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by

Marcus Böhme, Ruth Persian, Tobias Stöhr

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Adult Child Migration and Health of Elderly Parents in Moldova

Marcus Böhme[1], Ruth Persian[2,3], Tobias Stöhr[1,†]

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 the body mass index (BMI), mobility and self-reported health. No effects are found on depression and cognitive capacity. We trace these positive outcomes to an income effect which leads to improvements in diet and a reallocation of time use from subsistence farming to leisure and sleep. These positive effects seem to compensate the elderly for decreasing social contact with their migrant family members.

Keywords: international migration, elderly health

JEL classification: F22, I12, I15, J14, O15

[1] Kiel Institute for the World Economy, [2] ODI Fellow/Ministère de la Santé Publique et de la Lutte contre le Sida, Bujumbura, Burundi [3] Collaboration originated from an internship at the Kiel Institute for the World Economy

[†] Corresponding author: Kiel Institute for the World Economy, Hindenburgufer 66, 24105 Kiel, Germany. *Phone:* +49 431 8814 367. *Email:* tobias.stoehr@ifw-kiel.de

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1 Introduction

Aging and health are not only an ever more publicly debated concern of policy-makers in developed countries but also a central issue in developing countries (e.g. Lloyd-Sherlock, 2000; Barrientos et al., 2003). The demographic trends in many countries such as decreasing fertility and falling mortality rates have increased the population share of elderly people drastically. 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 even reach 45 percent in 2050 (UN, 2011)[1]. 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 above the poverty line.

The task of achieving this aim thus mostly falls to families. Labor migration is one of the most promising ways for poor families in developing and emerging countries to leave 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 (e.g. Hildebrandt and McKenzie, 2005; Antman, 2012b; Gibson et al., 2011a,b). Research on the consequences for the well-being of elderly people is still scarce and somewhat inconclusive. Migration of working-age children of the elderly, however, 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 Indonesia (internal migration, Kuhn et al., 2011) and Mexico (international migration to the US, Antman, 2013). 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. This scarcity of 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 health dimensions 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

[1] Constant fertility scenario.

survey data from Moldova. Using an instrumental variable strategy, we show that elderly whose children have migrated internationally eat a more diverse diet, are more mobile, allowing them to lead more independent lives, and tend to judge their own health more positively, accordingly. We argue that health effects are heterogeneous across different subgroups of the elderly population and provide evidence that an increase in disposable income and a beneficial change in time-allocation are likely to be responsible for these results. These overcompensate the elderly for decreasing contact to family members and thus 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 are discussed in detail in Section 5 followed by a section on robustness before 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. (2011a) 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.

Based on the strong evidence of a positive income gradients in health production functions (e.g. Jensen and Richter, 2004; Brenes-Camacho, 2011) 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. The income effect of an increase in disposable income might induce them 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. however do not account 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 does not only differ by living arrangement but is also significantly higher in villages with higher migration rates. 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. We 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 (2012a) 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. As House et al. (1988) and Holt-Lunstad et al. (2010) discuss, the link between a lack of social relationship and increased mortality is long established. Decreased social contact may also influence other health outcomes negatively (e.g. for physical functioning see Unger et al., 1999). Research on social networks and cognitive health indicates that an active lifestyle and good integration into society might protect elderly people against deteriorating memory (Fratiglioni et al., 2004). Cornwell and Waite (2009) provide evidence that being socially disconnected may not necessary affect mental health of elderly people if they do not feel isolated. An effect of migration may thus for example arise if decreased social contact affects psychological or subjective health outcomes negatively.

Finally a spillover channel causing potentially negative health effects of migration also on non-migrant households is the large scale outflow of health workers from some source countries. A lack of health professionals could cause a severe deterioration in health services that are available to the population. Remaining health personnel has to shoulder the additional burden and potentially provide services outside their direct area of expertise (World Health Organization, 2003). Although there is some evidence that this so called 'medical brain drain' is problematic in many Sub-Saharan countries (e.g. Bhargava and Docquier, 2008; Bhargava et al., 2011), we know of no substantive academic analysis for Eastern Europe where the partial breakdown of the Socialist health systems meant that many health workers still face unemployment. To our knowledge negative consequences of migration on health infrastructure in Moldova are limited. Only about one percent of physicians trained in Moldova have emigrated between 1991 and 2004 (Bhargava et al., 2011), compared to well above 30 percent from some African countries such as Ghana, Malawi and South Africa or 12 percent from the UK. With approximately 2.7 physicians per 1000 inhabitants in 2004 the country furthermore has a comparable supply of health workers as developed countries (3 in the U.S., 2.1 in the U.K.). The picture is far more negative when it comes to eldercare, which does not exist on a sufficient scale (Lloyd-Sherlock, 2000; World Bank, 2007; Atun et al., 2008; Turcanu et al., 2012).

Evidence on the health effect of migration on elderly left behind

So far, there is only inconclusive evidence regarding even the sign of the overall effect of migration on elderly mental and physical health. For Tonga, Gibson et al. (2011a) 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 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 negative health outcomes. 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. On the other hand, 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. For Mexico, Antman (2013) finds that elderly parents with a child who has migrated to the US tend to have 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 contact to one's children may be important, this may be partly compensated by more frequent other forms of contact and a positive income effect.

3 Data and Descriptives

For our empirical analysis we use a unique household survey from Moldova. The 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. To obtain information on the different dimensions of life that are affected by migration, we designed specific questionnaire modules for both the household head and the elderly residents. The first module

captures detailed information about general household characteristics such as composition, education and income. It also records 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 1.

[Figure 1 about here]

Moldova is the poorest country in Europe. Its GDP per capita at purchasing power parity was 3,424 current USD in 2012, which places Moldova between India and Pakistan (World Bank, 2013). In 2011, the minimum monthly state pension was 641 MDL and 570.66 MDL for agricultural workers (50.64 and 48.08 USD at the time of writing SSA, 2012) which covers about 60 percent of the national poverty line of 1093.1 MDL and is close to the 591.2 MDL threshold that delimits extreme poverty according to the Moldovan Ministry of Economic Affairs. Although the percentage of the population who are poor according to this poverty line has decreased from 30.2 percent in 2006 to 17.5 percent in 2011, a quarter of all those aged 65 and older were poor in 2011 (MEC, 2012). The 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. Old age pensions correlate positively with human capital such as education, because they are based on average monthly earnings, years of coverage and the effective date of retirement (SSA, 2012). In our sample, the mean reported monthly old age pension for elderly recipients is 826.5 MDL (65.3 USD). Many elderly thus depend on monetary and in-kind contributions from their children for their livelihoods.

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. The main reason for this was military service (52 percent), followed by migration on the persons own initiative (18 percent) and temporary work programs (mostly harvesting and tilling, 16 percent). Since the Russian financial crisis in 1998, which had severe consequences for the Moldovan economy Moldova has become one of the countries with the highest migration rates worldwide. According to the World Bank (2011), 770 thousand out of a population of 3.6 million were migrants in 2010. The share among the working age population, who are most mobile, is 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 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 to the US, Canada and increasingly other booming regions such as the Gulf States.

Moldova is heavily dependent on remittances. The remittance to GDP ratio peaked at 31.2 percent in 2008 which was the third highest in the world and decreased to 22.8 percent in 2011 as many migrant workers lost their jobs, especially in crisis-ridden Southern Europe (World Bank, 2013). Out of the 221 elderly individuals who consider themselves to share a household with their migrant children, 61 percent report positive monetary remittances[2]. In these households, median remittances are about 2.12 times the median old age pension in our sample (USD 2.14/day). Among 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.

The elderly generation in Moldova has lived through turbulent times. An 80 year old in our sample (born 1931) experienced the 1932-3 famine, Stalin's purges, the Second World War, the 1946-47 famine, the breakdown of the Soviet Union, the short civil war in 1992 and poverty following the economic collapse of the 1990s. Such events make cohorts' biographies heterogeneous. For example, the mean years of education are 4.6 years for those aged 80 and above who should have received parts of their primary and secondary education during the Second World War, 7.2 years for those between 70 and 80 and 10.1 years for the elderly below the age of 70. Hence, in this paper we use a number of control variables to account for such heterogeneity and which also analyze the potential differences in migration effects between cohorts by analyzing sub-samples.

Low birth rates during the 1980s and the economic breakdown of the 1990s make Moldova today particularly vulnerable to the economic and social consequences of aging. Already today, its population is old compared to other countries at the same income level. In Moldova 100 working age people have to provide for 16 over-64 year olds, compared to 8 in India, 13 in South Korea, and 20 in the United States (World Bank, 2013). Much of the burden of care and financial support is borne by families. Still, as pensions are low and markets for elderly care practically non-existent, the elderly in Moldova are extremely vulnerable to poverty, in particular if they cannot rely on support from their children. 93 percent of elderly in our dataset have children, but contrary to other developing countries, only 39 percent co-reside with their offspring. Most migration from Moldova to European destinations is seasonal or circular. This is likely to have implications for the effect of migration on elderly health as contact between children and elderly parents can be maintained. When asked about the relationship to their children (if applicable), in 86.6 percent of cases elderly people report that they maintain a close or very close relationship with their children. Among the subgroup of elderly with migrating children this share is significantly lower at 84.0 percent. Elderly women are more likely to maintain close or very close contact with their children (88.1 percent) than their male

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

counterparts (84.3 percent). The distribution of contact follows a bimodal distribution. 12.3 percent of the elderly without migrant children and 20.6 percent of those with migrant children report to have zero days of contact to them in an average week. When only counting personal visits and excluding for example contact via the telephone, 33.5 and 54.5 percent of elderly people in non-migrant and migrant families have less than weekly contact to their children, respectively. On the other hand, 42.7 and 23.8 percent have contact every day, respectively. These are mostly elderly people who co-reside with their children. While there is thus significantly less frequent contact between elderly parents and their children in migrant families, elderly with migrant children have contact to friends on significantly more days a week (1.3 times compared to 1.6). The frequency of contact to friends is however strongly correlated with age and mobility. The extent to which social contacts outside of the family can alleviate the potentially negative effects of decreased contact with the family on health may thus decrease with age.

The elderly we will cover in the analysis below exclude the seven percent who do not have any children. The average age in the working subsample is 69.4 with 54.6 percent belonging to the cohort 60-69 years and only 10.9 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 2.88 and 2.92, respectively. This difference is not statistically significant. 75.2 percent of the elderly in our working sample live in rural areas.

Health markers

Since health is multidimensional and difficult to assess without intrusive methods, our survey captures a number of standard mental and physical health markers for all elderly household members. As mental and physical health are likely to interact (Ruo et al., 2003; McArdle et al., 2007), we will not only investigate the indicators of physical and mental health, but also subjective health status of the elderly left behind.

Subjective indicators generally involve some kind of comparison to a reference group and are influenced by both physical and mental well-being. They have been found to constitute an important predictor of mortality (e.g. Idler and Benyamini, 1997). The question regarding the subjective health indicator is specifically framed as a comparison to the health of people of the same age[3]. The options given were "Much better" (5 points), "Better", "Neither better nor worse", "Worse" and "Much worse" (1 point). This indicator is potentially affected by non-health factors as Dwyer and Mitchell (1999) discuss. Eriksson et al. (2001) show that the self-reported health indicator with links to age is explained by mental health, functional health as well physical health but socioeconomic factors (e.g. education) have little and lifestyle (e.g. social activities, smoking) only limited influence on scores. The subjective health indicator in our sample has a median of three and a mean of 2.75. For all respondents, the question was posed as the

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

first question regarding health to avoid effects such as potentially different reactions to being reminded of one's health problems as documented for example by Crossley and Kennedy (2002).

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[4] at the beginning of the survey. On average respondents remembered 3.6 words immediately after hearing them. 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.

To assess elderly respondent's 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[5], 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. Thus, these health markers can be used for placebo robustness checks. We will establish that recent migration is not significantly associated with the chronic disease burden of elderly people. If this was not the case, correction for selection into migration may have been unsuccessful (see Antman, 2013). 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). 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. While underweight indicates potentially poor nutrition and sickness, it is well recognized that 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) they may have rather high BMIs. Obesity is therefore a common problem in developing countries and often undernourishment and

[4]Hotel, River, Tree, Arm, Gold, Market, Paper, Child, King, Cup.

[5]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.

overweight coincide (Prentice, 2006). As individuals' income increases, nutrition may improve in quality as more expensive but also more healthy sources of calories are consumed and BMIs decrease or remain stable. Jolliffe (2011) by contrast shows that the BMI increased with higher income for individuals at the lower end of the income distribution in the - certainly not developing country - United States between 1971 and 2006. This quality-quantity trade-off means that the sign of the migration effect on BMI may be difficult to interpret. We therefore include an indicator of nutritional diversity. Nutritional diversity is not a health marker on its own right but serves as a clearly interpretable input into health production that is closely related to income. Positive investment into nutrition as a consequence of migration was for example found recently by Nguyen and Winters (2011) for Vietnam whereas Karamba et al. (2011) find no significant effects in Ghana. Neither of these papers however focuses on or even mention elderly people. 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. 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 if needed is important in the migration context. We therefore use the IADL which include 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. For each activity, respondents were asked whether they could conduct it "easily", "with difficulty" or were "unable". If an elderly person is 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.

Figure 2[6] plots three core indicators against age, broken down by gender (top) and migrant status of an elderly person's family. Elderly women on average report worse subjective health than men and for both genders these scores decline over age and approach each other. The differences in self-reported health over age are not significant

[6] All differences that are reported are significant at the 1 percent level.

once we control for education which is one of the main differences between different age groups observable characteristics. Elderly individuals with migrant children report higher scores, i.e. better subjective health. The difference compared to elderly individuals in non-migrant families becomes insignificant for individuals in their 80s. Women report chronic diseases in 90 percent of cases, significantly more than men (center panels). Such gender differences are common and widely discussed in the literature. They may in parts be due to difference perceptions of health problems (for example Arber and Ginn, 1993; Benyamini et al., 2000; Naumann Murtagh and Hubert, 2004). Among men the likelihood of chronic disease increases from a high base of about 85 percent at age 60 to the women's level above the age of 85. The difference in chronic disease between the elderly with and without migrant family members is small and statistically insignificant. The average standardized IADL mobility score is consistently higher for men than for women[7] and deteriorates almost linearly towards the age of 90. According to this metric, elderly with migrants are on average better off than elderly without any migrant children. Among the oldest the difference becomes statistically indistinguishable.

[Figure 2 about here]

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 it excludes the endogenous co-residence choice that is particularly influential for results if households (or families) are relatively small and that is difficult to control for. Furthermore, when focusing on the effect of household-level migration potentially important effects of family-level migration would be overlooked. Consider, for example, the potential income effect of a non-household migrant in the family who sends remittances to a non-migrant household. We therefore use a dummy variable that reflects whether at least one biological child of the elderly is a migrant. The underlying process is far simpler to model empirically compared to the number of migrants at the family level[8], 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 can reasonably be expected to 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

[7]This is in spite the fact that remarkably many elderly men are, probably because of traditional gender roles, unable to prepare a meal. One might thus expect that, ceteris paribus, healthy men on average score lower on the IADL than healthy women as the indicator accounts for this.

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

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 described 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 larger families' members' ability to specialize in either migration or in providing care. It may thus be plausible to expect an upward bias of estimates that do not account for selection into migration, which fades with family size[9].

To address the endogeneity of the migration decision, we employ an instrumental variables strategy and use network-growth interactions as exogenous source of variation in the likelihood of migration conditional on family characteristics, the characteristics of the elderly individual and village-level 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 the access to foreign labor markets. Hence, network access makes it more likely that individual members decide to migrate (Munshi, 2003; McKenzie and Rapoport, 2007; Grogger and Hanson, 2011; Beine et al., 2011). 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. To create the network-growth-interaction instrument we calculate the number of migrants to each destination country at the village level from the 2004 census and interact it with the average destination country's GDP growth between 2004 and 2010[10]. The Moldovan 2004 census is particularly well-suited to provide good estimates of migrant networks,

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

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

because respondents were specifically asked for migrants who were on long spells abroad. As additional covariates, we control for the village-level migrant shares in the first stage.

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, 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[11] 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 lead to acculturation. Figure 1 shows the distribution of military personnel in Moldova before 1990 according to our community-level questionnaires for which local officials were interviewed. Military personnel was based throughout the country because Moldova had an international border of the Soviet Union. To ensure that the presence of military personnel before 1990 does not have direct effects on health outcomes after controlling for migration and other covariates such as urban status, we tested whether existing infrastructure differs significantly with the presence of the military before 1990. Two-sided t-tests suggest that the distance to the closest locality with a particular infrastructure[12] does not significantly differ at the 10 percent level for any of thirteen infrastructure types with the exception of banks or other formal financial institutions. This difference turns insignificant once controlling for urban/rural status of each locality in a simple OLS regression on the distance to the closest bank on military bases.

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

$$H_{ifv} = \alpha + \beta M_f + \gamma X_i + \delta F_f + \theta V_v + \epsilon_{ifv}$$

where H_{ifv} is the outcome variable measuring health, M_f is the instrumented indicator for migration of any biological child of the elderly, X_i are individual characteristics such as age, gender, whether the spouse is alive, being native Moldovan/Romanian speaker, and the years of education. In order to pick up the education level of an elderly household well, we include the difference between the elderly'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_f which comprises the

[11] Today, Russian troops only remain in the breakaway territory of Transnistria.

[12] The list of infrastructures 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.

number of the elderly person's children, their mean age, their squares, and pooled old age pensions. V_v are village characteristics such as urban status. In all but the baseline OLS estimations we furthermore include the migrant shares to Russia, Romania, Ukraine and Italy in 2004 at the village-level as necessary controls for the network-growth-interaction. instrument[13]. Robust standard errors will be allowed to cluster at the locality level.

For policy-making in fields that are not well researched yet, knowing that particular effects are positive or negative for particular groups or policies can be tremendously helpful. For this, exact point estimates may be of lesser importance (Manski, 2013, p. 175). We therefore use some recent insights from the econometrics literature to make inference about signs of migration effects for subgroups in which IVs are weak and also have relatively small sample size (for a discussion of the two-fold problem see Stock et al., 2002). If instruments are weak, the standard test statistics used for inference may be unreliable. Furthermore, point estimates can be off target. 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. The critical values suggest that the bias of IV estimates for some small subgroups in our sample such as men or specific age cohorts is likely to be sometimes above 25 percent when we analyze heterogeneity in the migration effect. 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) implemented in STATA using a package provided by 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

Table 2 reports the first stage results for the whole sample and separately by gender. Fathers' 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.[14]. Likewise the education of elderly women's spouses

[13]Village-level migrant shares to other destinations could be included but are small and do not have significant influence on results. They are thus left out in order to save degrees of freedom.

[14]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

is positively correlated with the likelihood that their children are migrants. The mean age of children has a concave effect on their likelihood to migrate which is estimated to peak at 45 years (column 1), which fits anecdotal evidence very well. 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 and thus have easier access to the Russian or Ukrainian labor market. Also, they might have stronger networks to Russia. 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. Elderly living in urban areas are more likely to have a migrant child than elderly in rural areas. However, when the sample is split by gender, the coefficient on this variable is significant only for mothers. Closer inspection of the data 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. Elderly who have more pensions available are less likely to have migrant children, indicating that migration is often a poverty reduction strategy in Moldova.

[Table 2 about here]

The network-growth-interaction instrument is highly significant and positively correlated with the likelihood of migration in the full sample as expected. 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 rk test for underidentification suggests that the full sample and the female sub-sample are not underidentified (p-values of 0.0052 and 0.0076, respectively) but highlights marginally weak identification for elderly men (p=0.0582).

Table 3 reports OLS and second stage IV results for the six health variables that cover the dimensions discussed above. For self-reported health, we find a positive effect that indicates that an elderly individual with migrant children rates her health on average more than one category better (e.g. "better" instead of "neither better nor worse") on the underlying five-point scale than an elderly person without migrating children. This is already, but only to some extent, visible from the OLS results. The lower OLS coefficient estimate is an expected consequence of self-selection into migration, as this is more likely among the poor, whose elderly parents are on average less healthy. Subjective, self-reported health is a compound of perceived physical health in all its dimensions and psychological well-being.

[Table 3 about here]

The MHI-5, which measures mental health, is not significantly negatively affected by migration (column 2). Qualitative interviews with a subset of households provided additional evidence that many of the elderly are coping well mentally with the migration of their children. One important aspect mentioned by the elderly is the positive effect of seeing one's children prosper and the family leave poverty. Second, some elderly provide care for grandchildren while their children are abroad or take over other forms of responsibility. Often they will have done so before migration as well, for example while parents were at work. Rather than being unwilling to help or overwhelmed by increased responsibility, many elderly people reported being happy about feeling 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, hence canceling out overall negative influences.

Cognitive capacity (column 3) is not negatively affected by migration of a biological child in general 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. As expected, cognitive ability decreases with age. Per additional year of age 0.06 words were remembered less, ceteris paribus. The cognitive test score is strongly positively correlated with additional years of schooling and higher pension income. Elderly women are furthermore better at remembering items than elderly men. As for the depression score, the lack of a migration effect might 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. Mobility is important for being able to lead an independent life and therefore is strongly correlated with the subjective health indicator in our sample. Elderly people with children who migrate are an estimated 0.270 points, or almost one standard deviation, more mobile on the underlying [0,1]-interval than elderly who do not have migrating children. This difference is very large in relative terms; it is approximately the same effect expected from subtracting 15 years of age, ceteris paribus. 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. In Moldova however, the large majority of the elderly eat sufficient calories and less than two percent of the elderly in our sample reported they could afford less than two meals per day[15]. Additional funds are thus rather invested into increasing nutritional diversity by adding

[15]It is therefore not surprising that we also do not find significant effects on the likelihood of eating at least three meals (not shown).

foods with positive income elasticities such as animal fats[16]. The point estimate of the migration effect on nutritional diversity (column 6) suggests that migration causes to a three 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[17]. 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 increase in BMI found in column 5. The BMI decreases with age by an average of 0.12 points, but does not vary significantly with education or pension income. Depending on the pre-migration BMI, this effect can have positive, neutral or negative implications for elderly health. Below we point out a likely transmission channel in addition to changing diets and discuss the welfare implications of the effect of migration on BMI.

We split up the sample by gender and for the two[18] main age cohorts in Table 4 in order to understand which subgroups drive the migration (non-)effect that we find in different health dimensions. Gender differences could matter if migration had a heterogeneous impact on male and female elderly or if reporting behavior differed. Age differences could highlight if, for example, the frailer old were less beneficially affected by migration than the more independent, younger elderly.

[Table 4 about here]

The positive effect of migration on subjective health we find is driven by a positive effect on elderly women 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 and 70-79 year old cohorts are positive and significant at the 10 percent level. The CLR test suggests that in the latter group, the migration effect could well be zero. Among the oldest (80+) elderly, we cannot credibly infer a positive or negative sign of the migration effect given our data. In terms of subjective health in particular women and in particular the relatively young 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,

[16] 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

[17] We do not use our IV approach to instrument remittance levels directly, which not only probably suffer from underreporting, but are likely to be affected by a violation of the exclusion restriction under the given approach. This is because remittance levels would be likely to be directly influenced by our IVs if, for example, network-growth-interactions proxied better destination country labor market access for migrants from a particular village and hence lower migration cost or higher wages abroad.

[18] 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.

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. If, in the Moldovan context, elderly men take into account only severe health problems, whereas women's responses depend also on small health improvements and improvements in living conditions, this can explain the gender-difference observed in elderly subjective health.
As for the whole sample above, we find no systematic evidence for a migration effect on mental health when analyzing subgroups. The results in column 3 underline that there is furthermore no systematic effect of migration on cognitive capacity for either men or women or in different age cohorts.

The effect of migration on nutritional diversity in column 6 is found to be positive for both genders and in both age cohorts. 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 3 above, heterogeneity in subgroups is too large to conclude that either subgroup's BMIs are significantly positively affected by migration. Likewise, the coefficients on the migration dummy are not significant in any of the subgroups. The 95% CLR confidence regions for the effect on BMIs have a highly positive upper boundary and lower boundaries are in the negative domain. Mobility is affected significantly positively for men and the confidence regions for the 60-69 and 70-79 suggest that there may be a positive effect overall in both cohorts. In countries such as China (Zohoori, 2001) and Turkey (Bahat et al., 2012) the likelihood of an inability to perform any IADLs has been found to be negatively associated with BMIs. Such association could play a role here as well. Changing activity patterns furthermore may affect both BMIs and IADLs and will be discussed below.

In many cases elderly are not left completely on their own. Elderly individuals' ability to cope with the migration of their family members is likely to be crucial for the migration effect, for example by determining how the income effect of remittances affects health. The elderly, especially the younger among them, can often rely on their spouse or partner to share some of the burden of migration. We therefore investigate how living arrangements affect the effect of migration by splitting up the sample into elderly who are married or living with their partner and all other marital statuses (widowed, separated, never married, etc.). The effect of the discrepancy in life expectancy between genders for the predominance of living arrangements is striking. While only 23 percent of elderly men in our sample lived without spouse or partner during the interview, 60 percent of elderly women did. Among the latter, 93 percent were widows. For the positive effect of migration on BMI the living arrangement clearly matters as estimates analogous to those in Table 4 show (available upon request from the authors). While for the elderly who live without a partner, the estimated migration effect of 0.678

(SE: 4.29) and the estimated 95% CLR confidence region of $[-17.50, 24.21]$ suggest that the data are largely uninformative about any migration effect on the BMIs within this subgroup. The positive effect of migration on BMI is driven by elderly who live with their partner (95% confidence region: $[1.15, 21.21]$). Furthermore, the estimated effect of migration on nutritional diversity is positive and significant for both married and unmarried women and married men. The 95% confidence regions overlap, thus not informing about the relative size of effects. Only among the small group of elderly men who are not living with a partner (149 observations without all necessary information) the data are uninformative about the sign of the effect. Asked directly, a significantly overproportional 20.2 percent of men reported that they were not able to prepare a meal for themselves compared to only 8.5 percent of females, who are on average older and less mobile. Some widowed elderly men therefore struggle to prepare a healthy diet and may benefit less from migration in terms of nutrition. This may be one of the reasons why the informational content of the data regarding the BMI effect of migration differs by co-residency status.

In Table 5 we assess the role of help of children. The group identifier is a dummy that is coded one if the elderly respondent reports that during a typical week, her children provide help or care for at least one hour. In total, 50.9 percent of the elderly report receiving help from their children regularly and the number of hours received vary within this from occasional help to full-time informal care. Although the selection into help and no-help may partly depend on health status of the elderly (see Antman, 2013; Stoehr, 2013), it still can serve as a useful exercise. We chose the cut-off at zero hours of help, which can also be expected for many healthy elderly. The top panel of Table 5 suggests that migration improves self-reported health of the elderly significantly only among those elderly people who receive at least a little help from their children and are thus in physical contact with them. The income effect of migration however increases the nutritional diversity of both groups. The positive effects on IADLs and BMI are weak in the bottom panel as well. On closer inspection, the insignificance of the BMI effect in the bottom panel is again a consequence of the absence of a systematic migration effect for elderly men. These results suggest that the income effect of migration on subjective factors may partly depend on the preservation of some social contact. We will explore this further below. The results in the bottom panel have the important implication that even without regular contact to biological children we find no systematically decreased MHI-5.

[Table 5 about here]

5.1 Additional transmission mechanism

Besides the effect of income on nutrition another likely transmission mechanism is a change in time allocation. In the interview with the elderly 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 elderly in the sample 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 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 fourth of the elderly report an average of three hours spent farming or working for the family business. Estimating analogues of Table 6 with different time uses as dependent variables can shed some light on the consequences of migration. The effect 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. 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 can be found in both cohorts that we analyze as the CLR confidence tests show.

[Table 6 about here]

There is however no significant difference in wage work outside of the household (column 2), which is still done by a subgroup of 11 percent of men and 7 percent of women[19]. 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"[20], in order to provide a contrast to the rather passively spent time watching TV or listening to the radio which is included separately in column 4. Both activities are positively affected by migration. The most significantly positive effect that may have a beneficial impact on health is furthermore additional sleep (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 and increase in passive activities can contribute to the positive effect on BMI. If elderly people stop calorie intensive activities such as farming and adopt more diverse diets, the surplus calories will most likely affect their weight. The effect of this increase on overall health requires some discussion. According to standard categorization of BMIs (cf. Zezza et al., 2011) the majority of elderly in our sample are at least slightly overweight (median BMI for women 27.7, for men 26.6). High BMIs, especially those above 30, are generally linked to increased mortality in working-age adults Visscher et al. (2001). Controlling for age, education, physical activity and alcohol use, Stevens et al. (1998) find that among the 30-74 year old, additional weight is linked to higher risk of death from cardiovascular disease. They find that these relative risk increases however decrease the older people become. Over the past decade it was indeed found that moderate overweight is beneficial for elderly mortality, which is mostly taken as the ultimately important health

[19]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 work, does not change results significantly.

[20]Both are also significantly positive by themselves.

marker. Several studies even find that BMI is a negative predictor of mortality (Allison et al., 1997; Janssen et al., 2005; Weiss et al., 2008; Kulminski et al., 2008; Stessman et al., 2009; Berraho et al., 2010). Allison et al. (1997) observe that in the elderly BMI is convexly linked to the risk of mortality. For women, a BMI of 31.7 and for men a BMI of 28.8 are found to mark the minimum in mortality. Kulminski et al. (2008) and Berraho et al. (2010) find similar u-shapes with mortality minima among the overweight elderly. The latter two studies point out that mortality is highest among those with BMIs below 22 (about 10 percent of the elderly in our sample), which would indicate ideal weight among the working-age population. In the literature cited here we find two hypotheses regarding the origin of the inverse association between BMI and mortality in the elderly most convincing (cf. Weiss et al., 2008). They have very different conclusions. First, the positive effect on BMI may be genuinely beneficial if the link was causal and occurred as a consequence of higher metabolic or nutritional reserves. However, the 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, there would be no beneficial consequence of higher BMI. Negative consequences of high BMI such as diseases that typically break out in overweight individuals in the medium- or long-run such as diabetes may be of lesser concern in the elderly, given their limited additional life expectancy. This would suggest that the increase in BMI as a consequence of migration can be seen as either beneficial for overall health or rather unimportant in the short- and medium-run. Decreased activity (for a discussion on farming, see Pérès et al., 2012) may have negative consequences in the long run, but revealed preference for less farm work and more leisure are indicative of the short-run welfare effect of migration in our view.

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 effect of family-level migration on the time spent on child care in column 7. This result holds when excluding elderly who do not have any grandchildren (not shown). In total 35.2 percent of the elderly and 38.4 percent of elderly women report spending positive hours on childcare. The mean time spent per day on childcare decreases from 1.8 hours for 60 year olds to 0.4 hours for elderly in their 80s. Only 17.3 percent of the elderly report to have helped their adult children with childcare while these were abroad (if applicable: at least one grandchild, migrant families). 23.0 percent report to have helped their children with childcare while in Moldova (if applicable). Only 2.5 percent of the elderly live in so called gap-households (elderly with grandchildren but no middle generation), whereas 25.8 percent have middle generation household members whom they can share childcare with (among these less than a third have an migrant household member). It is thus not surprising that we do not find marked effects of migration on the time spent on childcare by the elderly, especially when it comes to family-level rather than household-level migration. However, in particular circumstances such as elderly co-residing with their adult children and their grandchildren, elderly often become the main caregiver. While gap household arrange-

ments during migration spells can be problematic both because of and for an elderly person's health if she is not physically and mentally fit for this task, these are also relatively uncommon compared to the standard living arrangements of the elderly.

Migration thus seems to affect some health dimensions positively through an income effect that allows dietary change and a change in time allocation. Another transmission mechanism of the income effect of migration 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 approximately 20 percent of the population who remain uninsured (Turcanu et al., 2012) are mostly self-employed agricultural workers and individuals who work in the urban informal sector, as these individuals would have to purchase their own insurance instead of being covered by payroll contributions. The mandatory health insurance covers only certain treatments and only a limited number of pharmaceuticals. Other services and medicines have to be paid for directly. In addition, informal side payments remain frequent at most stages of the health system, more often by the uninsured than the insured (ibid). The elderly are thus mostly covered by basic health insurance. When asked about their use of remittances, in only 13 out of 159 cases covering medical bills for children or the elderly featured. For comparison, food and payment of utility bills were mentioned by 121 and 95 out of 159 households. This suggests that 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. Outcome variables such as visiting a doctor are however problematic because they are based on either a pre-existing condition or caring enough about preventative care. In the interview, respondents were first asked about chronic illness they were diagnosed with and subsequently whether they sought treatment for these in the past. Including the set of eleven chronic diseases in the first stage of the IV setup seen above as controls can then correct for potential differences in the likelihood of children to migrate conditional on particular chronic diseases of their parents. The likelihood of treating each particular disease is also controlled for by including these dummy variables for each illness. If migration eased access to health care, we would expect a positive coefficient of the migration variable on the probability of seeking treatment of these health problems[21]. The estimated coefficient is however small and insignificant (z-value: -0.25). Ensuringly, also pension income is not significantly correlated with visiting a doctor in order to treat an existing chronic illness. On the other hand, women and the more educated are more likely to seek treatment. Hence, providing funds to access health care does not seem to be a crucial transmission channel behind the positive health effects that we find.

[21]The exact phrase is: "Did you seek treatment for any of these illnesses in the past?"

6 Robustness

The network-growth interaction IV can be used for placebo regressions. As these are based on the 2004 census and exogenous growth variation between 2004 and 2010 in order to predict migration status in 2011, they should not predict migration status before 2004. Estimating the first stage of the IV approach with a dummy variable for migration of family members before 1990, which was collected in the questionnaire, yields an insignificant effect of the network-growth interaction (p-values: 0.828 and 0.781 if estimating the first stage with and without military base IV, respectively). As we are using two instrumental variables which are based on different reasoning, network-growth-interaction and the military personnel instruments, we can calculate an overidentification test. The Hansen J statistic is reported throughout and does not allow us to reject the null hypothesis that both IVs are valid. Our findings regarding the migration effects remain qualitatively very similar and have similar levels of significance whether we use 2SLS, optimal GMM or LIML estimators for the instrumental variables regressions.

The estimated migration effects discussed so far are the result of instrumenting family-level migration in the year 2011. The migration of adult children should hence have an effect on health only via short-term determinants of health problems or by easing existing ailments. As a placebo robustness check we can hence evaluate whether chronic illnesses are affected by migration according to our estimates. Using an indicator variable that is one if any of a list of eleven chronic diseases[22] has been diagnosed does not yield evidence of a significant migration effect. This is expected because suffering chronic illness 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 and that adult children as a whole are not significantly discouraged migrate by parental poor health.

Historic events could have had a lasting effect on the health of our respondents. If our results were particularly driven by certain age cohorts, this could influence our findings on the effect of migration. Alderman et al. (2006) find that early childhood malnutrition can have lasting effects on health in adults. We included dummies for health shocks the elderly suffered during early childhood. The two most important food shortages of the recent 100 years are both considered man-made and occurred in 1932-3 ("Holodomor") and 1946-47 ("Third Soviet Famine", which particularly affected the Moldovan SSR). A dummy variable for elderly who were hit by these famines during the first three years of their lives (cf. Alderman et al., 2006) that we entered as an additional control variable does not show up significantly and does not alter the overall estimation results.

In Moldovan media reports, there are examples of elderly people who become alcoholics in the absence of their children. Descriptively, we indeed find that the elderly in

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

migrant families consume more beer at the 10 percent significance level, however not significantly more wine or liquor. In the IV approach, the amount of beer is not significantly higher among the elderly in migrant households and a positive change might mostly be due to an income effect. For liquor, the results are far from any suggestive direction. This leaves us to conclude that health behavior is not significantly worse in this respect among the elderly in migration households although there may be extreme cases if elderly are left behind to fend on their own, which is not the norm.

The stable and almost perfectly linear development of health markers in Figure 2, in particular for subjective health suggest that our estimates do not suffer from severe distortions due to selective survival of particularly healthy elderly. We furthermore conducted some tests of the effect of living conditions by including control variables such as access to piped water and a toilet facility in the same building. These are however potentially endogenous as earnings from migration are often invested in housing. We find that elderly without toilet facilities in their flat or house are significantly more likely to report poor subjective health. The estimated migration effects on different health dimensions however remain approximately as before. The differences associated with having a toilet may indeed have physical health reasons, but could also be a direct consequence of less dire living conditions that may affect subjective health as discussed above.

Our results also remain qualitatively similar if we use household level migration instead of migration of biological children as the endogenous variable. As discussed above, this is not the preferred approach, because co-residency of biological children with their parents involves an additional selection stage. The core result of better nutrition and no negative migration effects on the other health markers used in Tables 3 and 4 hold. This is not surprising, because assigning those elderly who have biological children abroad who are not considered household members to the non-migrant group will bias any significant migration effect towards zero.

In addition to the endogeneity of migration, another potential concern is measurement error in our health variables. Self-reported health status can be subject to considerable uncertainty of individuals about their own health (Crossley and Kennedy, 2002). In our outcome variables we tried to limit this by keeping recall bias (Das et al., 2012) small by not asking crucial variables with a retrospective character. The exceptions are the nutrition questions, which hence only inquire about the last 24 hours. Anthropometric measures such as the BMI in particular can be ridden with measurement error. We therefore asked interviewers to take measurements inside and ask people to take off heavy pieces of clothing such as coats that some elderly were also wearing inside their dwellings due to a lack of heating material. Adding controls for the time of the day, outside temperature and interviewer effects did not provide evidence of serious measurement error or omitted variable bias. High BMIs above 40 were discussed individually with interviewers within a few days of each interview during field work. This helped ensure that these are genuine observations. Following Kwok and Whitelaw (1991) we

instructed the interviewers to measure elderly people's arm spans in addition to weight and height. While elderly people's height often decreases over time (e.g. due to kryophosis), arm length is less prone to being affected by old age. Both arm length and height are highly correlated. We hence calculate an alternative BMI using arm length instead of height. Re-estimating the effect of migration on BMI in Tables 3 and 4 with the alternative BMI, we find that the positive migration effect is statistically significant at the 10 percent level in the sub-sample who co-reside with their partner. Modeling the relationship in other ways, e.g. using arm-length as an exogenous variable and weight as the dependent variable yields estimates that are significant at even higher significance levels. The BMI effect thus seems to be caused by genuinely higher weight, conditional on the height or arm length of the elderly.

In addition to potential measurement error, attenuation bias due to a limited sample size (Aydemir and Borjas, 2011) and due to weak IVs (Bound et al., 1995; Staiger and Stock, 1997) are likely to 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 IV results in our case as Table 3 shows and should be overall biased towards negative health effects as we have discussed, 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 in effect of migration is not negative for elderly individuals and that some health markers are positively affected.

7 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 dimension 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 data. 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, according to some recent literature that we discuss, is likely to have either positive or no short- and medium-term consequences for other health dimensions. 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 the heterogeneity in migration effects in detail to analyze 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 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 the family is important, positive effects of migration such as the income effect 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. Many of the elderly are thus alone but healthwise better off as a consequence of their children's migration. These results help understand the effects of migration on the elderly left behind in many poor and middle income countries.

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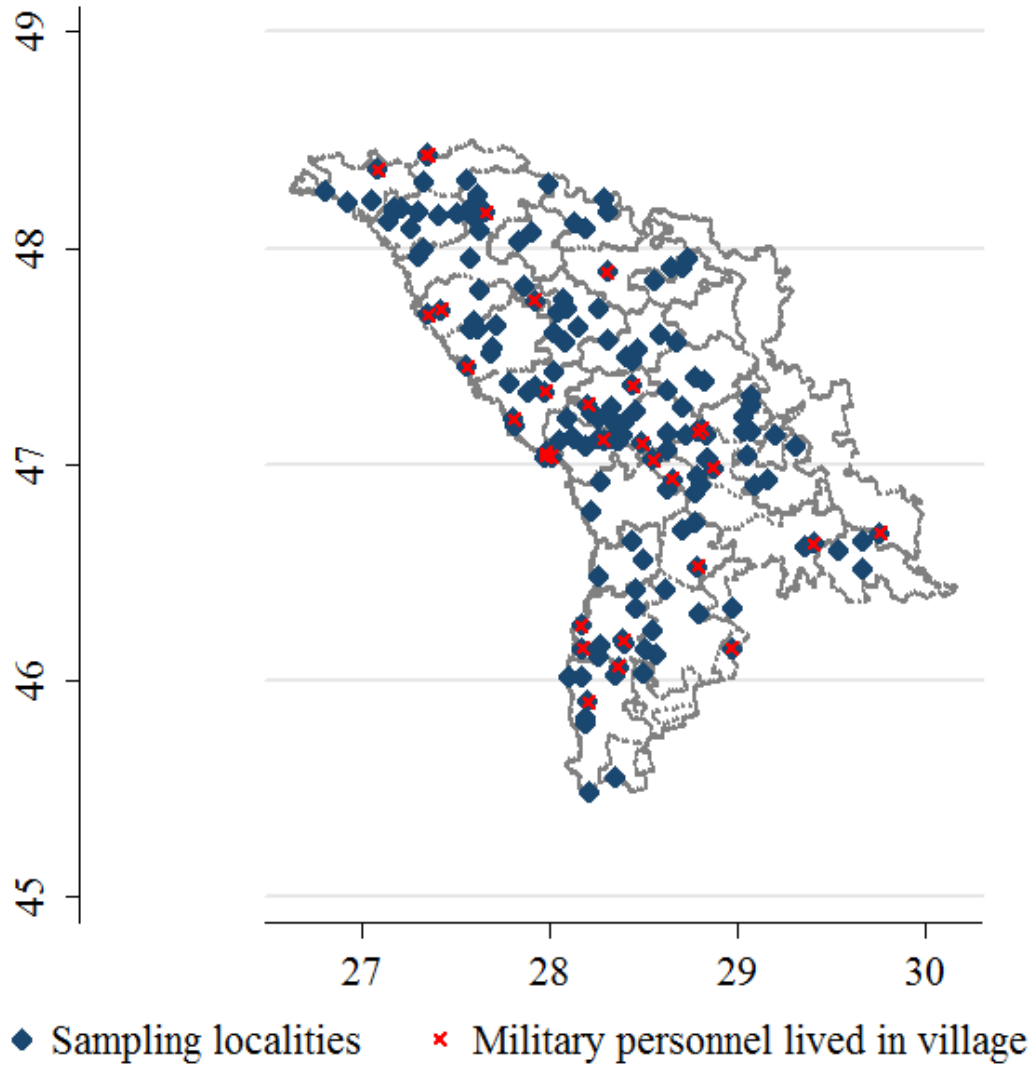
8 Appendix

Table 1: *Summary Statistics*

		by gender		by age cohort			migrant in 2011	
	All	female	male	60-69	70-79	80+	no	yes
Individual characteristics of elderly person								
Age	69.35	69.9	68.52	63.64	73.87	83.59	69.56	68.98
60-69	0.55	0.51	0.61	1	0	0	0.54	0.56
70-79	0.35	0.37	0.31	0	1	0	0.35	0.34
80+	0.11	0.12	0.09	0	0	1	0.11	0.1
Female	0.6	1	0	0.56	0.64	0.68	0.61	0.58
Years of education	8.49	7.87	9.41	10.11	7.2	4.43	8.41	8.61
Spousal education difference	0.45	0.47	0.43	0.4	0.4	0.91	0.46	0.44
Native language Moldovan	0.8	0.78	0.81	0.8	0.8	0.75	0.82	0.76
Receives help from children	0.5	0.53	0.46	0.47	0.53	0.6	0.55	0.43
Family characteristics								
Household-level old-age pensions	1.03	1.01	1.05	0.98	1.12	0.99	1.05	1
Urban	0.25	0.25	0.24	0.28	0.2	0.22	0.25	0.25
Number of children	2.65	2.67	2.62	2.52	2.76	3	2.39	3.1
Mean age of children	40.86	42.28	38.74	35.72	45	53.99	41.42	39.95
Household size	2.89	2.8	3.03	3.13	2.65	2.48	2.88	2.92
Child co-resides	0.42	0.43	0.4	0.46	0.37	0.37	0.42	0.42
Biological child migrated in 2011	0.37	0.36	0.38	0.38	0.36	0.35	0	1
Household has migrant member	0.13	0.13	0.14	0.16	0.11	0.12	0.04	0.29
Health markers of elderly person								
Subjective Health	2.75	2.69	2.84	2.85	2.67	2.55	2.72	2.8
MHI-5	18.54	18.71	18.27	18.46	18.55	18.92	18.56	18.5
IADL	0.62	0.57	0.69	0.73	0.52	0.33	0.6	0.64
BMI	27.92	28.57	26.94	28.5	27.64	25.71	27.74	28.21
Nutritional Diversity	5.22	5.14	5.33	5.33	5.1	5	5.17	5.29
Cognitive Test score	3.62	3.55	3.73	4.15	3.22	2.2	3.58	3.69
Any chronic disease	0.91	0.94	0.88	0.89	0.94	0.95	0.91	0.92
Hypertension	0.68	0.76	0.56	0.65	0.7	0.71	0.69	0.65
Diabetes	0.13	0.16	0.09	0.13	0.12	0.16	0.12	0.14
Coronary Heart Disease	0.43	0.49	0.35	0.4	0.47	0.48	0.45	0.4
Arthritis or Rheumatism	0.64	0.68	0.59	0.61	0.68	0.67	0.64	0.65
Sample Size	2045	1227	818	1116	706	223	1294	751

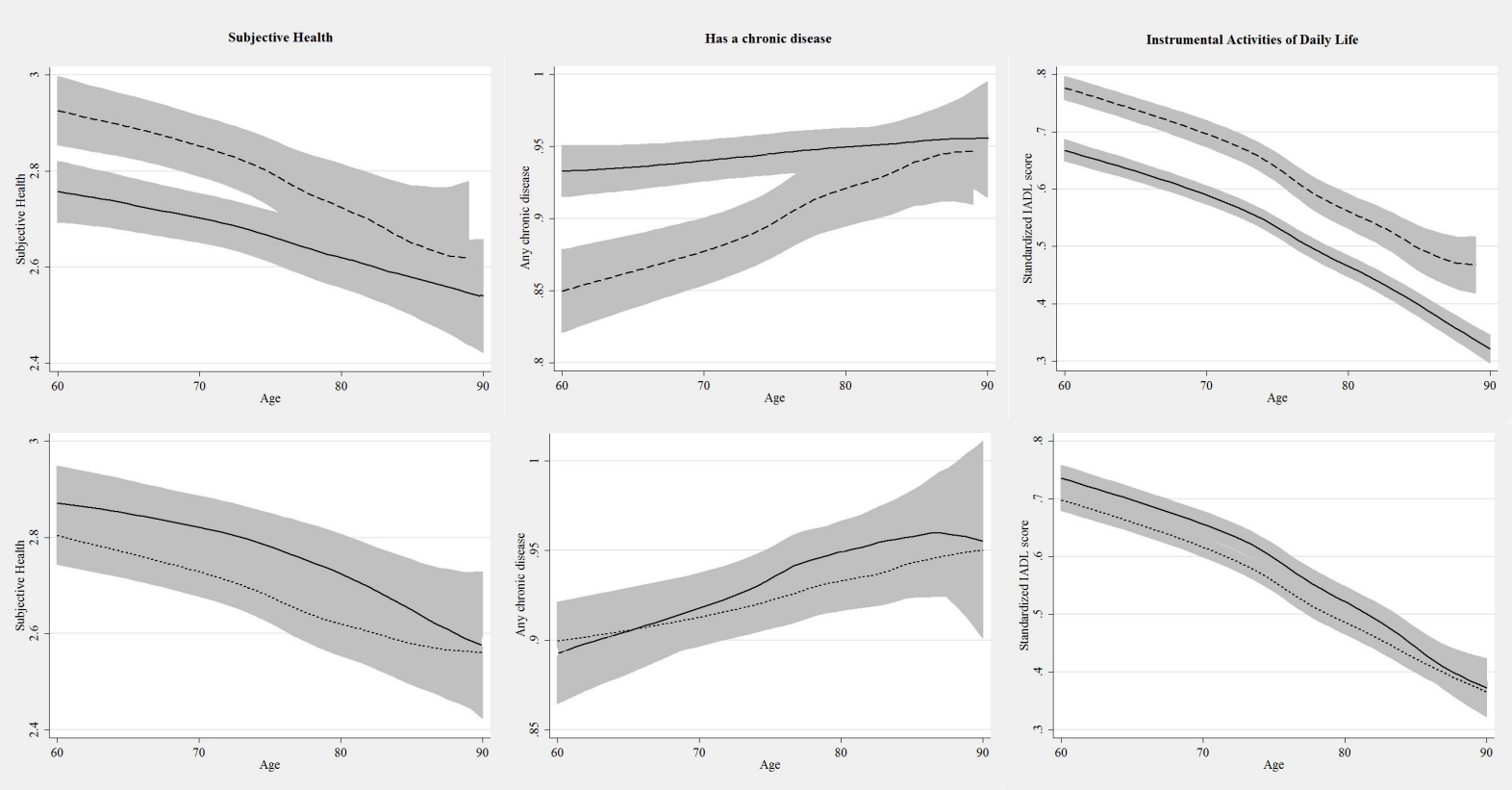
Notes: Authors calculation based on households with elderly in CELB 2012. These summary statistics are based on the working sample rather than the nationally representative sample of the elderly population, because these data exclude 153 elderly people without children.

Figure 1: *Sampling locations and military personnel distribution*



Notes: Authors calculation based on households with elderly in CELB 2012. 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: *Three health markers over age by gender (top) and migration (bottom)*



Legend: Dashed line indicates men. Dotted line indicates elderly without migrant children.

Notes: Authors calculation based on households with elderly in CELB 2012. Line and confidence intervals missing for 89 year olds, because of lack of observations. Subjective health not significantly correlated with age after controlling for other factors such as education.

Table 2: *First Stage: Explaining migration at the family-level in 2011*

	(1) all	(2) only male	(3) only female
Demographics			
Female	-0.0115		
	(0.021)		
Age	0.0078***	0.0060	0.0081**
	(0.003)	(0.005)	(0.003)
Education	0.0127***	0.0188***	0.0084
	(0.004)	(0.006)	(0.005)
Spousal Educational Difference	0.0227***	0.0130	0.0265***
	(0.008)	(0.015)	(0.009)
Moldovan mother tongue	-0.0781**	-0.0673	-0.0869**
	(0.038)	(0.068)	(0.038)
Household			
Household pensions	-0.0598**	-0.0607*	-0.0488
	(0.025)	(0.031)	(0.032)
Nr. Children	0.1454***	0.1104***	0.1691***
	(0.023)	(0.036)	(0.032)
(Nr. Children)^2	-0.0102***	-0.0067	-0.0126***
	(0.003)	(0.005)	(0.005)
Mean age of children	0.0139*	0.0199*	0.0107
	(0.007)	(0.010)	(0.011)
(Mean age of children)^2	-0.0003***	-0.0003**	-0.0002*
	(0.000)	(0.000)	(0.000)
Urban	0.0471	-0.0532	0.1108***
	(0.036)	(0.058)	(0.040)
Migration			
Migrant share Italy	0.0018**	0.0025**	0.0014
	(0.001)	(0.001)	(0.001)
Migrant share Russia	-0.0019	-0.0030	-0.0006
	(0.002)	(0.003)	(0.002)
Migrant share Romania	-0.0144***	-0.0093	-0.0167***
	(0.004)	(0.006)	(0.005)
Migrant share Ukraine	-0.0045***	-0.0043**	-0.0044***
	(0.001)	(0.002)	(0.001)
Network Growth interaction	0.0012***	0.0011***	0.0012***
	(0.000)	(0.000)	(0.000)
Military Base	0.0703**	0.0757	0.0659**
	(0.031)	(0.052)	(0.031)
Constant	-0.7181***	-0.7584**	-0.6772**
	(0.250)	(0.333)	(0.342)
Observations	1,645	658	987
R-squared	0.119	0.103	0.141
F stat	18.34	6.422	19.53
Kleibergen-Paap weak IV rk F statistic	10.7	4.25	8.72
Kleibergen-Paap weak IV rk F test	0.005	0.058	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. Robust standard errors in parentheses;*** p¡0.01, ** p¡0.05, * p¡0.1; Standard errors clustered at the village level.

Table 3: *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	0.097*	-0.091	0.143	0.030**	0.420	0.195*
	SE	0.049	0.121	0.087	0.014	0.308	0.086
IV	2SLS Coeff	0.990**	-1.153	-1.070	0.295**	4.456*	3.421***
	2SLS SE	0.429	1.228	0.944	0.142	2.445	0.912
	KP F	10.70	10.48	8.90	8.37	8.17	10.86
	HJ p	0.47	0.96	0.85	0.24	0.70	0.51
	95% CLR conf set	[0.29, 2.10]	[-3.44, 0.75]	[-0.37, 0.54]	[0.07, 0.71]	[-0.39, 11.13]	[2.06, 6.06]
	CLR test p-value	0.006	0.228	0.749	0.011	0.071	0.000
Sample Size		1645	1610	1653	1567	1477	1650

Notes: Authors calculation based on households with elderly in CELB 2012. Robust standard errors in parentheses; *** p¡0.01, ** p¡0.05, * p¡0.1; Standard errors clustered at the village level; 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. For additional controls see Table 2."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.

Table 4: *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	1.600**	-1.684	-0.965	0.193	4.687	3.026***
	2SLS SE	0.636	1.318	1.227	0.150	3.751	0.917
	N	987	965	984	954	887	990
	KP F	8.72	8.74	6.45	7.50	7.11	9.33
	HJ p	0.84	0.61	0.57	0.60	0.80	0.31
	95% CLR conf set	[0.64; 3.55]	[-5.23, 0.84]	[-4.05, 0.81]	[-0.11, 0.63]	[-2.37, 15.55]	[1.47, 6.98]
	CLR test p-value	0.001	0.175	0.260	0.191	0.181	0.000
Male only	2SLS Coeff	0.084	-0.758	-1.058	0.601**	3.943	4.133**
	2SLS SE	0.454	1.648	1.332	0.299	3.130	1.721
	N	658	645	656	613	590	660
	KP F	4.25	3.95	4.09	2.53	3.12	3.94
	HJ p	0.19	0.22	0.28	0.21	0.83	0.85
	95% CLR conf set	[-2.64, 2.40]	[-16.05, 4.30]	[-9.19, 1.17]	[0.20, 13.12]	[-4.75, 25.99]	[1.72, 14.42]
	CLR test p-value	0.930	0.589	0.250	0.007	0.294	0.000
60-69 cohort	2SLS Coeff	1.401*	-1.781	-1.199	0.360	4.555	4.075**
	2SLS SE	0.816	1.912	1.339	0.258	3.918	1.890
	N	871	861	871	834	788	875
	KP F	3.28	3.06	2.88	2.90	2.87	3.22
	HJ p	0.56 0.92	0.43	0.87	0.64	0.18	
	95% CLR conf set	[0.22, 5.48]	[-9.69, 1.98]	[-10.35, 1.30]	[-0.03, 1.48]	[-5.01, 24.26]	[2.32, 21.55]
	CLR test p-value	0.022	0.303	0.257	0.070	0.286	0.000
70-79 cohort	2SLS Coeff	0.855*	0.406	-1.142	0.315**	6.059	3.030**
	2SLS SE	0.505	1.213	1.223	0.147	4.365	1.242
	N	601	584	598	575	542	600
	KP F	6.40	6.34	7.16	5.15	3.68	6.36
	HJ p	0.99	0.89	0.86	0.28	0.09	0.57
	95% CLR conf set	[-0.34, 2.89]	[-2.78, 4.28]	[-4.64, 0.79]	[-0.06, 1.50]	[-0.61, 39.25]	[1.07, 8.68]
	CLR test p-value	0.148	0.770	0.238	0.089	0.067	0.002

For notes, please refer to Table 3.

Table 5: *The health effect of migration and receiving help*

		(1)	(2)	(3)	(4)	(5)	(6)
		Health Markers					
		Subjective Health	MHI-5	Cognitive Capacity	IADL	BMI	Nutritional diversity
Receive help	2SLS Coeff	1.225**	-2.047	-1.365	0.322*	7.107*	3.833***
	2SLS SE	0.585	1.770	1.527	0.190	4.185	1.296
	N	850	831	847	817	743	850
	KP F	5.19	5.37	4.44	4.64	3.80	5.55
	HJ p	0.46	0.84	0.75	0.39	0.66	0.52
	95% CLR conf set	[0.18, 3.71]	[-6.82, 0.82]	[-5.49, 0.65]	[-0.04, 1.22]	[-1.37, 28.71]	[1.91, 9.16]
	CLR test p-value	0.022	0.153	0.176	0.074	0.095	0.000
Receives no help	2SLS Coeff	0.642	-0.232	-1.270	0.228	3.748	2.941**
	2SLS SE	0.479	1.290	0.823	0.119	2.760	1.233
	N	795	779	793	750	734	800
	KP F	10.89	10.03	7.64	8.04	8.13	10.39
	HJ p	0.52	0.90	0.87	0.18	0.79	0.48
	95% CLR conf set	[-0.34, 2.06]	[-3.27, 2.67]	[-3.91, 0.41]	[-0.08, 0.87]	[-2.51, 12.26]	[1.31, 6.85]
	CLR test p-value	0.185	0.856	0.135	0.123	0.222	0.000

For notes, please refer to Table 3.

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	-1.776	0.966	1.765**	1.656	3.314**	-0.749	-1.049
	2SLS SE	1.313	1.054	0.794	1.034	1.370	1.090	0.757
	N	1644	1639	1644	1645	1645	1642	1592
	KP F	10.33	10.03	10.46	10.23	10.15	10.04	11.13
	HJ p	0.07	0.77	0.11	0.51	0.53	0.45	0.81
	95% CLR conf set	[-5.43, -0.63]	[-0.85, 3.15]	[0.66, 4.06]	[0.21, 3.73]	[1.83, 6.23]	[-3.00, 1.14]	[-3.17, 0.65]
	CLR test p-value	0.007	0.291	0.003	0.025	0.000	0.426	0.230
Female only	2SLS Coeff	-1.107	1.327	1.946**	1.874	4.615***	0.309	-1.016
	2SLS SE	1.364	0.974	0.983	1.333	1.355	1.277	0.919
	N	984	982	984	984	985	983	952
	KP F	8.79	8.72	8.79	8.61	8.51	8.35	9.63
	HJ p	0.04	0.61	0.02	0.56	0.72	0.22	0.76
	95% CLR conf set	[-6.18, 0.56]	[-0.68, 4.34]	[0.83, 7.25]	[-0.01, 4.98]	[2.51, 9.59]	[-2.34, 2.99]	[-3.99, 1.19]
	CLR test p-value	0.132	0.187	0.004	0.051	0.000	0.787	0.358
Male only	2SLS Coeff	-2.970	0.795	1.768**	1.544	1.016	-2.483	-1.059
	2SLS SE	1.920	1.785	1.019	1.182	1.879	1.811	0.951
	N	660	657	660	661	660	659	640
	KP F	3.81	3.49	3.98	3.89	3.85	3.76	3.92
	HJ p	0.46	0.35	0.78	0.56	0.55	0.86	0.93
	95% CLR conf set	[-16.69, -0.04]	[-5.43, 13.21]	[-0.64, 7.76]	[-1.24, 9.12]	[-2.23, 8.61]	[-13.74, 1.31]	[-8.51, 2.39]
	CLR test p-value	0.047	0.665	0.128	0.236	0.419	0.176	0.493
60-69 cohort	2SLS Coeff	-4.251*	2.253	2.606*	2.275	2.826**	-1.054	-1.455
	2SLS SE	2.325	2.751	1.559	1.556	1.332	1.823	1.433
	N	873	868	872	873	873	872	847
	KP F	3.18	2.94	3.28	3.18	3.18	3.09	3.23
	HJ p	0.41	0.69	0.69	0.54	0.17	0.20	0.46
	95% CLR conf set	[-17.75, -1.43]	[-2.17, 13.02]	[0.75, 9.42]	[-0.09, 9.00]	[1.12, 15.46]	[-18.01, 2.77]	[-10.27, 2.09]
	CLR test p-value	0.003	0.273	0.007	0.058	0.004	0.369	0.344
70-79 cohort	2SLS Coeff	-2.589	1.767	1.361	1.951*	3.773***	-0.643	-1.287
	2SLS SE	1.658	1.735	1.053	1.126	1.286	1.253	1.050
	N	1045	1040	1044	1046	1046	1043	1016
	KP F	6.58	6.24	6.72	6.53	6.38	6.32	6.49
	HJ p	0.28	0.71	0.24	0.69	0.27	0.37	0.54
	95% CLR conf set	[-7.95, -0.63]	[-1.20, 6.41]	[-0.24, 4.53]	[0.00, 5.28]	[2.02, 9.70]	[-4.46, 2.09]	[-5.29, 1.19]
	CLR test p-value	0.012	0.231	0.088	0.050	0.000	0.575	0.290

Notes: Authors calculation based on households with elderly in CELB 2012. Robust standard errors in parentheses; *** p¡0.01, ** p¡0.05, * p¡0.1; Standard errors clustered at the village level; 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. For additional controls see Table 2."KP F" denotes Kleibergen and Paap (2006) rk F statistic, "HJ" is p-value of the Hansen J statistic. H0 for CLR test ($\alpha = 0.05$): $\beta_{mig} = 0$.