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Abstract[1]

Infant mortality rates are considered by UNICEF as one of the basic indicators to determine the degree of progress a country has in the areas of social and economic development. In the last two decades, Albania went through a substantial reduction in infant mortality rates together with a widespread migration experience. In this paper we investigate whether migration has played any role in this decreasing trend of infant mortality rates in Albania by using the Albanian Demographic and Health Survey 2008-09 (ADHS). We find that migrant households have had lower rates of infant mortality than non-migrant households but only once the endogeneity of migration is tackled with country-specific instrumental variables.

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1. Introduction

Albania has more than twenty years of migration. These two decades were initially characterized by very impressive images of boat exodus, followed by a political and economic turmoil in 1997 when several fraudulent pyramid investment schemes collapsed. The fall of pyramid schemes brought to dramatic economic consequences to many families that lost their savings, houses and remittances and triggered in this way another wave of massive migration. Afterward, migration flows evolved at a slower step and continue to keep this trend even though the obstacles of border crossing are almost dismantled due to the conclusion of the visa liberalization process by the end of 2010.

Two decades of such particular and intensive migration are sufficient for establishing an empirical basis and building a solid research on the impact of migration on the development of the Albanian society across different socio-economic dimensions.[2] So far, researchers have shown an increased interest on the effects of migration on human capital investment and educational attainment of children belonging to migrant households or otherwise said children left behind.[3] However, no attention has been paid yet to child health status although in the history of development economics, health has been thought as a key factor. Such as a complete lack of empirical research on addressing the link between migration experience and child health outcomes is mainly due to the deficiency of specific datasets on child health status in Albania.

This scarcity of empirical research on the nexus migration-child health in Albania motivate this research. In particular, we address the impact of migration on child health status in Albania by considering child mortality indicators as a proxy of the degree of progress of a country in the social and economic development dimensions. Infant and child mortality rates are considered by UNICEF as one of the basic country indicators that help to determine its degree of progress in the areas of social and economic development. What is more, reducing child mortality rates is one of the Millennium Development Goals

2 King (2005) says that "Albania is a laboratory to study international migration".

3 See Gianelli & Mangiavacchi (2010) for a better understanding of the potential effects of migration on educational attainment of children left behind in Albania.

targeted by the United Nations Institutions.

According to different statistical sources, Albania had very high child and infant mortality rates in the early nineties compared to its Balkan neighbors. However, as reported by the Albanian Demographic and Health Survey 2008-2009 (ADHS), infant and under-five mortality have decreased over the period 1994-2008 respectively from 35 to 18 and from 39 to 22 deaths per 1000 births. Despite the gravity of these mortality statistics, in Albania, little is known on the factors behind it. Recently, the quality of demographic data has improved significantly; more specifically, the National Institute of Statistics and the Institute of Public Health have conducted the ADHS in 2008-2009. Such a survey presents a unique opportunity to assess the magnitude of migration in Albania together with the health outcome issues.

The declining trend of infant mortality rates may mask also an indirect effect of migration and remittances. The main issue that researchers face when estimating the impact of migration on a certain household or individual outcome is the endogeneity of migration, that is, migration's impact on child health outcomes may hide other effects – e.g. migrants may come from the healthy segments of population. Also natural disasters such as recurrent drought and floods or widespread violence and war conflicts may induce people to migrate but worsen their health status as well. These unobservable variables are often blamed for contaminating the estimated effects of migration on health outcomes by raising in this way an "endogeneity" issue. In this paper, we account for these potential identification problems by using two instrumental variable (IVs), constructed at regional level, which result to be statistically valid and allow to produce reliable estimates on the effects of migration on infant and mortality rates. The first instrumental variable (IV) measures the extent of pyramid scheme collapse shock in a certain administrative area and its use is rationalized by the network effect theory – that is – individuals of a certain neighborhood mimic others' behavior. The justification on the relevance of this IV is that the extent of the pyramid scheme shock in a certain area might be correlated with the migration decision an individual may take but not on the child health status at least in a short-run prospect. The second IV is related to the percentage of uninhabited dwelling in Albania constructed by region and rural/urban area. This percentage is shown to be significantly higher in areas characterized by a massive emigration which can be explained either by a drastic abandonment of existent dwelling or new dwelling constructed by emigrants. The widespread phenomenon of house-building by Albanian migrants in their home country in spite of not living anymore has been tackled by Dakaloglu (2010) who argues that it is not only a simple house-building but it ensures a constant link with home country or a "proxy" presence for migrants in their home community. Such an interpretation justifies the use of the degree of uninhabited houses as an IV for instrumenting migration phenomenon magnitude in a given region.

We use data extracted from the ADHS 2008-2009 to assess the impact of migration on infant mortality and find that migrant households have had lower infant mortality rates during the period 1991-2008 only once the endogeneity of migration is tackled with valid instrumental variables.

The paper is organized as follows: the second section deal with the literature review, the third and the fourth section describe child health statistics in Albania and the data used; in the fifth section the econometric model and instrumental variables approach are discussed together with the estimation results.

2. Literature review

In the literature pertinent to health dependence on remittances and migration status, various hypotheses on either deterioration or improvement of health outcomes of the non-migrating individuals prevail. In this spirit, child health is quite important for the well-being of households and determines long-term development of human capital. Starting from Grossman`s health production function (1972), remittances help to improve child health outcome by the means of purchases of childcare and nutrition, while migration phenomenon might affect child health first through the smaller amount of time spent by parents with their children and second through the health knowledge acquired abroad.

Kanaiaupuni and Donato (1999) find a negative effect of migration and remittances on health status of Mexican children and more specifically an increase in infant mortality which might be due to the disruptive effect of family separations. However this disruptive effect is observed only in the initial stage of the migration. As they argue, in the long-run, remittances bring significant reductions in infant mortality. Frank and Hummer (2002) also show positive effects on birth weights in the families experiencing out-migration versus those without migrants. Duryea et. al. (2005) use a cross-section of Mexican households and find that remittances have a positive effect on infant survival through improvements in living conditions (such as better housing) after controlling for a number of individual and community characteristics. Acosta et al. (2007) by using Multiple causes multiple indicators procedure analyze the development contribution of remittances to Latin America on a set of anthropometric measures such as weight-for-age and height-for-age for children aged 1 to 5, the probability that the delivery of the children has been assisted by a doctor and the probability that children aged 2 to 5 had been had been vaccinated. Their analyses show that children in recipient households enjoy a better health status than in non-recipient households across all these health indicators. As noticed, the above-mentioned studies focus only on Mexican data while child mortality or child health indicators remain a serious concern for African countries. In this aspect, Brockerhoff (1990) and Ssengonzi et. al. (2002) investigate the impact of female migration on child survival respectively in Senegal and Uganda and find that internal migration plays an important role in increasing child survival chances in these two African countries.

Although the pioneering role played in investigating the impact of migration on child health status, the literature mentioned above has ignored the critical issue of the endogeneity of migration. In fact, Hildebrandt and McKenzie (2005) make the first empirical effort to account for the endogeneity of migration in the health outcome equation by using the historical regional migration rates as instrumental variable and find reductions in infant mortality rates in Mexican families with members abroad. They also show that migration leads to less likely breastfed and vaccinated children but also higher level of health knowledge among mothers and argue that remittances somehow fail to capture the positive impact of migration to the child health as the latter may be strongly correlated with the mother health knowledge. Exploiting again Mexican data, Lopes-Cordova (2006) tackles the issue of migration' endogeneity by using as instrumental variable the interaction between historic migration rates to the United States and the distance to the American border and finds that migration and remittances area have a negative impact on infant mortality rate in Mexico. Also, by instrumenting the remittances with the number of Western Union offices, Anton (2010) finds that remittances have a positive effect on weight-for-height (short run) and weight-for-age (middle run) of children in Ecuador. Macours and Vakis (2010) instrument migration duration with the occurrence of various exogenous shocks in the household and show that once tackled the endogeneity issue, migration of mothers help to improve early cognitive development of children in Nicaragua.

In a recent strand of research, data from a migration lottery program in New Zealand are used to compare families of successful applicants (winners) with those who were not, and asses in this way the impact of migration on the families involved. Accordingly, while Gibson et al. (2011b) find a deterioration in diets and anthropometric indicators among Tongan children left behind, an improvement in health status is evidenced among children who migrate, Stillman et al. (2012). Although the importance of their methodological contribution, these experimental studies have produced insignificant results as regards children left behind mainly due to the fact that migrants are hardly their parents (the lottery rules favor family migration in case of married applicants). [4]

[4] See Antman 2012.

3. Child Health Statistics in Albania

According to the ADHS report, infant and under-five mortality have decreased over the period 1994-2008. More specifically, infant mortality rates for the periods 1994-1998, 1999-2003, and 2004-2008 are 35, 20 and 18, respectively, while the under-five mortality rates for these periods are 39, 22, and 22. This decrease in under-five mortality is mostly explained by the decrease in post-neonatal mortality (from 20 deaths per 1,000 births in 1994-1998 to 7 deaths per 1,000 births in 2004-2008) rather than the changes in neonatal mortality (15 and 11 deaths per 1,000, respectively). Despite such a noticeable reduction in child mortality rates, there is still work to be done before reaching by 2015 Child Health Targets set by the Albanian Ministry of Health, that is, reducing infant and child newborn mortality rates by 10 per thousand births.

In a Balkan context, Albania seems to perform worse in child mortality rates compared to its neighbors. The UN Population Division (2008) provides a under-five mortality ranking of the Balkan countries as follows: Albania (22), FYROM (19), Bosnia Herzegovina (17), Montenegro (13), Serbia (13), Bulgaria (16), Croatia (8), Greece (5) and an infant mortality ranking as: rates were estimated as follows: Albania (18), FYROM (17), Bosnia Herzegovina (14), Serbia(13), Bulgaria (13), Montenegro (12), Croatia (7) and Greece (4). Other national surveys show similar mortality rates. Similarly, the 2002 Albanian Reproductive Health Survey, show infant mortality rates estimated at 26 deaths per 1,000 births and under-five mortality at 32 deaths per 1,000 births for the ten-year period 1992-2002 while according to the 2005 Multiple Indicator Cluster Survey these estimates are estimated at 19% and 18% for a period around 2002 and at 29 deaths per 1,000 births and under-five mortality at 33 deaths per 1,000 births for a period around the beginning of 1996. Besides the surveys sources, we look into the administrative sources which show mortality estimates lower than the survey counterparts. Thus, INSTAT (Institute of Statistics) estimate infant mortality rates at 6 deaths per 1000 births in 2007 while the Ministry of Health estimate at 12 deaths per 1000 births. This may be due to the differences in the collection, elaboration and estimation of the above statistics. However, as Figure 1, (Appendix A) shows, a declining trend in child mortality rates seems to be confirmed by several sources in the last two decades.

4. Data description

This study is based on extracted data from the ADHS 2008-2009. The 2008-2009 ADHS is a nationally representative sample survey conducted during the period of October 2008 to April 2009 by the National Institute of Statistics (INSTAT) and the Institute of Public Health (IPH) under the technical assistance of ICF Macro and financial support of MEASURE DHS and UNICEF and provides information on population, demographic, and health characteristics in Albania. This survey gives detailed information and estimates on infant and child mortality, fertility and contraceptive use, maternal and child health on a selected sample composed of (15-49 years) reproductive age women. Furthermore, the survey provides estimates on migration behavior within selected households. The ADHS gives us an initial sample of 7584 individuals aged 15-49 out of 9000 households in 36 districts. This sample is selected in order to account for regional and rural/urban differences through a two-stage design. This sampling links it with the Living Standard Measurement Survey (2008) rendering in this way easier any recovery of information as regards regional variables, migration history and remittances or other variables from the LSMS. The 2008-09 ADHS makes possible to recover information on levels and trends in mortality among children under five.

Infant mortality is defined as the probability of dying before the first year of birth while child mortality as the probability of dying between the first and the fifth year of birth.[5] In the ADHS survey, a live birth is defined as "any birth, regardless of the pregnancy duration that, after separation from the mother, showed any sign of life, for example, breathing, heart beating, or movement of the voluntary muscles" according to

[5] Neonatal (probability of dying before the first months of birth) and post-neonatal (the difference between the neonatal and infant mortality probability) will not be analyzed here due to the limited number of observations.

WHO standard international definition (1993).[6] Child mortality statistics are often alleged to not be accurate. Their accuracy depend not only on the accurateness of reporting and recording the birth date or age at death but also on what is called the omission of births and deaths. Such omission might be accidental – women can forget about children births/deaths having occurred in the past 20-25 years – or intentional – women avoid to recall and report a tragic loss of child that occurred in the past. In the ADHS this omission somehow minimizes the risk of inaccurate report by focusing only on mortality reports for the 15-year period before the survey.

Given that the main goal of this study is to evaluate the potential impact of migration on child mortality rates, we limit our sample on the declared birth starting from 1990, the year that signed the first exodus mass or when migration phenomenon started to become important for the Albanian population. After dropping all missing values as regards birth records and selecting all households with children born starting from 1990, we are left with 9894 children born in 5172 households from which, 1109 households have migration experience (in other districts of Albania or abroad).Infant mortality rate in our selected sample is 31 per 1000 births and seems to be lower for migrant households than non-migrant households (29 per 100 births versus 32 per 100 births).

Table 1 (Appendix A) shows summary statistics for the whole sample of households having a child born since 1991 and then separately for household migration experience. These statistics say that migrant households compared to non-migrant households have not only a lower infant and mortality rate at average but also they are less likely to space births too close. Mother's Age at birth and education level seem to not

[6] Information as regards each live birth reported in the birth history was collected on the month and year of birth, sex, survival status, and current age at the time of the interview if the child was living, or age at death if the child had died while mortality rates for specific periods preceding the survey were calculated using direct estimation techniques. There are several methods that can be used for the direct calculation of infant and child mortality measures, including the period approach, true cohort approach, and synthetic cohort approach. DHS uses the synthetic cohort approach, which calculates mortality probabilities for small age segments, and then combines these component probabilities for the full age segment of interest.

vary across households while household size is higher in migrant households. As regards health infrastructure, migrant households are placed in regions with inferior infrastructure level although will less children died before the 90s. Finally, migrant households seem more likely to have been affected by pyramid scheme shock and live in areas with higher percentage of uninhabited dwellings.

5. Econometric model and results

To evaluate the impact of migration on infant mortality rates we estimate the following equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_2 M + \mu$$

where left-hand side variable Y refers to the infant mortality indicator and takes value 1 if the child has died before the first year of life or 0 otherwise; the variable M refers to the migration event and is a dummy variable that takes value 1 if any household member has migrated before the child was born and 0 otherwise.

In the right hand side of the equation we have included the following variables:

1) The vector X1 related to child-specific variables (whether the child is twin and his birth is placed with less than 24 months) and mother-specific variables (age, age squared, education level and a proxy of mother health status).
2) The vector X2 related to region-specific variables and health infrastructure (regional indicator delivery beds per 100000 and regional infant mortality rates in 1995 extracted from Statistical sources) and infant mortality rates before 1991 per PSU (calculated from the ADHS), to capture regional and macroeconomic factors that may affect child health status and regional dummies to account for regional disparities (rural/urban/town/mountain area)

Endogeneity of household migration experience variable is the main issue we have to tackle when estimating the above-mentioned equation. More specifically, such endogeneity can be due to the fact that either unobservable factors or external shocks may contaminate the real impact of migration on a certain outcome and explain the differences between migrant and non-migrant households. For example, people living close to air pollution hot spots may undergo a deterioration of their community health status and in the same time be induced to escape from it by migrating. Also, external and often unpredictable shocks such as infective diseases or crop failure due to climate changes might provoke both massive migration and deterioration of health status of those who remain.[7] To account for this endogeneity issue, the impact of migration on infant mortality is estimated by using instrumental variable methods such as standard two-stage least squares (2SLS) and fully observed mixed process modeling (CMP) proposed by Roodman (2009).

5.1 Selection of Instrumental Variables

The choice of the right instrumental variables (IVs) remains still an open issue in the migration literature and looks even more questionable in a "migratory" country where migration have a bearing on all socio-economic dimensions of development. The right IVs, as stated by McKenzie and Sasin (2007), should depend on the data availability and the outcome of interest. In this regard, migration literature has proposed several variables as IVs: for example, the historical migration networks (Hildebrandt & McKenzie), distance from the border and distance from the host country, natural shocks or fluctuation of exchange rates, Yang (2008), the number of money transfer operations across regions, Dorantes and Pozo (2006) and Hanson and Woodruff (2003), cultural affinities, language knowledge etc. In case of Albania, the fact that migration was strictly prohibited and penalized before the year 1990 renders pointless the use of historical migration networks. Secondly, almost 90% of Albanian migrants have as destination EU countries such as Italy

[7] See Angrist and Krueger (2001) for a detailed explanation of the validity of instrumental variables.

and Greece independently of any knowledge they had before nineties as regards Italian and Greek languages or the distance from their borders. Therefore, using the distance from the border and the knowledge of foreign languages as IVs may probably result reasonable in statistical terms (pass most possible endogeneity and overidentification test) but not justified under the Albanian context where one fourth of the population has migrated only in the last two decades and without migratory historic trends as its neighbors have.

That being said, in this paper we try to construct valid IVs upon country-specific data and socio-demographic features rather than to use the typical IV variables predominantly proposed by the migration researchers. Valid instruments should be related to the determinants of migration in these 20 years of Albanian migration. As shown in the Figure 2, Appendix A (the distribution of migrants by year of migration and by sex and by whether they migrated within or outside of Albania) three main peaks stand out in the graph of migration trend flows in the last 20 years.

The first peak of Albanian migration is related to the first massive exodus via sea towards Italy and land towards Greece in 1991. Although this migration episode should not be considered as the initial point of Albanian migration – the very first migrants were the ones who asked for asylum in several foreign embassies – it remains the very first event that made Albanian migrants notorious in the headlines of the Western media.

The second peak of Albanian migration coincides with the aftermath of the collapse of the pyramid schemes in 1998. The national epidemic of pyramid scheme took place in the period 1992-1997 and plunged the country into a chaos with very severe political and economic repercussions. These fraudulent schemes found fertile ground in the Albanian newly emerging economy due to both incapacity of Albanian financial institutions to regulate and attract the inflows of capital and both individual and state unawareness towards this type of fraud. The size of money poured into various pyramid schemes was estimated at $1 billion or put differently at 43% of the country's GDP. As a result, starting from March 1997, another peak of migration towards Italy and Greece happened largely on irregular basis.

The third peak of Albanian migration occurred at around 2000 and corresponds to the after Kosovo war which took place in 1999. During this war, the Albanian population of Kosovo were displaced and moved mainly to Albania. The Kosovo humanitarian crisis probably contributed to this new migration wave as many Albanian citizens moved abroad, especially towards the UK. After year 2000, migration flows have shown a steady decline.

Having in mind such migration trends, we can construct a set of valid instruments as possibly as similar to the Albanian specification.

1) <u>First Instrument</u>

The first instrument is related to the incidence of the pyramid shocks in the certain primary sampling unit where the household is located. Korovilas (1999) demonstrates that the rise and fall of pyramid investment schemes in 1996 was closely linked to the inflow of remittances and such schemes have also played a part in fuelling the rapid economic growth in the Albanian economy, before their collapse in 1997. Although similar schemes have appeared in other transition economies, the Albanian pyramid schemes case are quite unique due to the high number of people involved in them, and the dramatic consequences afterwards. They came as a result of a mixture of social economic transitory factors: a large share of accumulated savings due to increasing inflows of remittances (26% of remittances were saved) and inappropriate financial infrastructure and regulations (Jarvis, 1999). What Vickers and Pettifer (1997) claim as regards is that Albanian inexperience with fraudulent facet of free market capitalism was an aftermath of the economic and cultural isolation during the communism era. In effect, also massive migration phenomenon in the early nineties was an immediate consequence of this total and unique Albanian isolation. Other reasons may be behind of such collective irrationality but what Albanian themselves answered when asked why they invested in obviously unreasonable pyramid investment schemes was the "peer" pressure and the possible repentance of not taking part in these extremely prolific investment opportunities. Again, such a "peer" effect is found to be an important factor in explaining the establishment of Albanian migration networks in the destination countries.

Despite the drastic socio-economic consequences such pyramid investment schemes brought upon during the year 1997, the Albanian economy was quick on the recovery phase, a fact that Korovilas (1999) explains as a reversal of the causality from the collapse of pyramid schemes to the new waves of migration towards Greece and Italy. Or to put it simply, remittances fuelled the Albanian fraudulent pyramid schemes whose collapse on the other hand triggered the new migration exodus after 1997. For all these reasons, we believe that migration episodes inside the households are strongly correlated with the extent of pyramid shocks.

To construct this variable we extract data from the LSMS (2008) - the percentage of people declaring to have experienced a shock due to the collapse of pyramid scheme (1996-1997) in a given primary sampling unit (which links the ADHS with LSMS survey). The different set of households chosen in ALSMS 2008 and ADHS doesn't allow to construct this IV at household basis and therefore we are left only with the possibility of a regional variable.

2) Second Instrument

Large scale internal and international migration have been the main causes of depopulation of rural areas and a shrinking of the entire Albanian population as the preliminary results from last Albanian Census (2011) show. More specifically, it says that the entire Albanian population has shrunk by 7.7% in about ten years and only 46.3% of them live in the rural area. What it really makes headline is that "for the first time in the history of the population censuses in Albania, the population in urban areas is larger than the population in rural areas". Another finding of the 2011 Albanian Census is that the percentage of uninhabited dwellings has significantly increased in the last decade. Such a phenomenon is not new for the Albanian population after 1991 and can be explained by the abandonment of dwellings due to out-migration (internal or international) and substantial construction of new dwellings mainly due to remittances.

If we look at the percentage of uninhabited dwelling across prefectures in Albania (Figure 3, Appendix A), we notice that such a percentage is higher in the southern part of the country (Gjirokastra and Vlora) which has been in the same time affected by massive exodus to Greece. The phenomenon of house building by migrant even though they don't have plans to return is not odd in countries with intensive emigration. For example, neighboring countries of Albania such as Macedonia and Kosovo have been undergoing a house-building process even before 1990s. From an anthropological viewpoint, Dakaloglu (2010) examines the house built or refurbished by Albanian migrants in their home country in spite of not living anymore. By focusing on the process of constructing houses rather than merely on the material entity a house represents, he argues that this widespread phenomenon is not only a simple house-building but it ensures a constant link with home country or a "proxy" presence for migrants in their home community.

Based on Dakaloglu's interpretation, we use the degree of uninhabited dwellings as a proxy of migration phenomenon magnitude in a given region. For that, we extract from the Census 2011 report of preliminary results, the percentage of uninhabited dwelling by region and rural/urban area and construct the other regional IV to instrument the migration variable.

According to the IV wide theory, a valid instrumental variable should respect both relevance (correlation with the endogenous variable) and exogeneity (orthogonal to the error term in the child health outcome equation). While the former criterion can be tested through a first-stage regression of migration outcome on the instrumental variables and other exogenous variables, the latter needs to be well-grounded. The relevance of the instrumental variable, for example, the extent of pyramid schemes shock in a certain administrative area, should imply that a household living in a community with high incidence of being involved and affected by pyramid schemes shock is more likely to have had a migrant member than an identical household living in a community not affected by pyramid schemes shock. Also, a high percentage of uninhabited dwellings may merely signal a massive migration (abandon) of the area.

5.2 Impact of Migration on Fertility and Sex Composition

Dynamics of child health indicators is strongly linked with dynamics of fertility behavior, which in turn may depend on the consequences of migration experience households members go through. That is, migration may contribute to the reduction of child mortality rates through the so-called social remittances channel (health knowledge transmission) and the economic channel (remittances) but in the same time less children will be born just because of the family planning (contraceptive methods) practices migrant household members transfer home. It might be also that remittances sent by migrants help to release their families' budget constraint and reach their desired family size. Indeed, as ADHS report, not only child mortality rates have decreased but also fertility has fallen substantially in the past 20 years among all age groups. Therefore before evaluating for any potential differences that exist in child survival rates between migrant and non-migrant households, we assess the impact of migration on child conception and use the sample of all women aged 15 to 49 who have ever been married.

We consider two fertility proxy: 1) whether a woman aged 15-49 has given birth to a child after 1990 and 2) total number of children being born after 1990. The first variable measures the probability to have a child after 1990 and the second variable measures the number of children being born after 1990. The Table 2 in the Appendix shows the results of several specifications performed to assess the differences triggered by migration experience into the fertility decisions. The first two columns show the estimation results under a Probit and a two-step OLS specification when the dependent variable is the fertility dummy variable while the last two columns show the respective results when the dependent variable is the number of children being born after 1990.

All specifications show that being in a migrant household doesn't have a significant effect both on the likelihood of having a child and the number of children ever born to women after 1990. This result holds even when we instrument the migration with the instrumental variables described in the previous section although the endogeneity test (Durbin-Wu-Hausman test) doesn't reject the exogeneity of migration in the fertility equations. First-stage regression results reported in the Table 2, shows that only in the first two specifications the set of IV seem to be strongly correlated with the migration variable (F-test is higher than 10) while over-identification tests indicate that the instruments can be considered as exogenous. Other facts appear to be important from these estimations. For example mother age and education are both significant determinants to fertility decision and have the right sign. Also, the indicator of regional fertility rates seems to be important determinant for total number of children born rather than the likelihood of ever having a child while women in rural areas have both higher fertility likelihood and total number of children than women in urban areas.

Fertility decisions within a family do not only concern the family size; they may affect also the sex composition of the family. According to a recent report from the Council of Europe, 112 males were born for every 100 females in 2011 in Albania – a figure very distant from the average European rate of 106 to 100 but very similar to some Caucasian countries. Disparities in sex ratio may reflect a strong preference for boys as a result of social, economic and cultural factors which in turn may be related to migration itself. While the preference for male offspring has been traditional and cultural roots in Albania, the access to sex information technology and abortion practice is quite a recent phenomenon – in the early 90s - and coincides with migration.

Although the ADHS attempted to collect information on abortion and emergency contraception the collected information suffers of substantial under-reporting mainly because of social stigma attached to this phenomenon. For the three years preceding the survey, the ADHS results in 90 abortions per 1000 live births that is very different from the one reported by INSTAT of 272 abortions per 1000 in 2007. This under-reporting by about two-thirds which occurred also with the abortion data collected in the ARHS 2002 (CDC, IPH, and INSTAT, 2005) renders useless any further analysis of the abortion data from the ADHS. Since the data needed for sex selection investigation is not directly available in this Survey, we look at actual birth history within each family and examine the sex of the second or third child conditional upon the sex of the first child based on the assumption that sex selection should not be a common phenomenon for first births or may be considered as a random event.

Table 3 (Appendix B) shows the estimation results of a Probit regression and a two-step OLS regression where the probability that a higher-order birth is boy is explained by a set of socio-demographic variables. While in the first two columns, the total number of children per woman and the sex of the first child (girl=1 and boy=0) are used as explanatory variables in order to control for sex selection practices, in the last two columns the sex of the first child interacted with a dummy variable (that shows if the family has changed residence before the child is born) is used instead. The reason for using this interaction lies in the fact that most of the abortion take place in urban area rather than in rural area, especially in towns and in the capital area where the "new comers" stay between the past rural traditional households and the new urban reality without social contacts.[8] Mother education and age as well regional variables (regional fertility rates and living in rural area) are used as explanatory variables.

The results indicate that having a girl as a first child increases the likelihood of having a boy as the second or third child. The interaction between sex of the first child and event "change of residence" appears also to be significant implying that sex imbalance at birth is more likely among women who have changed residence before the child is born. Also, women with more children have lower chances to have a son which on the other hand may be explained as the strong preference for son push women to have more

[8] Although by law abortion is allowed up to the 12th week of pregnancy (insufficient period to have a diagnostic sex test), there are cases that gets permitted beyond this period by obtaining a medical justification from a doctor whose categories is one of the most corrupted in Albania.

children. As regards mother characteristics, only age seems to be significant for having a son while no significant relationship is found for education. Also, women living in areas with high fertility rate are more likely to produce sons while living in rural or urban area doesn't appear important.[9]

However, in this paper we have to investigate the impact of migration on sex composition rather than the phenomenon of sex composition per se. In its regards, we don't find any evidence that being in a migrant household is associated with a higher probability of having a higher-order son after 1990 even when migration is instrumented with the instrumental variables described in the previous section. The endogeneity test (Durbin-Wu-Hausman) doesn't reject the exogeneity of migration although first-stage regression results shows that the selected IVs are highly correlated with the migration variable (F-test is higher than 10) and over-identification test doesn't reject the exogeneity of IVs.

Considering these estimation results, we can say that women living in migrant and non-migrant households share similar fertility behavior and sex birth ratio and therefore we can focus now on only on health indicators of children being born after 1990.

5.3 Impact of Migration on Infant Mortality

After having controlled for the causal effect of migration on fertility behavior, we proceed with the assessment of migration impact on infant and child mortality rates. Table 3 presents the estimates of the migration impact on the infant mortality rates under several specifications. While in the first three columns of Table 3 we include only information on household and child level, in the last three columns we subsequently add information on region-level variables.

Independently of the specification used, endogeneity tests (bottom part of Table 3) suggest that migration is endogenous to infant mortality and therefore should be

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[9] Further analysis need to be performed for assessing the extent and importance of sex ratio imbalances in Albania. This is left for future research.

instrumented using the IVs we discussed above. First-stage regression results reported at the bottom part of Table 3 shows a value of joint F-statistics higher than 10 implying a strong correlation between migration variable and IVs. Also over-identification tests reveal that both IVs pass the exogeneity requirement.

Comparing results across specifications, we notice that if the endogeneity of migration experience is neglected, migration seems to have a positive but insignificant effect on infant mortality rates (column 1 and column4, Table 3). However, once migration is treated as endogenous, migrant households appear to have lower mortality rates than non-migrant households. To isolate the migration impact we use also information on the children died before 1990 within a household and within a primary sampling unit. While the former variable should control for the household characteristics (both biological endowment and housing sanitary conditions), the later controls for community characteristics (previous epidemics or poor health infrastructure). The estimated coefficients related to these variables demonstrate that infant mortality experience a household has undergone before 1990 is positively correlated with the infant mortality trends after 1990 and it is statistically significant at both levels.

Several other facts emerge from these estimations. Starting with the child characteristics, twins have lower probabilities of survival together with births spaced in less than 24 months. As regards mother characteristics, Table 3 shows that while mother's age at birth is not significantly correlated with infant mortality rates, other characteristics, such as mother's education and health status (proxied by the hemoglobin test) result to be important factors. The estimates related to regional health infrastructure such as the percentage of delivery beds per capita are statistically significant and have a negative sign implying that the regions with a better health infrastructure have had lower mortality rates.[10] A similar contribution brings also the inclusion of regional mortality rates of 1995.

Migration may affect child health outcomes through two main channels: first, the financial or monetary channel which means an increase in household wealth or an

[10] Other health infrastructure variables such as the percentage of maternity and pediatric beds and doctors do not show any statistical significance.

improvement in standard of living, including here both housing and nutrition level; second, the nonmonetary channel such as the transfer of health information or knowledge. Both these factors have been somehow investigated by Hildebrandt and McKenzie (2005) and appear to have been positively impacted by migration. However, ADHS provides information related to wealth factor and main housing equipment or housing conditions only for the latest year of the Survey rendering somehow questionable a further investigation on any mediating role of wealth on infant mortality. Also, information on family planning knowledge and health knowledge are given only for birth placed since 2003. For these reasons, the mediating effect of standard of living and health knowledge will not be considered in this paper.

6. Conclusion

In this paper we have investigated the role played by migration in reducing infant mortality rates in the last twenty years of intensive migration in Albania. The main finding is that migration results in lower infant mortality rates only when endogeneity of migration is tackled with country-specific instrumental variables that pass endogeneity and over-identification tests. Although child mortality rates was our main variable of interest, the role of migration on fertility trends and family composition has been also researched in this paper but no significant results were obtained.

This study contributes to enriching our knowledge on the advantages of migration for home countries and more specifically for a country with an intensive migratory experience such as Albania. Future research on migration and it impact on other health indicators and inputs (such as weight-at-birth, breastfeeding frequency and duration, doctor visits, child sickness, antenatal care) will help to broaden our view on this respect and provide information to policymakers and international institutions to develop appropriate programs for enhancing child health status and making the best of migration benefits.

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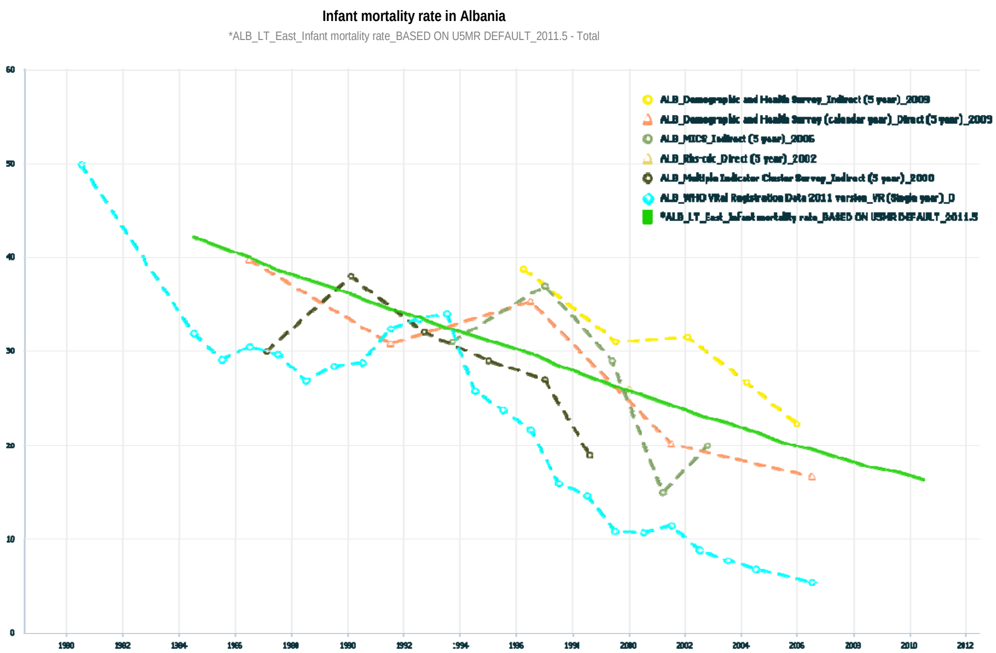
Appendix A

Figure 1



Extracted from the web site: http://www.childmortality.org/

Figure 2: Migration flows by year of migration, gender and destination

(Source: Extracted from ADHS Report, 2009)

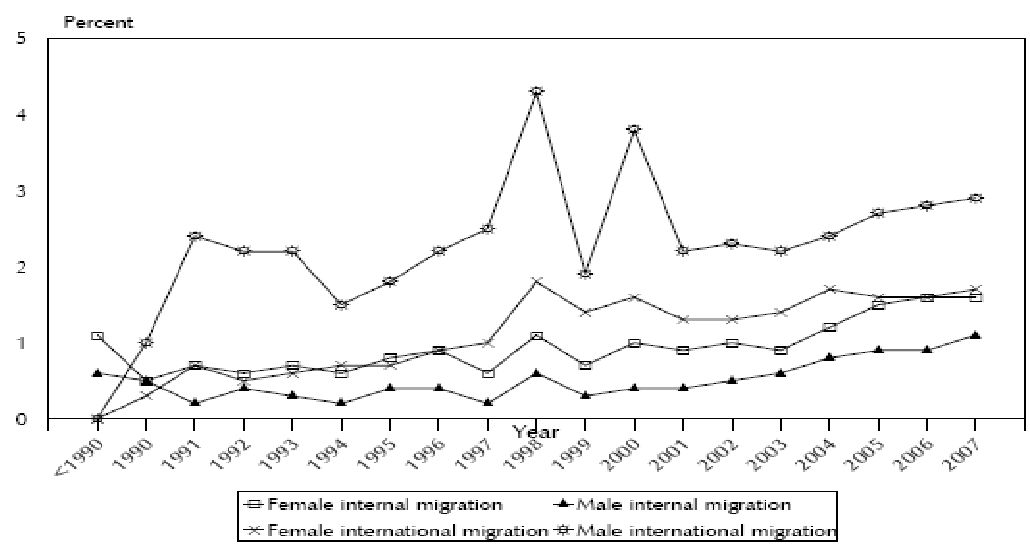
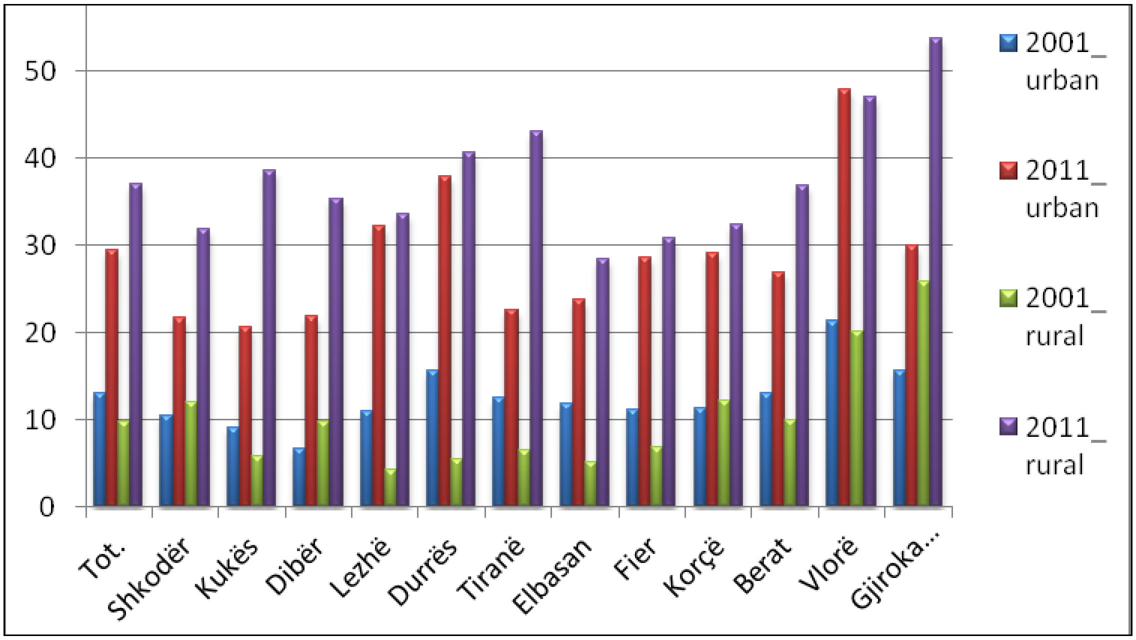


Figure 3. Percentage of uninhabited dwellings by region in Albania

(Source: Albanian CENSUS 2011, Preliminary Report)



Appendix B

Table 1 : Summary statistics for sample of households with a child born after 1990

	Migrant households		Non-migrant households		All households	
	Mean	**St.dv**	**Mean**	**St.dv**	**Mean**	**St.dv**
Infant mortality rate	0,029	0,169	0,032	0,176	0,031	0,174
Child mortality rate	0,001	0,034	0,004	0,060	0,003	0,055
Birth Spacing - Less 24 months	0,103	0,304	0,143	0,350	0,133	0,339
Child is twin	0,020	0,139	0,022	0,147	0,021	0,145
Children lost before 1990 - Household level	0,014	0,171	0,029	0,202	0,025	0,195
Mother Age at birth	26,284	4,857	26,948	4,629	26,779	4,697
Education in single years	9,711	2,619	9,772	2,554	9,757	2,571
Health Status	0,784	0,411	0,790	0,407	0,789	0,408
Number of household members	5,508	1,789	5,212	1,572	5,287	1,635
Children lost before 1990 - PSU level	0,350	0,662	0,407	0,832	0,392	0,792
Total of delivery beds per capita	6,709	5,153	7,240	5,318	7,105	5,281
& of families affected by pyramid scheme	1,630	2,045	1,349	1,878	1,421	1,926
% of uninhabited dwellings	10,469	4,555	9,753	3,849	9,935	4,052
Living in Rural Area	0,571	0,495	0,539	0,499	0,547	0,498
Observations	2524		7370		9894	

Note: Migrant households are defined as household with at least one migrant abroad before the child birth

Table 2: The Impact of Migration on Fertility Rates

	Probit	2SLS	Probit	2SLS
	coef/t	coef/t	coef/t	coef/t
Dependent Variable	Ever had a child after 1990		Total number of children born after 1990	
Children ever born before 1990	-0,345***	-0,090***	-0,305***	-0,358***
	(-11,199)	(-5,796)	(-15,895)	(-5,916)
Mother Age	0,674***	0,141***	0,384***	0,418***
	(31,899)	(45,401)	(17,201)	(9,596)
Mother Age Squared	-0,008***	-0,002***	-0,005***	-0,005***
	(-26,299)	(-30,577)	(-15,888)	(-9,758)
Education in single years	-0,075***	-0,018***	-0,054***	-0,052***
	(-8,843)	(-8,788)	(-9,274)	(-7,943)
Number of household members	0,133***	0,025***	0,310***	0,332***
	(10,191)	(4,816)	(33,672)	(13,286)
Regional Fertility Rate	0,013	0,001	0,510***	0,519***
	(0,301)	(0,143)	(18,457)	(17,136)
Living in Rural Area	0,106**	0,011	0,205***	0,152**
	(2,132)	(0,730)	(6,840)	(2,301)
Migrant Household	*-0,022*	*-0,029*	*-0,026*	*0,459*
	(-0,496)	(-0,253)	(-0,930)	(0,869)
First Stage Results				
Pyramid Shock		0,012***		0,008
		(3,980)		(1,800)
% of Uninhabited dwelling		0,006***		0,0062*
		(-3,840)		(2,780)
Endogeneity Test - Durbin-Wu-Hausman		0,064		0,824
Prob>Chi-sq(1)		(0.8006)		(-0,364)
Overidentification Test - Sargan Test		0,694		0,824
Prob>Chi-sq(1)		(0,405)		(0,360)
Joint-Significance Test of all Ivs - F-Statitics		15,87		5,6
Number of observations	7.242	7.242	3.810	3.810

note: *** p<0.01, ** p<0.05, * p<0.1; t-values in brackets.

Table 3: The Impact of Migration on Probability of having a male child at higher-order births

	Probit coef/t	2SLS coef/t	Probit coef/t	2SLS coef/t
Dependent Variable	Higher-order birth is boy		Higher-order birth is boy and the first birth is girl	
Total children ever born	-0,075***	-0,044***	-0,112***	-0,056***
	(-5,852)	(-4,011)	(-6,293)	(-4,193)
1st child is girl	0,070**	0,034**		
	(2,218)	(2,552)		
Mother Age at birth	0,012***	0,005***	0,017***	0,007***
	(3,112)	(3,282)	(3,247)	(3,185)
Education in single years	-0,004	-0,003	-0,003	-0,002
	(-0,598)	(-0,988)	(-0,249)	(-0,549)
Has changed residence	0,052	0,038*	0,108**	0,056**
	(1,345)	(1,958)	(2,134)	(2,299)
Living in Rural Area	-0,008	0,009	0,064	0,037*
	(0,301)	(0,143)	(18,457)	(17,136)
Migrant Household	-0,013	-0,261	-0,031	-0,206
	(-0,360)	(-1,481)	(-0,625)	(-1,069)
First Stage Results				
Pyramid Shock		.006*		0,009*
		(2,1)		(2,500)
% of Uninhabited dwelling		0,0087***		0,010
		(6,3)		(5,350)
Endogeneity Test - Durbin-Wu-Hausman		2,294		1,109
Prob>Chi-sq(1)		(0.1299)		(0.2924)
Overidentification Test - Sargan Test		0,402		1,628
Prob>Chi-sq(1)		(0.5263)		0.2020
Joint-Significance Test of all Ivs - F-Statitics		24,36		19,60
Number of observations	6.607	6.607	3.548	3.548

note: *** p<0.01, ** p<0.05, * p<0.1, t-values in parenthesis

Table 4: The Impact of Migration on Infant Mortality Rates

	Specification 1	Specification 2	Specification 3	Specification 4	Specification 5	Specification 6
	Probit	**2SLS**	**CMP**	**Probit**	**2SLS**	**CMP**
Dependent Variable: Infant Mortality						
Children lost before 1990 - Household level	0,359***	0,037***	0,041**	0,265***	0,031***	0,205**
	(3,909)	(3,829)	(2,528)	(2,598)	(3,294)	(2,186)
Birth Spacing - Less 24 months	0,928***	0,081***	0,088***	0,922***	0,083***	0,774***
	(15,960)	(12,243)	(9,488)	(15,504)	(13,696)	(8,234)
Child is twin	0,906***	0,100***	0,101***	0,923***	0,102***	0,841***
	(6,331)	(8,114)	(3,566)	(6,479)	(8,432)	(5,755)
Mother Age at birth	0,038	-0,002	0,001	0,038	-0,001	-0,003
	(0,647)	(-0,607)	(0,384)	(0,658)	(-0,228)	(-0,049)
Mother Age at birth Squared	-0,001	0,000	-0,000	-0,001	0,000	0,000
	(-0,542)	(0,540)	(-0,343)	(-0,557)	(0,192)	(0,048)
education in single years	-0,052***	-0,003***	-0,003***	-0,043***	-0,002***	-0,036***
	(-4,212)	(-3,786)	(-4,027)	(-3,181)	(-2,650)	(-2,843)
Health Status	-0,163**	-0,013***	-0,012**	-0,165**	-0,012***	-0,159**
	(-2,345)	(-2,855)	(-2,076)	(-2,376)	(-2,874)	(-2,327)
number of household members	-0,125***	-0,005***	-0,007***	-0,131***	-0,006***	-0,102***
	(-5,440)	(-3,398)	(-5,192)	(-5,799)	(-4,537)	(-4,263)
Migration	0,042	-0,104**	-0,024***	0,035	-0,066**	-0,730***
	(0,585)	(-2,560)	(-3,123)	(0,495)	(-2,022)	(-2,956)
Children lost before 1990 - PSU level				0,090*	0,007***	0,071*
				(1,929)	(2,947)	(1,674)
Health Infrastructure				-0,017***	-0,001***	-0,018***
				(-2,617)	(-3,088)	(-3,078)
Living in Rural Area				0,082	0,006	0,100
				(1,098)	(1,383)	(1,432)
Regional Infant Fertility Rate in 1995				0,004	0,000**	0,005
				(0,935)	(2,175)	(1,499)
First Stage Results						
Pyramid Shock		0,0138***	0,043***		0,013***	0,042***
		(3.08)	(3,211)		(3.07)	(3,360)

% of Uninhabited dwelling		0,0078***	0,024***		0,0122***	0,037***
		(4.11)	(4,183)		(5.94)	(6,153)
RHO			0,099***			0,515**
t-value			(5,884)			(2,572)
Endogeneity Test - Durbin-Wu-Hausman		7,674***			4,742***	
Prob>Chi-sq(1)		(0.0056)			(0.0295)	
Overidentification Test - Sargan Test		0,707			0,005	
Prob>Chi-sq(1)		(0,401)			(0.9424)	
Joint-Significance Test of all Ivs - F-Statitics		51			78	
Number of observations	9.894	9.894	9.894	9.894	9.894	9.894

note: *** p<0.01, ** p<0.05, * p<0.1, t-values in brackets