for a few countries, including Indonesia (internal migration, Kuhn et al., 2011), Tonga (international migration to New Zealand, Gibson et al., 2011) and Mexico (international migration to the US, Antman, 2013b). While Kuhn et al. find a positive effect of migration on elderly parents, Antman's results suggest a negative health effect for elderly left behind in Mexico and Gibson et al. find no effect of migration on the health of elderly household members. This scarce and mixed evidence stands in stark contrast to the widely acknowledged importance of both migration and the demographic change in many countries.

We contribute to the literature by providing evidence that international migration can have a causal, overall beneficial effect on the health of elderly people after accounting for self-selection into migration. We show that some dimensions of physical health are affected positively, while mental health and cognitive capacity are not significantly affected by migration. Our paper furthermore expands the existing evidence regionally by using novel survey data from Moldova. Using an instrumental variable strategy, we show that migration of their children induces the elderly in the sample to eat a more diverse diet, has a positive effect on their mobility, perhaps allowing them to lead more independent lives, and makes them judge their own health more positively. We show that these health effects may be heterogeneous across different subgroups of the elderly population and provide evidence that remittances are partly responsible for these results. An additional role may be played by beneficial changes in time-allocation. These appear to overcompensate the elderly for decreasing contact with family members and thus help explain why we find no evidence of widely suspected negative health effects on the elderly population in general.

Section 2 of this paper discusses the possible effects of migration on elderly health in detail. Section 3 introduces the data and Section 4 lays out the identification strategy. Estimation results and their robustness are discussed in detail in Section 5 followed by the conclusion.

2 Possible Effects of Migration

Potential Channels

The most tangible consequence of migration that might affect the health of those who stay behind is the availability of remittances. While these increase disposable income, migration of formerly employed working-age household members decreases household-level labor income. Depending on the incentives of the migrant to remit (Lucas and Stark, 1985; Rapoport and Docquier, 2006) and employment opportunities at the destination, the per capita budget of the remaining household members may increase or decrease. Gibson et al. (2011) analyze the implications of a migration lottery program which provides Tongans with visa for New Zealand. Households with migrants are found to face a decrease in per-capita income by about 25 percent because the increase in remittances does not offset the loss of the migrant's previous labor income. It however remains unclear how this change in income and assets affects the household members who stay behind, because migrants might have consumed a disproportionally high share of household resources before going abroad. For elderly households, Antman (2010) finds that Mexican parents with children who have migrated to the US have less income at their disposal. There is however no significant difference in asset holdings for parents with and without migrant children. Elderly persons who shared a household's budget with the migrant may see their available budget decrease as a consequence of migration. If however remittances overcompensate the loss in labor income (e.g. if domestic wages are low) and especially if the migrant was not co-residing with the elderly person prior to migration, the income effect of migration for those left behind will be positive.

The strong evidence of a positive income gradient in health production functions suggests additional income from increasing household budgets can be expected to provide a positive effect of migration on elderly health. First, in the absence of free health care or insurance, it provides funds to pay for health services. Adhikari et al. (2011) report that elderly individuals with migrant children in Thailand are 22 percent more likely to seek treatment for their illnesses. Second, an increase in income gives the elderly the opportunity to improve other important health inputs such as their diets, leisure or living conditions. Such health inputs might affect both physical and psychological health dimensions. Third, although it is hard to identify the direction of causality, recent evidence suggests that there might be a causal effect of poverty and income on depression. Friedman and Thomas (2008) show for the case of Indonesia that the Asian financial crisis caused severe and persistent psychological distress especially for economically vulnerable groups. Das et al. (2008) study a multi-country sample that is based on different household surveys and find no conclusive link between poverty and mental health, though.

Migration will furthermore potentially affect the time allocation of the elderly. We raise this point specifically, because the interaction between health and decisions about time use (e.g. labor supply) has received considerable attention in labor economics, health economics, medicine and related disciplines. These literatures have provided evidence of causality in both directions. Worsening health can cause lower labor supply or earlier retirement and changing activity patterns can lead to changing health outcomes either by affecting time invested in health production (e.g. rest instead of work in a model such as Grossman, 1972) or by more complex factors such as for instance discussed for the case of farming by Pérès et al. (2012).

An income effect of migration through an increase in disposable income might induce elderly people to stop working or subsistence farming (Singh et al., 1986). On the other hand, elderly parents might have increased responsibility within the household or in agriculture and might have to live without non-material support from their migrant children, especially if these children previously lived in the same household or nearby. In certain cases, elderly individuals might also become the main caregiver for their grandchildren. Pang et al. (2004) find that elderly people in China who do not live with their children have a much higher likelihood of participating in the workforce and that this relative difference in workforce participation is even more pronounced when only people older than 70 are considered. Also, the authors find that women shoulder the majority of the additional responsibility. Pang et al. (2004) however do not control for the endogeneity of children's migration decision. Accounting for selection into migration to some extent by using village-level migration rates, Chang et al. (2011) find that in rural China time use of the elderly differs by living arrangement and is significantly higher in villages with higher migration rates. In a high migration setting, the elderly allocate significantly more time to both domestic and farm work, suggesting that they substitute to a certain extent for labor input previously provided by the migrant. This effect is stronger for women than for men. It is therefore plausible to suspect that the elasticities of domestic and farm labor supply are non-linear in income and that migration effects therefore depend on the pre-migration allocation of work as well as income levels.

Migration can also have an effect on the time allocation of other, non-migrating family members, for example on their time spent providing informal eldercare. Any analysis of the effects of migration on the family left behind is therefore complicated by interaction between family members. For Mexico, Antman (2012) finds that siblings' time contributions to elderly parents are substitutes. This implies that if one child migrates and therefore cannot provide time inputs to the parents, the remaining siblings are likely to make up for some of the decrease. On the other hand, an increase in monetary contributions by one child is associated with an increase in contributions from the other children as financial contributions are found to be complements, a consequence of what might be a bequest motive. Stoehr (2013) finds evidence that in Moldova siblings base their migration decision partly on their siblings' decision, which may be motivated by the aim to ensure elderly parents receive both income and care. In many families non-migrants at least partly make up for migrants' contributions to the elderly. This implies that the migration of an adult child does not necessarily mean that elderly parents lose out in terms of contributions from their children.

In addition to indirect effects of migration on health caused by differences in health inputs, there may be a direct relationship between children's migration and elderly parents' health outcomes, for example if an elderly person's health deteriorates if they feel isolated when left behind (Cornwell and Waite, 2009).

Evidence on the health effect of migration on elderly left behind

So far, there is inconclusive evidence regarding even the sign of the overall effect of migration on elderly mental and physical health. For Tonga, Gibson et al. (2011) find no significant impact of migration of a household member on the health outcomes of older adults, defined as people of age 46 and above. Neither health behavior, which includes smoking and alcohol consumption, nor health measures such as BMI, waist-to-hip ratio and mental health are significantly affected. However, the study finds that households with migrants tend to consume more rice and roots and less fruit and vegetables, which might be a result of the lower income as rice and roots are a cheap source of calories. Kuhn et al. (2011) use a propensity score matching approach to analyze the impact of internal migration in Indonesia on elderly parents' self-reported health status, self-reported mobility status and mortality and find that having a migrant child is associated with reduced risk of negative health outcomes and lower mortality. Their data do not permit to assess the effects of more lucrative international migration, which may offer sufficient incentive for migrant families to send migrants in spite of relatively poor health of the elderly left behind. Antman (2013b) finds, after accounting for selection into migration, that migration of at least one child to the US causes poorer self-reported health and a higher likelihood to suffer from stroke or heart attack in Mexican elderly parents.

The empirical evidence of migration effects on mental health is particularly inconclusive. For example, Adhikari et al. (2011) report a strongly negative association between elderly mental health and their children's out-migration from the parents' province in Thailand. In contrast, for a smaller sample drawn from a region in Western Thailand, Abas et al. (2009) observe lower incidence of depression among parents whose children are all rural-urban migrants compared to parents of whom none or only some children have migrated. For elderly parents of whom only some children have migrated, Abas et al. find no significant association between depression and migration status. Both studies do not address the problem of endogeneity and can therefore not establish a causal effect convincingly. In addition to the above cited negative effect on physical health Antman (2013b) finds that, for the affected Mexican parents, their children's migration results in worse mental health outcomes as measured by the incidence of depression, loneliness and sadness. This might be the case especially if the migrant entered the country of destination illegally, as this would potentially impose additional psychological stress and fear on kin left behind and usually would imply a lower frequency of contact and visits. While face to face contact with one's children may be important, this may be partly compensated by frequent communication and a positive income effect.

3 Data and Descriptives

For our empirical analysis we use a unique household survey from Moldova. The "Children and Elderly Left Behind" (CELB) dataset is based on the 2011 sampling frame of the National Labor Force Survey and constitutes a stratified random sample. It was collected between October 2011 and February 2012 and is nationally representative for migrant and non-migrant households with members aged 60 and older, whom we will define as the elderly. The first module of the specifically designed questionnaire captures detailed information about general household characteristics such as composition, education and income as well as details on the migration experiences of all household members for the last decade. In the questionnaire's module that is targeted at the elderly we collected data on topics such as the health and the family network of each elderly household member. In total we interviewed 3539 households in 129 communities out of which 2175 households have a member aged 60 or older. The geographical distribution of sampled localities is plotted in Figure 1. The analytical sample comprises 1566 elderly from 111 localities for which all relevant information are available and which have at least one child. The average age in the analytical sample is 69.3 with 54 percent belonging to the 60-69 year old cohort and only 10 percent to the 80+ cohort (see Table 1). The elderly have on average 2.7 children, with older cohorts having more. The average household size of elderly people with and without migrant children is virtually identical at 2.91 and 2.92, respectively. 77 percent of the elderly in our analytical sample live in rural areas.

[Figure 1 and Table 1 about here]

Moldova is the poorest country in Europe with a GDP per capita of 3,424 USD (PPP) in 2012, which places it between India and Pakistan (World Bank, 2013). In 2011, the minimum monthly state pension was about 50 USD (SSA, 2012), which is close to levels that are considered extreme poverty by the Moldovan Ministry of Economic Affairs. Government old age pensions do not depend on how much income other family members or the elderly themselves receive and can thus be treated as exogenous. In our sample, the mean reported monthly old age pension for elderly recipients is 826.5 MDL (65.3 USD). Many elderly people thus depend on monetary and in-kind contributions from their children for their livelihoods.

Out of the 221 elderly individuals who consider themselves to share a household with their migrant children, 61 percent report positive monetary remittances[1]. In these households, median remittances are about 2.12 times the median old age pension in our sample (USD 2.14/day). Among the elderly who live without younger family members and therefore have to share less of the remittances they receive, median reported remittances are still about 1.04 times the median pension. The main reported uses of monetary remittances are current expenditures for groceries and utility bills. Non-monetary remittances such as food, medicine or medical equipment are hardly ever reported in our sample.

Large-scale migration from Moldova is a relatively recent phenomenon. During the Soviet era there was limited, often temporary migration within the Soviet Union. Of the elderly in our data only 9 percent report that before 1990 a family member migrated abroad[2]. Since the Russian financial crisis in 1998, which had severe consequences for the Moldovan economy, Moldova has one of the highest migration rates worldwide. According to the World Bank (2011), 770,000 out of a population of 3.6 million were migrants in 2010. The share among the working age population is even higher. The two most important destinations are Russia, due to historical ties and easy labor market access, and Italy, due to the linguistic proximity of the Romanian[3] and Italian languages and the ability of many Moldovans to claim EU passports because of Romanian family ties. Other destinations vary widely from relatively close Southern and Western Europe and Turkey

[1]As usual for remittance figures, these numbers are likely suffer from considerable underreporting, see Akee and Kapur (2012).

[2]The main reason for this was military service (52 percent), followed by migration on the person's own initiative (18 percent) and temporary work programs (mostly harvesting and tilling, 16 percent). The most common destination was today's Russia, followed by Ukraine and Belarus. All reported destinations were Warsaw Pact countries.

[3]Romanian is the official language of Moldova; it is sometimes called Moldovan

to the US, Canada and increasingly other booming regions such as the Gulf States, but the numbers of migrants going to each of these destinations, especially at the village level, are still small. Migration from Moldova is mostly seasonal with many migrants returning at least for a few months each year, for example during winter when there is little activity in the construction sector. Recent migration of the elderly themselves is very uncommon, with only 2.0 percent of the elderly having migrated since 1999. There is no significant correlation between the likelihood of elderly people having migrated recently and the instruments or the 2004 village level migrant shares that will be introduced below.

Health markers

Since health is multidimensional, our survey captures a number of standard mental and physical health markers for the elderly. As mental and physical health are likely to interact (Ruo et al., 2003), we will also investigate the elderly's subjective health status.

The question regarding the subjective health indicator was specifically framed as a comparison to the health of people of the same age[4]. The options given were "Much better" (5 points), "Better", "Neither better nor worse", "Worse" and "Much worse" (1 point). Eriksson et al. (2001) show that the value of the self-reported health indicator with links to age is explained by mental health, functional health as well physical health but socio-economic factors (e.g. education) and lifestyle (e.g. social activities, smoking) have only limited influence on scores. The subjective health indicator in our sample has a median of 3 and a mean of 2.75[5].

To quantify the cognitive capacity of elderly respondents we conducted a short memory test. We obtained an immediate measure of the recall of 10 simple words at the beginning of the survey[6]. On average respondents remembered 3.6 words immediately after hearing them.

To assess elderly respondents' psychological well-being, we calculate the so called MHI-5 (based on the Mental Health Inventory by Veit and Ware, 1983). The index performs well in screening mood disorders and anxiety disorders in particular (Rumpf et al., 2001). Based on answers to five questions concerning the individual's recent mental health[7], we construct a variable ranging from 5 (very poor mental health) to 30 points (very good mental health). The average score for all elderly in the sample is 18.5, the median 18 and the scores in the sample resemble a normal distribution.

In addition, we use indicators that cover chronic and acute diseases. Chronic diseases are heavily influenced by genetic and long-term determinants and thus unlikely to be causally affected by rather recent migration episodes. Thus, these health markers can be

[4]"Compared with other people of the same age, how would you say your health is?"

[5]For all respondents, the question was posed as the first question regarding health to avoid effects such as potentially different reactions to being reminded of one's health problems.

[6]The words were: Hotel, River, Tree, Arm, Gold, Market, Paper, Child, King, Cup. In around 7 percent of the cases interviewers reported that the explanation for this test was not understood by the respondent and in about 10 percent of the interviews the test was interrupted. In the analysis we will control for these confounding factors when estimating migration's effect on cognitive capacity.

[7]The five questions are: 1. "During the past month, how much of the time were you a happy person?" 2. "How much of the time, during the past month, have you felt calm and peaceful?" 3. "How much of the time, during the past month, have you felt tense or 'high-strung'?" 4. "How much of the time, during the past month, have you felt downhearted and blue?" 5. "How much of the time, during the past month, did you feel so down in the dumps that nothing could cheer you up?" In the English version of the questionnaire, question 3 differs slightly in wording. In Romanian, the question used by us and the one used by Mental Health Inventory are equivalent.

used for placebo robustness checks. Anthropometric measures such as the body mass index (BMI) augment these long-run measures by a medium-run dimension because factors that can change in the short-run such as nutrition may first affect weight before having chronic manifestations (e.g. diabetes)[8]. While underweight indicates potentially poor nutrition and sickness, it is well recognized that significant overweight is associated with diabetes, many forms of cancer, cardiovascular diseases, asthma and other diseases (Guh et al., 2009). As poor individuals are often thought of as maximizing calories given their budget (cf. Drewnowski and Specter, 2004) higher BMIs have some positive implications. Obesity however is therefore also a common problem in developing countries and undernourishment and overweight often coincide (Prentice, 2006). The health implications of the sign of the migration effect on BMI may thus be unclear. We therefore also include an indicator of nutritional diversity. Nutritional diversity is not a health marker in its own right but serves as a clearly interpretable input into health production. For the construction of our indicator, respondents were asked whether they had eaten bread, the local staples potatoes or mamaliga (maize porridge), eggs, meat or fish, milk or dairy products, vegetables, fruits, or sweets during the 24 hours before the interview[9]. For each kind of food, one unit is added to the nutritional diversity index which thus may range between 0 and 8. On average, elderly individuals in our sample had consumed 5.18 different kinds of foods in the 24 hours before the survey. The indicator is correlated positively with income variables such as remittances or old age pensions and thus has the potential to capture income differences that are unobserved due to unreported remittances.

Finally, functional indicators focus on whether the respondent experiences difficulties carrying out certain activities, often measured with reference to activities of daily living (ADL) or instrumental activities of daily living (IADL), cf. Lawton and Brody (1969). While ADL measure the ability to perform basic tasks such as dressing, walking across a room and eating alone, IADL focus on activities necessary to live relatively independently. For the elderly, being able to live independently is important in the migration context. For each activity in our IADL index[10], respondents were asked whether they could conduct it "easily", "with difficulty" or were "unable". If an elderly person was able to conduct an activity, we add two points to the mobility index and one if she is able "with difficulty". The index is then standardized between zero and one. The average score for individuals in our sample is 0.61.

We restrict the sample to individuals for whom subjective health, MHI-5, cognitive capacity, and the IADL index are available. For the regressions using BMI as an outcome variable we have to restrict the sample even further, as 159 elderly from our analytical sample refused to or could not be measured. Two-sided t-tests find at the five percent significance level that older, less healthy and less mobile individuals self-selected into not being measured and weighed in the voluntary anthropometrics section of our survey. Excluding them biases the sample towards more healthy elderly people. This caveat should be kept in mind when interpreting the results related to BMI.

[8]The height and weight required to calculate the BMI were measured by the interviewers who were carrying scales and measuring tapes and had been trained to apply them properly.

[9]For more discussion on measurement of nutritional diversity, see Ruel (2003).

[10]Drawing a pail of water from a well, carrying a heavy load for 20 meters (like the pail of water), walking for one kilometer, sweeping the house floor or yard, bowing/ squatting/kneeling, shopping for personal needs, preparing a meal for oneself, taking medicine and visiting friends in the same village.

4 Identification Strategy

In this paper we estimate the causal effect of the international migration of biological children on elderly health. Focusing on migration of biological children provides more easily interpretable results compared to estimating the effect of migration of a household member. This is because a specification with a focus on the family-level rather than the household level does not require modelling the endogenous co-residence choice of adult children that may be particularly important if households are relatively small as in the case of Moldova. Furthermore, when focusing on the effect of household-level migration, potentially important effects of family-level migration would be overlooked[11]. We therefore use a dummy variable that reflects whether at least one biological child of the elderly is a migrant. We define the children of the elderly as migrants if they have stayed abroad for at least three months during the year 2011. The underlying process is far simpler to model empirically compared to the number of migrants at the family level[12], whose decision to migrate might not be independent and thus result in non-monotonicities in the likelihood to migrate.

Thus, the central concern with respect to identification is the endogeneity of migration. The ensuing selection bias might be positive or negative. Unobservable factors such as a less disease-prone constitution due to family-level differences in genetic endowment may be correlated with both a higher likelihood of migration of a family's children and good health of elderly people. Adult children might only migrate if their elderly parents are still able to care for themselves or take over some additional household chores such as child care. Alternatively, bad health coupled with liquidity constraints could have led to the decision to migrate in order to obtain the resources necessary to treat the health problem. A priori, it is hence not possible to clearly determine the direction of the potential bias. For rural China, Giles and Mu (2007) find that the parent's death one or two years later, which the authors use as an indicator of current health status, is associated with a fall in the probability of migration. Stoehr (2013) finds a negative correlation between the likelihood to migrate of only-children with parental age (which is strongly correlated with their health) for the dataset used in this paper, but shows that in families which have more than one child this association is insignificant. He suggests this pattern is explained by the ability of larger families to have members who specialize in either migration or in providing care. It may thus be plausible to expect an upward bias for estimates that do not account for selection into migration, which fades with family size: children in small families when confronted with their parent's poor health might decide to provide care instead of engaging in migration, thus leading to an overestimation of a positive or an underestimation of a negative effect of migration on health in such families [13]. We conducted detailed checks using the sampling frame as well as our raw survey data to ensure that results in this paper are not driven by permanent emigration of whole families with particularly healthy elderly.

To address the endogeneity of the migration decision, we employ an instrumental variables strategy with two instrumental variables. Firstly, we use network-growth interactions as an exogenous source of variation in the likelihood of migration conditional on family characteristics, the characteristics of the elderly individual and village-level

[11]Consider, for example, the potential income effect of a non-household migrant in the family who sends remittances to a non-migrant household.

[12]See Stoehr (2013) for a detailed discussion.

[13]A robustness check by the authors supports this expected pattern.

migration networks. The reasoning behind using network-growth interactions is that existing migrant networks are shared locally (e.g. at the village level) and act as catalysts for the spread of information about migration prospects, decrease the cost of migration and improve access to foreign labor markets. Hence, network access makes it more likely that individual members decide to migrate (Munshi, 2003). Additionally, if there is an economic boom or bust at a potential migration destination, information about changing prospects will reach networks members in particular, thus making them more likely to react than their peers outside of the network. For instrumental variables based on this reasoning, variation in destinations and migration intensity between network nodes (e.g. villages) is required. In our case, this is given because migration destinations of Moldovans cover destinations as diverse as the former Soviet Republics, most EU countries, Turkey, the Gulf States, Canada, the US and Israel and there is considerable variation between Moldovan villages regarding destination countries. The exclusion restriction is based on the assumption that GDP growth in destination countries is exogenous to the elderly and their families in Moldova and only affects elderly health through its effect on the likelihood of migration. Moreover, the local network a potential migrant faces at her place of origin has to be exogenous. Given the Moldovan context, this assumption is reasonable given that most of the elderly live at or very close to their place of birth. It is thus very unlikely that the elderly move to locations with particularly good migration networks. To create the network-growth-interaction instrument we calculate the number of migrants to each destination country relative to the total population at the village level from the 2004 census and interact it with the average destination country's GDP growth between 2004 and 2010. Hence,

$$\text{Network-Growth-Interaction}_i = \sum_{j=1}^{J} \left[\frac{\text{migrants } 2004_{i,j}}{\text{population } 2004_i} \frac{1}{T} \sum_{t=1}^{T} \left(\frac{\text{GDP}_{j,t+1} - \text{GDP}_{j,t}}{\text{GDP}_{j,t}} \right) \right],$$

where $t = 2004, \ldots, 2010$ are years, $j = 1, \ldots, J$ are all destination countries, and $i = 1, \ldots, I$ all sampled localities in Moldova. The Moldovan 2004 census is particularly well-suited to provide good estimates of migrant networks, because respondents were specifically asked for migrants who were on long spells abroad. As additional covariates, we control for the village-level migrant shares, that is the percentage of the population of a village that migrated to a particular location, in the first stage[14].

A second instrumental variable that is specifically aimed at picking up migration to former Soviet Union countries and especially Russia is the presence of military personnel in a locality before 1990. Silver (1974) discusses different hypotheses about Russification of non-Russophone ethnic groups in the Soviet Union. Higher exposure to Russian language and Russian culture because of the pursuit of higher education, a more urban place of residence, having served in the army and similar experiences are thought to have led to a higher likelihood of cultural assimilation. We argue the Russian presence before 1990[15] at the local level thus will have had a similar effect. While the military rank and file were largely kept on base and allowed little contact to the local population, Soviet officers, who were mostly ethnic Russian, lived in the vicinity of these bases in private accommodation and had considerable contact with locals. We expect this to have caused substantial Russification of local population that improved language skills but also led

[14]See below for details.

[15]Today, Russian troops only remain in the breakaway territory of Transnistria, which is not included in the sample.

to acculturation. Military personnel was based throughout the country because Moldova had an international border of the Soviet Union.

To assess whether our instruments are as good as random we tested for differences of characteristics of populations in localities (see Table 2). The comparison of averages of individual respondent characteristics for localities with a low and a high level of the network-growth-interaction IV (below and above the median value) and of localities with and without former Soviet military presence do not suggest any significant correlation between our instruments and the individual characteristics used in the present analysis. An exception is years of education, which is significantly (at the 5% level) lower in villages with high values on network growth interactions than in villages with below median values. The difference is, however, only 0.5 years, thus economically not very significant. Moreover, we control for years of education in our regressions. Towards the bottom of Table 2 there is another significant difference. All but one of 25 localities with military base before 1990 have a health center or hospital, whereas ten out of 86 villages that did not host soldiers before 1990 do not have one. The distance to health infrastructure does however not explain health effects as the variable is insignificant throughout the regressions reported below (detailed results available on request from the authors). Two-sided t-tests using the distance to other infrastructures[16] do not significantly differ at the 10 percent level for any of the other eleven infrastructure types. At the bottom of Table 2 we have added median night-light intensity corrected for population size and the growth rate of this median (cf. Henderson et al., 2012). In the sense that these may be a good proxy for GDP at a regional or local level, their similarity across villages suggests our instruments do not merely pick up local GDP differences.

We also plotted the geographical distribution of all villages for both the network-growth interaction (where we once more distinguished below and above median villages) and the military base instrument in Figure 1. The visual inspection of the distribution does not suggest any significant clustering. These results overall suggest that our instruments do not represent village specific characteristics that could potentially determine our dependent variables.

[Table 2 and Figure 1 about here]

Our IV approach thus estimates, at the level of the individual,

$$H_{ifv} = \alpha + \beta M_{ifv} + \gamma X_{ifv} + \delta F_{fv} + \theta V_v + \epsilon_{ifv}$$

where H_{ifv} is the outcome variable measuring health, M_{ifv} is the instrumented indicator for migration of any biological child of the elderly, X_{ifv} are individual characteristics such as age, gender, whether the spouse is alive, being a native Moldovan/Romanian speaker, and the years of education. In order to pick up the education level of an elderly household, we include the difference between the elderly person's and her spouse's years of education, censored at zero. This should control for uneducated individuals (mostly women), from pre-war cohorts who were disadvantaged in terms of education but married well-educated spouses. Other family characteristics are included in the vector F_{fv} which comprises the number of the elderly person's children, their mean age, their squares, and pooled (at the household level) old age pensions. V_v are village characteristics such as

[16]The full list of infrastructures covered by our community questionnaire comprises health center/clinic, hospital, pharmacy, pre-school, primary school, secondary school, market, public phone, internet connection, post office, bank/formal financial institution, money transfer operator, and security/police services.

urban status. In all but the baseline OLS estimations we include the migrant shares to Russia, Romania, Ukraine and Italy in 2004 at the village-level as controls for the network-growth-interaction instrument. We do this to control for potential effects that migration had already started picking up in 2004 and might have had some effect on the health of the elderly at this time[17]. Robust standard errors cluster at the village level. Clustering at the household level does not affect significance levels qualitatively and yields generally less conservative results than those reported below.

If instruments are weak, the standard test statistics used for inference may be unreliable and point estimates can be imprecise. Stock et al. (2002) propose critical values that can help estimate the relative size of the bias of IV estimates compared to the bias of uncorrected OLS estimates. When we analyze heterogeneity in the migration effect, the critical values suggest that the bias of IV estimates for some small subgroups in our sample such as men or specific age cohorts might be above 25 percent in certain cases. We follow Moreira (2003), Moreira (2009) and Mikusheva and Poi (2006a) by using the conditional likelihood ratio (CLR) test, which is valid under weak instruments, to ascertain whether the migration effect is significantly different from zero and positive or negative, where possible. We also calculate the CLR confidence region for the migration coefficient (Andrews et al., 2006; Mikusheva and Poi, 2006a). In contrast to standard confidence intervals for e.g. 2SLS, these confidence regions have correct coverage probability under weak IVs. These confidence regions will have one of three forms as Mikusheva and Poi (2006b) discuss. If the data contain sufficient information on the migration coefficient, the confidence region for the estimated coefficient will be a finite interval. Otherwise it can be a union of two intervals spanning $(-\infty, x_1), (x_2, +\infty)$, where $x_1 < x_2$ or a single interval $(-\infty, +\infty)$.

5 Results

5.1 Main Results

Table 3 reports the first stage results for the whole sample and separately by gender. Elderly persons' years of education are significantly correlated with their children's likelihood of migration, because it proxies the education of children and thus the education premium that can be reaped by migrating[18]. The children's mean age has a concave effect on their likelihood to migrate which is estimated to peak at 45 years (column 1).

[17]As discussed above, Romanian speaking individuals are more likely to migrate to Italy and native Russophones are more likely to migrate to Russia. Russia and Italy thus were the first important destinations migrants went to. The census we use to calculate village-level networks is from 2004. As in 2004 migration to Russia and Italy had already picked up (according to 2004 census estimates the migration rate was about 1/3 that in 2011) and may have had some effects (e.g. on health of the elderly back then) we control for these possible effects in the past. We do not control for other countries' migrant shares, because their importance was, and is, overall low. Russia, Italy, Romania and Ukraine cover 76 percent of the destinations of migrant children in 2011 while the remaining 24 percent are made up of 21 additional destination countries. In unreported regressions, we added the shares for other, less important destinations. The results remain qualitatively the same. As this would add several variables with statistically insignificant coefficients, we decided to only control for the biggest and oldest destinations.

[18]Women were traditionally far less likely than men to obtain education beyond primary school, which is why in particular for the oldest of the elderly women in the sample, who left school before the Sovietization of the education system that began in the late 1940s; there is little correlation between their and their children's years of education.

Elderly individuals who report that their native language is Moldovan are less likely to have migrants among their children than minorities who are often native Russophones or Ukrainian speaking. The number of adult children has a positive, concave influence on the likelihood of migration, where a second child is estimated to add about 11.5 percent and a third child about 9.5 percent to the likelihood of migration, ceteris paribus. In some cases we find differences in significance levels of covariates of migration when splitting the sample by gender (see columns 2 and 3). Closer inspection suggests that this may have to do with the maturity of migrant networks among women, who are significantly more likely to belong to older cohorts due to lower mortality. Elderly people who have higher pensions are less likely to have migrant children, indicating that migration is often a poverty reduction strategy in Moldova.

[Table 3 about here]

As expected, the network-growth-interaction instrument is highly significant and positively correlated with the likelihood of migration in the full sample. In the sub-sample of elderly men the military base instrument is insignificant but the coefficient is of similar size to that for women. Again, this may be a consequence of elderly men being less present among the oldest whose children use more mature networks to Russia rather than more recent ones to Western destinations. The Kleibergen-Paap test for underidentification suggests that the full sample and the female sub-sample are not underidentified (p-values of 0.009 and 0.007, respectively) but suggests marginally weak identification for elderly men (p=0.088).

Table 4 reports OLS and second stage IV results for the five health variables and nutritional diversity that cover the dimensions discussed above. The OLS results suggest mobility and nutritional diversity are better among the elderly with migrant children. Compared to the IV results, the lower OLS coefficient estimate is an expected consequence of self-selection into migration, as migrating is more common among the poor, whose elderly parents are on average less healthy. When correcting for self-selection, we find a positive effect of migration on subjective health that indicates that an elderly individual with migrant children rates her health on average one category better (e.g. "much better" instead of "better") on the underlying five-point scale than an elderly person without migrating children.

[Table 4 about here]

As reported in column 2 of Table 4 the MHI-5, which measures mental health, is not significantly negatively affected by migration. In qualitative interviews with a subset of households elderly interviewees mentioned the positive effect of seeing one's children prosper and the family leave poverty. Furthermore, some elderly provide care for grandchildren while their children are abroad or take over other forms of responsibility. Rather than being unwilling to help or feeling overwhelmed by increased responsibility, many elderly people reported being happy about being needed despite their old age. Such channels overall seem to make up for the potential decrease in personal social contact to their children due to migration.

Cognitive capacity (column 3) is generally not negatively affected by migration of a biological child either. The 95 percent CLR confidence region reported at the bottom suggests that any effect is likely to be either insignificantly different from zero or slightly negative, equivalent to an elderly person with a migrant child remembering about one word less than her peer without migrant children. The lack of a migration effect might again be explained by the fact that the decrease in social contact to one's own children is compensated for by increased contact to other members of the community, as we will discuss below.

We find a positive effect of migration on mobility. Elderly people with children who migrate are an estimated 0.27 points, or almost one standard deviation, more mobile on the underlying [0,1]-interval of the IADL indicator than elderly who do not have migrating children (column 4). Taking into consideration how the IADL index was constructed, this is, for example, also equivalent to the average elderly person stating that she is able to perform five out of the nine activities "easily" rather than "with difficulty". Mobility is generally higher among more educated elderly individuals and if more income is available.

The income channel may play a core role in explaining the positive self-reported health effects of migration that we find. The most frequently reported use of remittances by the elderly in this survey is food. In 76 percent of cases it ranks among the top three uses. Increased food expenditure could be expected to result in higher weight for the elderly if these were previously not able to afford enough calories. However, less than two percent of the elderly in our sample reported they could afford less than two meals per day. Additional funds are thus rather invested into increasing nutritional diversity by adding foods with positive income elasticities such as animal fats[19]. The point estimate of the migration effect on nutritional diversity (Table 4, column 6) suggests that migration causes an almost four point increase in the number of kinds of foods the elderly had eaten during the 24 hours before the interview. This suggests that the income effect of migration significantly improves elderly diets[20]. If higher nutritional diversity goes along with increasing calorie content of meals (e.g. more fatty foods) or simply eating more, this dietary change can explain the large and statistically significant increase in BMI found in column 5: having a migrant child leads to an increase of almost 5 BMI points in the average elderly person, which is equivalent to an increase in body-weight by 14 kg for an 1.70 m tall individual. In the literature there is much evidence that moderate overweight is a negative predictor of mortality in elderly people. If this link was causal and occurred as a consequence of higher metabolic, nutritional reserves or the absence of unobserved illness, the positive migration effect on BMI could be genuinely beneficial. However, increased mortality of individuals with high BMI at younger ages may mean that the elderly with high BMI who are still alive are positively selected. In this case, a higher BMI would not necessarily be an indicator of better health.

5.2 Heterogeneity

In Table 5 we split up the sample by gender and for the two[21] main age cohorts in order to understand which subgroups drive the migration (non-)effect that we find along different

[19]In our data, the three least frequently reported kinds of foods are meat/fish, dairy products, and eggs. Pension income is also strongly positively correlated with nutritional diversity.

[20]We do not use our IV approach with remittances as the main endogenous variable, because we suspect considerable underreporting of remittances, which would bias results. Please refer to the robustness section for short discussion and results using remittance levels.

[21]We do not report results for the cohort 80+, because given the small sample size of only 147 to 175 observations (depending on the dependent variable) and poor performance of IVs in the first stage for this subgroup we would like to discourage inference based on the corresponding estimates. All point estimates for the migration effect are qualitatively in line with those for other subgroups and insignificantly different from zero at the 10% level.

health dimensions.

[Table 5 about here]

The positive effect of migration on subjective health we find is driven by a positive and large effect in elderly women of 1.6 points on the five-point-scale as Table 4 shows. For elderly men the CLR confidence region is centered around zero. The point estimates of the migration effect for the 60-69 year old cohort is positive and significant at the 10 percent level and of similar magnitude as the one for the subsample of female elderly. Among the second age cohort, we cannot credibly infer a positive or negative sign of the migration effect. In terms of subjective health, thus women and the relatively less elderly benefit from their children's migration. Such gender differences in self-reported health measures are common. Benyamini et al. (2000) report that women's self-rated health in contrast to men's is affected by non-health factors, regardless of disease status. Furthermore, they find that men's self-reported health is associated with serious, life-threatening illness whereas among women there is also a significant association with mild disease and living conditions. If such reporting behavior also applied in Moldova, this could explain the gender-difference observed in elderly subjective health.

As for the whole sample, we find no systematic evidence for a migration effect on mental health and cognitive capacity when analyzing subgroups (column 2 and 3). Mobility is affected significantly positively for men; men with migrant children score on average 0.49 points higher on the [0,1]-scale (column 4). This is equivalent to stating for each of the nine listed activities that one can perform it "easily" rather than "with difficulty".

The effect of migration on nutritional diversity in column 6 is found to be positive for all subgroups. Note that the youngest cohort has a higher standard error than the group aged 70-79 despite the latter's smaller size. Hence, the former group has a higher internal heterogeneity in effects. One reason is that remittances are a less important source of income in the 60-69 year old cohort, whose members are often still economically active. While the point estimate for the migration effect on BMI is still approximately the same size as in Table 4, heterogeneity within subgroups is too large to conclude that either gender's BMIs are significantly positively affected by migration (column 5). The 95% CLR confidence regions for the effect of migration on BMI have a highly positive upper boundary and lower boundaries are in the negative domain for all but the 70-79 age group. The point estimate for this group should be interpreted cautiously due to relatively weak identification. Additional tests (results not shown) suggest that although nutritional improvements can be found for both groups, the health of married elderly people is more positively affected by migration of children than the health of widowed or unmarried elderly individuals.

Besides the effect of income on nutrition another likely transmission mechanism is a change in time allocation. In the interview we asked for the number of hours spent on child care, chores, work on the family farm or for the family business, salaried work, listening to the radio or watching TV, meeting friends, other leisure, and sleep, on a typical weekday. The typical interviewee spends about 3 hours on household work, 2.5 hours watching TV or listening to the radio, and 1.4 hours on meeting friends and other leisure and gets 7 hours sleep. Furthermore, the average elderly person spends about 40 minutes working on the family farm or for the family business, but this disguises that about 75 percent do not do any work there. The remaining 25 percent report an average of three hours spent farming or working for the family business.

The effect of children's migration on the time spent working on the farm or for the family business is negative according to the CLR test and 95 percent confidence regions in column 1 of Table 6. The point estimate suggests a reduction in farm work by 1.84 hours per day for elderly who have a migrant child. The estimated migration effect on farming is not significantly different from zero according to the 2SLS estimate because of the relatively small share of the elderly who still farm. The decrease is driven more systematically by men than by women and by the relatively less elderly.

[Table 6 about here]

There is however no significant difference in wage work outside of the household (column 2), which is still done by 11 percent of men and 7 percent of women[22]. The time saved is reallocated towards leisure and sleep. Leisure in column 3 includes two categories of rather active pastimes, seeing friends and "other hobbies"[23], in order to provide a contrast to time spent watching TV or listening to the radio which is included separately in column 4. Both activities included in column 3 are positively affected by migration, suggesting that the elderly increase social contacts to non-family members in their community when their children migrate. The most significantly positive effect that may have a beneficial impact on health is that elderly with migrating children increase sleep by about three hours per night(column 5; cf. the discussion in Moore et al., 2002). We find no difference in the time spent performing chores, which is expected in most situations because elderly women typically ran the household even if their children co-resided before migration. The decrease in farm work can contribute to the positive effect on BMI if elderly people stop calorie intensive activities such as farming and adopt more diverse diets. Decreased physical activity and more sleep can also be seen as an increase in health inputs which could explain improvements in subjective health.

Interestingly, although grandmothers are more often the primary caregiver of children if the mother migrates and families lived in a three generation household prior to the migration spell, we find no significant positive effect of family-level migration on the time spent on child care in column 7.

Migration thus seems to have a positive effect on some health dimensions by allowing dietary change and a change in time allocation. Note however that, with the current data, it is not possible to empirically establish income and time allocation as the channels through which migration affects elderly health. Figure 2, build analogous to the charts in Kosuke et al. (2011) underlines why: The chart at the top shows that with the complex structure of the migration effect that we suspect, the mediator M (remittances) has an influence on time use (mediator N). Kosuke et al. point out that such scenarios are problematic[24]. Even when assuming the absence of reverse causality from health to time use, we would need either a separate instrument affecting remittances and not time use (or the other way around) to estimate the respective mediator's contribution to the overall effect. Hence, estimating the contribution of remittances to the migration effect is not possible in this context. The same is true for the reallocation of time use. Nevertheless we think that our results provide convincing evidence in support of these transmission mechanisms.

[22] The official retirement ages are 62 for men and 57 for women (SSA, 2012). Excluding men under the age of 62 or 65 (as some elderly men carry on working), does not change results significantly.

[23] Both are also significantly positively affected by themselves.

[24] We suspect that because of underreported remittances, our paper faces a combination of scenarios "8a" and "8b" in Kosuke et al. (2011).

[Figure 2 about here]

Another transmission mechanism of an income effect could be the potentially positive effect on the health of the elderly if remittances eased liquidity constraints that might obstruct access to healthcare. Primary care and emergency treatment are free in Moldova irrespective of a pensioner's insurance status and contributions to the mandatory health insurance scheme are paid for by government funds for pensioners and individuals in households below the poverty line. The mandatory health insurance covers only certain treatments and only a limited number of pharmaceuticals. Other services and medicines have to be paid for out-of-pocket. In addition, informal side payments remain frequent at most stages of the health system, more often by the approximately 20 percent of the population that are uninsured ((Turcanu et al., 2012)). When asked about their use of remittances, in only 8.1 percent of cases covering medical bills for children or the elderly featured. This suggests that, despite most elderly being covered only by basic health insurance, liquidity constraints when accessing health care are not of general concern. Another test of this channel can be provided by analyzing health care utilization directly. In the interview, respondents were first asked about chronic illnesses they had been diagnosed with and subsequently whether they had sought treatment for these. Including the set of eleven chronic diseases in the first stage of the IV setup can correct for potential differences in the likelihood of children to migrate conditional on particular chronic diseases of their parents. If migration improved access to health care, we would expect a positive coefficient of the migration variable on the probability of seeking treatment for these health problems. The estimated coefficient is however small and insignificant (z-value: -0.25). Hence, providing funds to access health care does not seem to be a crucial transmission channel behind the positive health effects that we find.

5.3 Robustness Checks

Our estimates are robust to a number of robustness checks. Firstly, in the appendix, two additional tables (A1, A2) report results from estimations that use the number of children who migrated in 2011 or remittances adjusted for household size as the endogenous explanatory variable. The results are remarkably similar to those in Table 4 when using the number of children who migrate as instrument (A1). This specification serves as a robustness check for plausible cases in which higher network growth interactions induce households to send additional individuals. Table A2, with remittances as the explanatory variable, shows few significant results with the exception of a large and significant effect on nutritional diversity, which is indicative of the income effect discussed above[25]. In Table A3 we report the estimated effects of remittances on time allocation. The 2SLS estimates underscore the argument that an income effect is the likely reason for a decrease in work on the family farm and in the family business.[26] As expected, the Hansen J test rejects the hypothesis that there is no direct effect from our instrumental variables on health. If there was no such effect, there should be only the income channel and not the

[25]Note, however, that we suspect a high incidence of unreported remittances. This would bias our results towards zero and also cause problems with identification as observed, explaining why only nutritional diversity, the outcome that is arguably most directly linked with income, is significantly positively affected among the 2SLS estimates in Table A2. The CLR tests suggest that there are borderline significant effects on BMI and subjective health.

[26]For men the remittance equation is not identified in the time use set up. This is partly explained by their lower likelihood of receiving remittances compared to women, especially widows.

other mechanisms through which migration may affect health or time use that we have discussed above.

Secondly, Table A4 reports estimates when migration is measured at the household level. Note, however, that 70.2 percent of the elderly who have migrating children will be misclassified as not being subject to a migration effect because their migrant children are not household members. Hence, the significant Hansen J test provides evidence of direct effects of the instruments on health outcomes. While the estimated nutrition and BMI effects are still positive, the insignificance of effects on subjective health and IADL fit the reasoning that the negative effects (e.g. psychological, loss of help) will be more strongly felt the closer the contact to the migrant before migration was.

Thirdly, the network-growth interaction IV is used for placebo regressions attempting to predict migration in 1990 (p-values: 0.83 and 0.78 if estimating the first stage with and without military base IV, respectively). Results are robust to using different IV estimators.

Fourthly, as we estimate the effect of family-level migration in the year 2011 the migration of adult children should have an effect on health only via short-term determinants of health problems or by easing existing ailments. As expected, using an indicator variable that takes the value one if any of a list of eleven chronic diseases[27] have been diagnosed does not yield significant results for the migration effect. This is expected because suffering chronic illness probably depends more on genetic factors and long-term influences than on short-term migration effects. It also suggests that the likelihood of being diagnosed given an otherwise identical disease burden is not significantly affected by migration. Controlling for early childhood exposure to historic events such as the 1932-3 famine *(Holodomor)* and 1946-47 *Third Soviet Famine* does not alter our estimates. We also do not find any evidence of a negative health effect related to child care provided by elderly people to their grandchildren.

Measurement error and attenuation bias due to a limited sample size and due to weak IVs may affect our results. All three sources of error can be shown to bias the results towards either the OLS estimates, which are smaller than the reported IV results, or zero. When using a null hypothesis of no migration effect or negative (in the welfare sense) migration effect, our results may thus be incorrect in not rejecting the null (type II error), but are unlikely to suffer from type I errors. We thus can confidently state that the overall health effect of migration is not negative for elderly individuals and that some health markers seem to be positively affected.

5.4 Multiple Hypothesis Testing

In this paper, we analyze the effect of migration on several health outcomes as well as within subgroups and will thus briefly discuss the risk of false positives arising from testing multiple hypotheses. As for example Newson (2003), Anderson (2008), and Gibson et al. (2011) discuss, there are important trade-offs such as a severe loss in power between using different ways of correcting p-values for multiple hypothesis testing. The main two issues that can be targeted are the risk of making *any* type I error (the family-wise error rate, FWER) and the expected share of “false” rejections of the hypothesis H0: $\beta_{mig} = 0$ (the false discovery rate, FDR). If we treated the six indicators in Table 4 plus the insignificant chronic disease indicator reported in the text as independent of

[27] These are hypertension, diabetes, tuberculosis, asthma, other lung conditions, coronary heart disease, liver problems, disability after stroke, cancer, arthritis or rheumatism and uric acid.

each other and with true effect of zero, for α=0.1, the likelihood of finding at least one false positive would be 0.522[28]. The likelihood that, as in this paper, four or more out of seven indicators showed up significant by chance would however be a mere 0.00018. However our health indicators should not be considered uncorrelated. Tables A5 and A6 report results of corrections of critical values using some standard techniques from the literature that allow for correlation of tested indicators. The first table shows that with the very conservative Bonferroni correction[29] for an uncorrected $\alpha = 0.1$ only the effect on nutritional diversity should be considered significant. According to the less conservative FDR methods by Simes (1986) and Benjamini and Hochberg (1995), the four significant results can be trusted.
Analyzing multiple hypotheses across subgroups increases the risk of drawing false conclusions. The corrections of significance levels for the large number of 42 hypothesis tests (6 subgroups, 7 indicators) that is reported in Table A6 suggests that the effect on nutritional diversity for females can be trusted even if being very conservative. Across subgroups the corrections do however not account for the imbalance in terms of power, which is higher for the female subgroup.
It is crucial to note that even the most conservative correction of significance levels (i.e. applying Bonferroni p-values) does not suggest in any way that there are negative health effects. Rather, multiple testing adjustment highlights that results regarding particular indicators may be spurious. Hence, readers should be cautious taking strong action (e.g. policy-wise) on one particular dimension that is found significant, but can be assured that a positive health effect of migration is likely.

6 Conclusion

This paper is the first to find positive effects of international migration on elderly health after rigorously controlling for self-selection of their adult children into migration. We use a number of health dimensions to provide a detailed picture of the health effects of large scale labor migration from Moldova and argue that the income effect from remittances is the empirically most relevant transmission channel of migration on elderly health in our sample. We find that migration allows elderly people to eat a more diverse diet and to spend more time on leisure and sleep instead of working in subsistence farming. This corresponds with an increase in the weight of the elderly, which if not excessive is seen as a positive health indicator in the elderly in the literature. We find no systematic effect of migration on mental or cognitive health. We furthermore provide evidence that the migration effect does not depend on easing access to formal health services.

We analyze heterogeneity in migration effects to identify which groups benefit in particular. Our results highlight that improvements in subjective health seem to depend to some extent on maintaining a minimum of social contact as children migrate. We show that elderly people seem to substitute the loss in contact to their migrant children by increasing the time spent meeting friends. These results suggest that while contact to family or community is important, positive effects of migration such as the income effect

[28] $0.522 = 1 - F(6, 4, 0.1)$, where F is the binomial CDF.

[29] With a Bonferroni adjustment of the form α/m, where m is the number of hypotheses, thus for example $0.1/7 = 0.01667$, the above probability of four or more significant estimates in the absence of a true effect and uncorrelated errors would be approximately 0, but the likelihood of having not a single false positive would still just be 0.889.

can at least compensate the elderly. If the elderly are able to maintain social contact and benefit from remittances at the same time, health effects can in fact be positive.

In the most closely related paper up to date, Antman (2013b), uses a similar methodology but finds negative health effects of the migration of adult children on parental health. She applies sex and marriage ratios of the elderly's children as IVs with the motivation that male and unmarried children are more likely to migrate. Considering who qualifies as a complier in the instrumental variable setting in each study, the local average treatment effect of Antman (2013b) can be expected to differ substantially from the one calculated in our paper, which is potentially broader because it is location specific and thus not tied to a specific gender. For interpreting results another factor may however be even more crucial: Whereas Antman (2013b) provides evidence that the mental health channel is important and suggests that illegality and the related insecurity of migrant children could play an important role, in our study this channel is likely not to matter much. Migration from Moldova is mostly either legal or bears little risk and visiting parents for at least a few weeks every year is possible and very common. Negative effects on the mental well-being of elderly parents can hence be expected to be smaller. Furthermore, income levels in Mexico at the time covered by Antman's data were more than three times those in Moldova in 2011 (in PPP terms). Hence, positive effects of additional income should be relatively more important in our study. These differences between countries could also be useful for providing guidance to which effects should be expected in other origin country contexts.

In the case of Moldova, many of the elderly seem thus to be alone but healthwise better off as a consequence of their children's migration.

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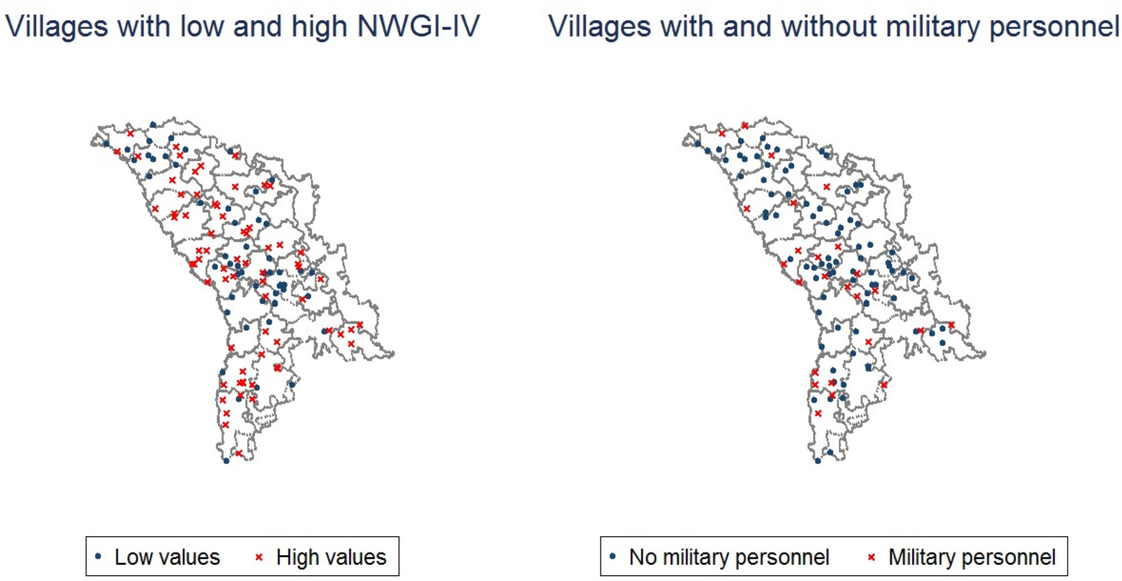
7 Appendix

Figure 1: *Sampling locations, network-growth-IV levels and military base distribution*



Notes: Authors' calculation based on households with elderly in CELB 2012. The panel to the left marks localities with below median values of the network-growth-interaction (NWGI) instrumental variable with a cross and villages with above median values with a dot. In the panel to the right villages without and with military personnel before 1990 are plotted as dots and crosses, respectively. Information on military personnel from the CELB community survey module. The un-sampled region to the East of Moldova is the breakaway territory of Transnistria where no sampling was possible for political reasons.

Figure 2: *Proposed causal relationships and evidence in the paper*

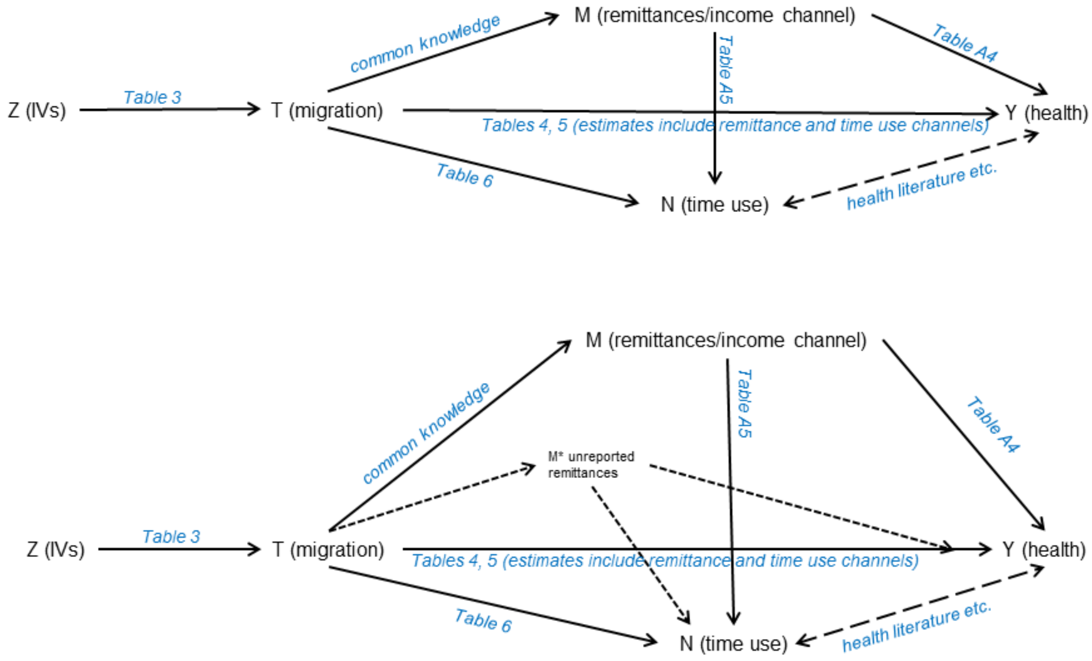


Table 1: *Summary Statistics*

	All	by gender		by age cohort			migrant in 2011	
		female	male	60-69	70-79	80+	no	yes
Individual characteristics of elderly person								
Age	69.33	69.98	68.35	63.57	73.85	83.70	69.57	68.95
60-69	0.54	0.49	0.60	1.00	0.00	0.00	0.52	0.55
70-79	0.37	0.40	0.32	0.00	1.00	0.00	0.37	0.35
80+	0.10	0.11	0.08	0.00	0.00	1.00	0.10	0.10
Female	0.60	1.00	0.00	0.55	0.65	0.69	0.61	0.58
Years of education	8.39	7.78	9.30	9.96	7.16	4.42	8.23	8.63
Spousal education difference	0.46	0.47	0.45	0.39	0.41	1.02	0.45	0.48
Native language Moldovan	0.79	0.78	0.81	0.79	0.80	0.76	0.82	0.75
Family characteristics								
Household-level old-age pensions	0.98	0.97	1.00	0.91	1.10	0.94	0.99	0.96
Urban	0.23	0.23	0.22	0.25	0.19	0.24	0.22	0.24
Number of children	2.69	2.70	2.68	2.56	2.80	3.01	2.43	3.09
Mean age of children	40.94	42.36	38.81	35.64	45.12	54.12	41.51	40.06
Household size	2.91	2.81	3.07	3.17	2.62	2.62	2.91	2.92
Child co-resides	0.43	0.44	0.41	0.47	0.37	0.39	0.43	0.42
Biological child migrated in 2011	0.39	0.38	0.41	0.40	0.38	0.38	0.00	1.00
Household has migrant member in 2011	0.14	0.14	0.15	0.17	0.11	0.13	0.04	0.30
Reports receiving remittances	0.13	0.13	0.12	0.15	0.09	0.10	0.04	0.26
Annual reported remittances in LCU	4144	4452	3679	5630	2557	1975	1388	8416
Health markers of elderly person								
Subjective Health	2.78	2.72	2.86	2.88	2.67	2.60	2.76	2.81
MHI-5	18.56	18.75	18.26	18.48	18.56	18.96	18.59	18.51
IADL	0.62	0.57	0.69	0.73	0.53	0.37	0.61	0.64
BMI	27.98	28.60	27.06	28.56	27.67	25.92	27.78	28.31
Nutritional Diversity	5.28	5.20	5.40	5.39	5.17	5.06	5.21	5.38
Cognitive Test score	3.67	3.62	3.74	4.18	3.25	2.41	3.59	3.78
Time allocation of elderly person								
Farm/Family Business	0.86	0.68	1.13	1.09	0.65	0.45	0.87	0.85
Wage Work	0.53	0.37	0.76	0.91	0.11	0.02	0.54	0.51
Friends/Hobbies	1.40	1.24	1.64	1.53	1.28	1.08	1.29	1.55
TV/Radio	2.50	2.36	2.69	2.61	2.42	2.19	2.45	2.57
Sleep	6.90	6.78	7.08	6.95	6.86	6.81	6.84	6.99
Chores	3.17	3.46	2.75	3.43	3.05	2.25	3.12	3.27
Child Care	1.19	1.33	0.99	1.52	0.92	0.40	1.08	1.36
Sample Size	1566	941	625	838	572	156	952	614

Notes: Authors' calculation based on the analytical sample for this paper in CELB 2012. These data exclude elderly people without children and individuals with missing information on either health outcomes, controls or instrumental variables.

Table 2: *Village characteristics by IV level*

	(1) all	(2) Low NWGI	(3) High NWGI	(4) No mil. base	(5) Military base
Biological child migrated in 2011	0.38	0.33**	0.42**	0.36*	0.43*
Household has migrant member in 2011	0.13	0.12	0.14	0.11**	0.20**
Subjective Health	2.78	2.78	2.79	2.79	2.78
MHI-5	18.51	18.53	18.48	18.48	18.59
Cognitive capacity	3.76	3.80	3.72	3.71	3.91
IADL	0.63	0.64	0.61	0.62	0.63
BMI	28.12	27.93	28.33	27.91	28.86
Nutritional diversity	5.26	5.32	5.21	5.25	5.32
Any chronic illness	0.91	0.91	0.92	0.91	0.92
Age	69.16	69.30	69.02	69.33	68.59
Cohort 60-69 (0/1)	0.55	0.54	0.56	0.53	0.59
Cohort 70-79 (0/1)	0.35	0.37	0.33	0.36	0.31
Cohort 80+ (0/1)	0.10	0.10	0.11	0.11	0.10
Female	0.61	0.60	0.62	0.60	0.64
Years of education	8.62	8.87**	8.37**	8.58	8.73
Education difference between spouses	0.41	0.43	0.39	0.42	0.38
Native language Moldovan	0.83	0.87	0.78	0.84	0.76
Household pensions in 1000 lei	0.96	0.96	0.96	0.96	0.95
Urban	0.28	0.25	0.31	0.26	0.36
Number of children	2.64	2.57	2.72	2.68	2.51
Age of children	40.75	41.13	40.37	40.96	40.05
Household size	2.88	2.96	2.78	2.90	2.80
Share of village population 50 or older in 2004	0.27	0.28	0.26	0.27	0.27
Lights median 2004/1000 vill pop	0.60	0.65	0.56	0.61	0.58
Lights median 2011/1000 vill pop	0.97	1.15	0.81	0.97	0.98
Annual Growth rate (median) 2004-12	0.05	0.07	0.04	0.05	0.06
Distance to closest health center/hospital†	0.78	0.09	1.49	1.01**	0.00**
Distance to closest pharmacy†	2.72	2.88	2.55	2.98	1.81
Distance to closest bank/money transfer agency†	0.46	0.38	0.54	0.47	0.42
Number of villages	111	56	55	86	25

Notes: Authors' calculations based on households with elderly in CELB 2012. NWGI stands for network-growth interaction. *, and ** indicate differences at the village at the 10 and 5 percent significance level using two-sided t-test with unequal variances between column 2 and 3, and 4 and 5., respectively. †: If infrastructure available in same locality, 0 km assumed.

Table 3: *First Stage: Determinants of children's migration in 2011*

	(1) all	(2) only male	(3) only female
Demographics			
Female	-0.0026		
	(0.022)		
Age	0.0067**	0.0043	0.0069*
	(0.003)	(0.005)	(0.003)
Education	0.0139***	0.0202***	0.0097*
	(0.005)	(0.006)	(0.005)
Spousal Educational Difference	0.0230***	0.0127	0.0269***
	(0.008)	(0.016)	(0.010)
Moldovan mother tongue	-0.0811**	-0.0544	-0.1023**
	(0.039)	(0.069)	(0.040)
Household			
Household pensions	-0.0440*	-0.0327	-0.0427
	(0.024)	(0.031)	(0.031)
No. Children	0.1429***	0.0968**	0.1707***
	(0.023)	(0.037)	(0.032)
(No. Children)^2	-0.0093***	-0.0053	-0.0118***
	(0.003)	(0.005)	(0.004)
Mean age of children	0.0121	0.0199*	0.0070
	(0.008)	(0.011)	(0.011)
(Mean age of children)^2	-0.0002**	-0.0003**	-0.0002
	(0.000)	(0.000)	(0.000)
Distance to closest health center	-0.0009	0.0013	-0.0025
or hospital (in km)	(0.003)	(0.002)	(0.004)
Urban	0.0442	-0.0620	0.1092***
	(0.036)	(0.056)	(0.038)
Migration			
Migrant share Italy	0.0020**	0.0025**	0.0018
	(0.001)	(0.001)	(0.001)
Migrant share Russia	-0.0018	-0.0028	-0.0005
	(0.002)	(0.003)	(0.002)
Migrant share Romania	-0.0148***	-0.0124**	-0.0155***
	(0.004)	(0.006)	(0.004)
Migrant share Ukraine	-0.0043***	-0.0044**	-0.0039**
	(0.001)	(0.002)	(0.001)
IV: Network Growth interaction	0.0012***	0.0011***	0.0012***
	(0.000)	(0.000)	(0.000)
IV: Military Base	0.0656**	0.0555	0.0718**
	(0.031)	(0.053)	(0.030)
Constant	-0.6539**	-0.6647*	-0.5619
	(0.254)	(0.356)	(0.345)
Observations	1,566	625	941
R-squared	0.121	0.099	0.151
F stat	17.13	6.293	19.76
Kleibergen-Paap weak IV rk F statistic	9.540	4.188	7.875
Kleibergen-Paap weak IV rk F test	0.009	0.088	0.007

Notes: Authors' calculation based on households with elderly in CELB 2012. Subjective Health used in 2nd stage (cf sample size). Results near identical for other dependent variables. Heteroskedasticity robust standard errors are clustered at the village level; *** p<0.01, ** p<0.05, * p<0.1;

Table 4: *The Effect of Migration (OLS and IV)*

		(1)	(2)	(3)	(4)	(5)	(6)
		Health Markers					
		Subjective Health	MHI-5	Cognitive Capacity	IADL	BMI	Nutritional diversity
OLS	Coeff	0.08	-0.07	0.11	0.03*	0.40	0.18*
	SE	0.05	0.12	0.09	0.01	0.32	0.09
IV	2SLS Coeff	1.02**	-1.17	-0.91	0.27**	4.99**	3.78***
	2SLS SE	0.48	1.24	0.87	0.13	2.51	1.05
	KP F	9.54	9.54	8.72	9.54	7.54	9.54
	HJ p	0.44	0.86	0.94	0.25	0.41	0.49
	95% CLR conf set	[0.28, 2.26]	[-3.62, 0.83]	[-0.41, 0.58]	[0.05, 0.64]	[0.08, 12.47]	[2.31, 6.96]
	CLR test p-value	0.01	0.24	0.76	0.02	0.05	0.00
Sample Size		1566	1566	1566	1566	1407	1566

Notes: Authors' calculation based on households with elderly in CELB 2012. Heteroskedasticity robust standard errors cluster at the village level; *** p<0.01, ** p<0.05, * p<0.1; Standard errors clustered at the village; Instruments are village-level interactions between emigrant stocks (2004) in destination countries and these destination countries' GDP per capita growth (2004-2010) and locality-level for stationing of military personnel before 1990. "KP F" denotes Kleibergen and Paap (2006) rk F statistic, "HJ" is p-value of the Hansen J statistic. H0 for CLR test ($\alpha = 0.05$): $\beta_{mig} = 0$. Column 3 (cognitive capacity) includes additional dummy controls for whether the memory test was explained clearly, whether the explanation was repeated and whether the test was interrupted. All estimations include the control variables listed in Table 3.

Table 5: *Heterogeneity of the migration effect*

		(1)	(2)	(3)	(4)	(5)	(6)
		Health Markers					
		Subjective Health	MHI-5	Cognitive Capacity	IADL	BMI	Nutritional diversity
Female only	2SLS Coeff	1.63**	-1.71	-0.85	0.18	4.88	3.42***
	2SLS SE	0.73	1.38	1.21	0.15	3.82	1.09
	N	941	941	937	941	847	941
	KP F	7.87	7.87	6.42	7.87	6.83	7.87
	HJ p	0.63	0.75	0.46	0.63	0.69	0.21
	95% CLR conf set	[0.64, 3.95]	[-5.58, 1.02]	[-4.06, 0.98]	[-0.13, 0.61]	[-2.45, 16.85]	[1.81, 9.09]
	CLR test p-value	0.00	0.20	0.31	0.23	0.18	0.00
Male only	2SLS Coeff	0.17	-0.58	-0.44	0.49**	4.74	4.22***
	2SLS SE	0.43	1.70	1.10	0.21	3.26	1.71
	N	625	625	620	625	560	625
	KP F	4.19	4.19	4.26	4.19	3.28	4.19
	HJ p	0.25	0.27	0.25	0.20	0.44	0.71
	95% CLR conf set	[-3.02, 3.66]	[-14.62, 4.96]	[-8.38, 2.96]	[0.11, 3.33]	[-3.65, 38.58]	[1.74, 16.68]
	CLR test p-value	0.82	0.69	0.63	0.01	0.21	0.00
60-69 cohort	2SLS Coeff	1.41*	-1.89	-0.74	0.36	4.29	4.39**
	2SLS SE	0.83	1.93	1.11	0.26	3.68	1.84
	N	838	838	834	838	757	838
	KP F	3.20	3.20	2.99	3.20	3.24	3.20
	HJ p	0.71	0.94	0.40	0.98	0.78	0.30
	95% CLR conf set	[0.15, 5.65]	[-9.8, 1.8]	[-8.5, 2.51]	[-0.03, 1.46]	[-4.66, 20.94]	[2.31, 20.35]
	CLR test p-value	0.03	0.27	0.51	0.07	0.29	0.00
70-79 cohort	2SLS Coeff	0.92	0.47	-0.96	0.22	9.48*	3.48***
	2SLS SE	0.58	1.23	1.21	0.15	5.05	1.38
	N	572	572	570	572	520	572
	KP F	6.08	6.08	6.97	6.08	3.85	6.08
	HJ p	0.88	0.91	0.95	0.18	0.15	0.71
	95% CLR conf set	[-0.29, 3.12]	[-2.81, 4.48]	[-4.4, 1.03]	[-0.17, 1.14]	[3.56, 41.61]	[1.4, 9.52]
	CLR test p-value	0.13	0.74	0.32	0.21	0.00	0.00

For notes, please refer to Table 4.

Table 6: *The effect of migration on the time allocation of the elderly*

		(1) Farm/ Fam. Busi.	(2) Wage Work	(3) Friends/ Hobbies	(4) TV/ Radio	(5) Sleep	(6) Chores	(7) Child Care
All	2SLS Coeff	-1.84	0.86	1.88**	1.44	3.10**	-0.76	-1.37*
	2SLS SE	1.15	1.12	0.87	1.04	1.48	1.15	0.80
	N	1560	1556	1561	1561	1562	1558	1510
	KP F	9.68	9.22	9.71	9.59	9.53	9.38	10.39
	HJ p	0.08	0.63	0.19	0.43	0.66	0.38	0.86
	95% CLR conf set	[-5.31, -0.54]	[-1.09, 3.22]	[0.67, 4.24]	[-0.06, 3.59]	[1.56, 5.97]	[-3.24, 1.22]	[-3.73, 0.42]
	CLR test p-value	0.01	0.38	0.00	0.06	0.00	0.43	0.14
Female only	2SLS Coeff	-1.49	1.34	1.90*	1.71	4.13***	0.21	-1.39
	2SLS SE	1.31	1.03	1.10	1.33	1.49	1.35	1.02
	N	937	935	937	937	938	936	905
	KP F	8.22	8.19	8.22	8.03	7.91	7.77	9.13
	HJ p	0.06	0.76	0.02	0.50	0.58	0.33	0.84
	95% CLR conf set	[-6.69, 0.2]	[-0.84, 4.61]	[0.71, 8.15]	[-0.28, 5.07]	[2.05, 9.41]	[-2.69, 3.05]	[-4.76, 0.93]
	CLR test p-value	0.07	0.22	0.01	0.09	0.00	0.86	0.24
Male only	2SLS Coeff	-2.61*	0.92	1.80*	1.28	1.36	-2.27	-1.35
	2SLS SE	1.50	1.90	1.01	1.07	1.98	1.76	0.94
	N	623	621	624	624	624	622	605
	KP F	4.13	3.61	4.20	4.20	4.20	4.07	4.09
	HJ p	0.49	0.28	0.50	0.46	0.89	0.70	0.80
	95% CLR conf set	[-16.28, 0.51]	[-7.4, 29.65]	[-0.75, 10.25]	[-1.79, 9.95]	[-1.6, 8.75]	[-15.67, 1.77]	[-11.62, 2.32]
	CLR test p-value	0.09	0.64	0.13	0.34	0.31	0.23	0.41
60-69 cohort	2SLS Coeff	-3.92*	2.09	2.64*	2.16	3.07**	-1.18	-2.15
	2SLS SE	2.06	2.88	1.60	1.53	1.34	1.77	1.52
	N	835	831	835	835	835	834	809
	KP F	3.24	2.83	3.24	3.24	3.24	3.16	3.24
	HJ p	0.42	0.58	0.95	0.41	0.31	0.24	0.85
	95% CLR conf set	[-17.56, -1.05]	[-2.77, 15.1]	[0.69, 9.62]	[-0.24, 9.85]	[1.19, 13.98]	[-19.8, 2.52]	[-11.63, 1.37]
	CLR test p-value	0.01	0.32	0.01	0.07	0.00	0.33	0.21
70-79 cohort	2SLS Coeff	-1.14	-0.08	2.02**	1.25	2.29	-0.92	-0.94
	2SLS SE	1.37	0.47	0.97	1.37	2.21	1.42	1.04
	N	571	571	572	571	571	571	550
	KP F	5.91	5.91	6.08	5.98	6.03	5.91	6.83
	HJ p	0.02	0.89	0.27	0.51	0.85	0.60	0.73
	95% CLR conf set	[-22.56, 1.04]	[-1.62, 1.31]	[0.06, 7.28]	[-1.18, 5.89]	[-0.37, 7.58]	[-5.51, 2.55]	[-4.59, 1.63]
	CLR test p-value	0.16	0.89	0.04	0.29	0.09	0.59	0.46

For notes, please refer to Table 4.

Table A1: *The Effect of Migration (Table 4) with the number of children who were migrants in 2011 as instrumented variable*

		(1)	(2)	(3)	(4)	(5)	(6)
		Health Markers					
		Subjective Health	MHI-5	Cognitive Capacity	IADL	BMI	Nutritional diversity
OLS	Coeff	0.061**	0.00	0.104**	0.013***	0.476**	0.117**
	SE	0.03	0.96	0.04	0.15	0.01	0.02
IV	2SLS Coeff	0.509**	-0.61	-0.47	0.131**	2.649*	1.923***
	2SLS SE	0.23	0.65	0.43	0.07	1.38	0.48
	KP F	12.32	12.32	12.61	12.32	12.93	12.32
	HJ p	0.37	0.90	0.98	0.18	0.45	0.36
	95% CLR conf set	[0.13, 1.1]	[-1.83, 0.41]	[-0.19, 0.3]	[0.02, 0.31]	[0.06, 6.26]	[1.21, 3.43]
	CLR test p-value	0.01	0.24	0.69	0.03	0.05	0.00
Sample Size		1566	1566	1566	1566	1407	1566

Notes: Authors' calculation based on households with elderly in CELB 2012. Heteroskedasticity robust standard errors are clustered at the village level; *** p<0.01, ** p<0.05, * p<0.1;Instruments are village-level interactions between emigrant stocks (2004) in destination countries and these destination countries' GDP per capita growth (2004-2010) and locality-level dummies for stationing of military personnel before 1990. "KP F" denotes Kleibergen and Paap (2006) rk F statistic, "HJ" is p-value of the Hansen J statistic. H0 for CLR test ($\alpha = 0.05$): $\beta_{mig} = 0$. Column 3 (cognitive capacity) includes additional dummy controls for whether the memory test was explained clearly, whether the explanation was repeated and whether the test was interrupted. All estimations include the control variables listed in Table 3.

Table A2: *The effect of remittances*† *on elderly health*

		(1)	(2)	(3)	(4)	(5)	(6)
		Health Markers					
		Subjective Health	MHI-5	Cognitive Capacity	IADL	BMI	Nutritional diversity
OLS	Coeff	0.01	0.02	0.00	0.005**	-0.01	0.029**
	SE	0.01	0.02	0.01	0.00	0.05	0.01
IV	2SLS Coeff	0.12	-0.24	-0.16	0.03	1.22	0.563**
	2SLS SE	0.12	0.30	0.22	0.03	0.75	0.28
	KP F	3.41	3.41	3.19	3.41	2.80	3.41
	HJ p	0.05	0.79	0.60	0.01	0.87	0.02
	95% CLR conf set	[-0.01, 0.99]	[-0.98, 0.2]	[-0.05, 0.22]	[-0.03, 0.29]	[0.06, 4.65]	[0.49, 4.64]
	CLR test p-value	0.06	0.27	0.27	0.19	0.04	0.00
Sample Size		1566	1566	1566	1566	1407	1566

Notes: †: Logarithm of (annual remittances+1 leu) per household member (OECD adult equivalent). For more notes, please refer to Table 4.

Table A3: *The effect of remittances*† *on the time allocation of the elderly*

		(1) Farm/ Fam. Busi.	(2) Wage Work	(3) Friends/ Hobbies	(4) TV/ Radio	(5) Sleep	(6) Chores	(7) Child Care
All	2SLS Coeff	-0.545*	0.09	0.20	0.34	0.47	-0.02	-0.25
	2SLS SE	0.31	0.21	0.22	0.22	0.29	0.24	0.23
	N	1560	1556	1561	1561	1562	1558	1510
	KP F	3.46	3.50	3.47	3.48	3.47	3.41	3.66
	HJ p	0.61	0.45	0.07	0.91	0.12	0.22	0.52
	95% CLR conf set	[-1.497, -0.209]	[-0.402, 0.658]	[0.018, 3.557]	[0.014, 0.984]	[0.291, 2.924]	[-0.582, 0.609]	[-0.915, 0.131]
	CLR test p-value	0.00	0.69	0.04	0.04	0.00	0.96	0.20
Female only	2SLS Coeff	-0.369*	0.19	0.01	0.26	0.379*	0.12	-0.18
	2SLS SE	0.20	0.16	0.15	0.17	0.20	0.17	0.17
	N	937	935	937	937	938	936	905
	KP F	5.55	5.57	5.55	5.57	5.58	5.53	5.92
	HJ p	0.51	0.70	0.02	0.75	0.05	0.61	0.51
	95% CLR conf set	[-0.961, -0.094]	[-0.133, 0.652]	$[-\infty, +\infty]$	[-0.021, 0.752]	[0.259, 2.294]	[-0.239, 0.584]	[-0.689, 0.156]
	CLR test p-value	0.01	0.24	0.73	0.07	0.00	0.47	0.28
Male only	2SLS Coeff	-0.83	0.52	0.57	0.38	0.54	-0.94	-0.49
	2SLS SE	0.61	0.61	0.51	0.43	0.76	0.84	0.52
	N	623	621	624	624	624	622	605
	KP F	1.27	1.49	1.29	1.29	1.29	1.26	1.18
	HJ p	0.49	0.43	0.49	0.42	0.95	0.96	0.75
	95% CLR conf set	$[-\infty, +\infty]$	$[-\infty, +\infty]$	$[-\infty, +\infty]$	$[-\infty, +\infty]$	$[-\infty, +\infty]$	$[-\infty, +\infty]$	$[-\infty, +\infty]$
	CLR test p-value	0.15	0.50	0.20	0.48	0.44	0.31	0.56

Notes: †: Logarithm of (annual remittances+1 leu) per household member (OECD adult equivalent). For additional notes, please refer to Table 4.

Table A4: *The effect of household-level migration*

		(1)	(2)	(3)	(4)	(5)	(6)
		Health Markers					
		Subjective Health	MHI-5	Cognitive Capacity	IADL	BMI	Nutritional diversity
OLS	Coeff	0.09	0.10	-0.05	0.06***	-0.06	0.18
	SE	0.07	0.19	0.13	0.02	0.52	0.14
IV	2SLS Coeff	0.53	-1.30	-0.99	0.10	7.53*	2.91**
	2SLS SE	0.79	1.92	1.33	0.17	4.20	1.44
	KP F	7.99	7.99	7.99	7.99	7.63	7.99
	HJ p	0.03	0.71	0.59	0.00	0.66	0.01
	95% CLR conf set	[-0.49, 2.06]	[-4.34, 1.3]	[-0.23, 0.97]	[-0.25, 0.51]	[0.36, 18.17]	[2.57, 10.52]
	CLR test p-value	0.25	0.32	0.25	0.50	0.04	0.00
Sample Size		1566	1566	1566	1566	1407	1566

Notes: Dummy for migration at the household level used as endogenous explanatory variable. Setup otherwise as in Table 4 with the addition of OECD equivalent of household members and number of adults in household as controls. For additional notes, please refer to Table 4.

Table A5: *Adjustment to multiple testing for significance levels of overall treatment effects*

Indicator	p-values	Critical values			
	uncorrected	uncorrected	Bonferroni One-Step	Holm Step-Down	Simes Step-Up
Nutritional diversity	0.000	0.100†	0.014†	0.014†	0.014†
Subjective health	0.032	0.100†	0.014	0.017	0.029†
IADL	0.044	0.100†	0.014	0.020	0.043†
BMI	0.047	0.100†	0.014	0.025	0.057†

This table reports uncorrected p-values and uncorrected as well as corrected corresponding critical values for the overall treatment effect of migration on health. $m = 7$ indicators included. Only combinations with uncorrected p-values below 0.1 listed. †: Indicates a rejection of H0 that no migration effect is present at the unadjusted critical value of 0.1 and the respective adjusted critical values in columns 2-4. $c_i^{Bonferroni} = c_i^{uncorrected}/m$. $c_i^{Holm} = c_i^{uncorrected}/(m-i+1)$. $c_i^{Simes} = \frac{i}{m} c_i^{uncorrected}$ is discussed in detail in Benjamini and Hochberg (1995). For discussion of the methods and software package that has been used, please see Newson (2003).

Table A6: *Adjustment to multiple testing within and across subgroups*

Indicator	Subgroup	p-values	Critical values			
		uncorrected	uncorrected	Bonferroni One-Step	Holm Step-Down	Simes Step-Up
Nutritional diversity	female	0.000	0.100†	0.002†	0.002†	0.002†
Nutritional diversity	70-80	0.010	0.100†	0.002	0.002	0.005†
Nutritional diversity	married	0.010	0.100†	0.002	0.003	0.007†
Nutritional diversity	married	0.010	0.100†	0.002	0.003	0.010†
IADL	married	0.010	0.100†	0.002	0.003	0.012†
Nutritional diversity	60-70	0.020	0.100†	0.002	0.003	0.014
BMI	male	0.020	0.100†	0.002	0.003	0.017
Subjective health	female	0.030	0.100†	0.002	0.003	0.019
Subjective health	widowed/unmarried	0.060	0.100†	0.002	0.003	0.021
IADL 70-80	widowed/unmarried	0.060	0.100†	0.002	0.003	0.024
Nutritional diversity	widowed/unmarried	0.060	0.100†	0.002	0.003	0.026
Subjective health	60-70	0.090	0.100†	0.002	0.003	0.029
BMI	widowed/unmarried	0.090	0.100†	0.002	0.003	0.031

This table reports uncorrected and corrected p-values for the subgroup analysis of migration on health. Only combinations with uncorrected p-values below 0.1 listed. Total of 42 hypotheses considered and corrected for (six subgroups and seven indicators). †: Indicates a rejection of H0 that no migration effect is present at the unadjusted p-value of 0.1 and the respective adjusted p-values in columns 2-4. $c_i^{Bonferroni} = c_i^{uncorrected}/m$. $c_i^{Holm} = c_i^{uncorrected}/(m-i+1)$. $c_i^{Simes} = \frac{i}{m} c_i^{uncorrected}$ is discussed in detail in Benjamini and Hochberg (1995). For discussion of the methods and software package that has been used, please see Newson (2003).