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# **Maternal Migration and Child Well-Being in Peru**

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Grupo de Análisis para el Desarrollo (GRADE), Young Lives

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# Abstract

Migration affects not only those who migrate, but may also have intergenerational effects on their children. Looking at those mothers with a history of internal migration who are part of the Young Lives project, and comparing them with suitable controls, we find that mothers' migration has had a positive impact on the nutritional outcomes and cognitive achievement of their offspring. However, we also find that there are heterogeneous impacts, as different types of migration trajectory (rural to rural; rural to urban – to intermediate cities or to the capital, Lima) can be associated with the prevalence of different channels affecting child well-being. Those channels are the income channel, as migration may lead to new income-generating opportunities; the information channel, as migration may allow the mother to access more information about child-care and health-related practices; and the access to services channel, as migration may facilitate or hinder access to key public services.

# The Authors

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## About Young Lives

Young Lives is an innovative longitudinal study investigating the changing nature of childhood poverty. Young Lives is tracking 12,000 children in Ethiopia, India (Andhra Pradesh), Peru and Vietnam over 15 years through a quantitative survey and participatory qualitative research, linked to policy analysis. Young Lives seeks to:

- improve understanding of the causes and consequences of childhood poverty and to examine how policies affect children's well-being
- inform the development and implementation of future policies and practices that will reduce childhood poverty.

Young Lives is a collaborative partnership between research and government institutions in the 4 study countries, the University of Oxford, the Open University, other UK universities, and Save the Children UK.

Young Lives is core-funded by the UK Department for International Development (DFID) for the benefit of developing countries. Sub-studies are funded by the Bernard van Leer Foundation, the Inter-American Development Bank (in Peru), the International Development Research Centre (in Ethiopia), the Oak Foundation.

The views expressed here are those of the author(s). They are not necessarily those of, or endorsed by Young Lives, the University of Oxford, DFID or other funders

# 1. Introduction

Despite the large number of studies focusing on the determinants and effects of migration on welfare, not many have focused on the relationship between migration and child welfare. Those that have addressed the issue point out that the impacts of migration on children's well-being depend basically on the causes of migration, the stage of childhood, level of education, health status and other characteristics of the parents, and on the characteristics of the places of origin and destiny.

Typically, migrants are positively selected in terms of having better educations, health, occupational skills, wealth, higher aspirations for their children, etc., than those who stay behind (Shaw 1975; Findley 1977). According to this view, we may see migration as a choice people make to improve their economic circumstances. However, we can also view migration as a response to economic, demographic and environmental shocks that lead poor people away from their communities of origin, aggravating their economic and social situation, as de Haan (1999) points out. In extreme conditions such as drought, famine and civil war, households with worse conditions in terms of education, health, wealth, etc., may have to take the decision to migrate.

In the case of Peru, the reasons for migration have changed quite dramatically over the last three decades. During the eighties and the first half of the nineties, rural to urban migration was exacerbated by terrorism and counterinsurgency activities launched by the State. Forced migration typically resulted in the breakdown of family structures and exposed children to physical and psychosocial risk.

More recently, since the mid-nineties, seeking new livelihood opportunities in the context of rapid growth seems to be the main reason why Peruvian families decide to migrate. Indeed, wage differentials appear to be an important determinant of migration (Sabatés 2000). In addition, other studies, like that of Cox et al. (1998) have shown that migration may be considered a livelihood strategy and remittances may be a part of an elaborated livelihood strategy to reduce risks and credit constraints.

Young Lives is an international study carried out in four countries (Ethiopia, the state of Andhra Pradesh in India, Peru and Vietnam) whose objective is to improve our understanding of the causes and consequences of childhood poverty and to examine how shocks and policies affect children's well-being. In the case of Peru, Young Lives is in a unique position to study the long-term effects of migration, not only on those who migrate but also on the next generation. Although the Young Lives Younger Cohort was born at a time when violence in Peru, brought about by terrorism, had almost ceased (2000-2001), it is important to recognise that a significant number of children were raised in post-conflict environments, and their parents had suffered the effects of violence and were compelled to migrate. It is interesting to note that a high proportion of the parents of the Younger Cohort in Peru migrated (46 per cent), and that 20 per cent of mothers who did so were born in areas of the country where conflict-related episodes were reported as being very high by the Truth and Reconciliation Commission (CVR 2000).

The long-term effects of these migration episodes can be studied by looking at the differential impact of migration on child well-being depending on the different possible observed trajectories (i.e., from urban to urban, from urban to rural, from rural to urban and from rural to rural). To do so, this paper uses propensity score matching techniques to compare the well-being of children whose mothers migrated before they were born with suitable controls whose



mothers did not migrate. Since there are likely to be unobserved factors correlated with both the migration decision and current child welfare outcomes, we introduce a measure of migration intensity, which captures the percentage of people migrating from the area where the mother was born. The aim of this is to control for potential endogeneity biases, so as to isolate the effect of migration on child welfare. We also study the migration effect on a particular group of migrants – for example, those who live in areas where high intensity conflict prevailed. It is very likely that this group was forced to migrate, and because of this, other factors associated with the decision to migrate may be less important than the violence that prevailed in the communities of origin. Still, to control for potential endogeneity problems in this subgroup, emigration rates and characteristics of the areas of origin and destiny have been included to control for other factors affecting the migration decision.

The paper is divided into six sections, including this introduction. In the second section, we show how studies have contributed to an understanding of the effect of migration on child well-being. We show that, although vast, the literature has seldom explored the causal link between maternal migration and the subsequent effect on her offspring. Next, in Section 3, we present the methodological framework used to assess the effect of maternal migration on key child well-being outcomes. Here we present and assess the conditions under which we can construct a proper counterfactual to evaluate these effects. Section 4 describes the data used in the analysis, examining not only Young Lives data for Peru but also complementary information needed to construct a reasonable counterfactual under which the impact of maternal migration can be evaluated. Section 5 presents our main results, evaluating the impact of overall migration as well as of forced migration on child well-being. We show that, although overall results may be positive, the impacts are quite heterogeneous, depending on the type of migration trajectory. In this section, we also explore some of the main transmission channels through which migration may affect child well-being. Finally, Section 6 presents a summary of our findings, outlines some of the pending research challenges ahead, and discusses some of the policy implications of this research.

## 2. Migration and child well-being: A brief literature review

The literature on the relation between migration (and forced migration) and child well-being comes from a very wide disciplinary community, including health, medicine, nutrition, psychiatry, developmental psychology, anthropology, sociology, political science, epidemiology, demography, geography and economics. This vast literature explores the stressors behind migration, focusing on general migration settings as well as forced migration settings, where vulnerability is higher. The negative impact that these stressors may generate is moderated and eventually overcome depending on access to public services, access to information, or additional income sources that migration may bring about.

The impact of migration is heavily influenced by the characteristics of individual migrants and the asset base available to them prior to departure. For example, Brockerhoff (1994a) distinguishes between the loss of income caused by the termination of employment just before the migration episode and the exposure of the child to new diseases after migration has

occurred. Thomas (2007) shows that, in comparison to the indigenous population, the poorest immigrants have a higher child mortality rate than native inhabitants, whilst for the wealthiest immigrants, it is lower. Again, there is no attempt to correct for potential selectivity biases.

Post-migration factors may also affect the relationship between migration and child well-being. For example, some studies have found several negative impacts on child welfare occurring during or just after the migration process. These negative impacts may occur either because there is discrimination against the migrant or because the migrant self-discriminates through fear of the unknown or due to a perception of the environment as unfriendly. In this context, Uyanga (1983) has shown marked differences in disease beliefs and related health-care behaviours between migrant and non-migrant households in Eastern Nigeria, which may exacerbate the negative impacts on children or families. Similarly, Kiros and White (2004) found that children born to rural–rural migrant mothers in Ethiopia had significantly less chance of receiving full immunisation coverage than children born to non-migrant mothers. Similarly, McKenzie and Hildebrandt (2005) show that migration may reduce the likelihood of breastfeeding and vaccinations.

## 2.1 Migration and stressors

One of the possible negative effects of migration has to do with the stress-inducing effect that it may generate. There is no doubt that a mother's experiences are transmitted to her offspring. Farahati et al. (2003) show, for example, that parent's mental illness can increase the probability of high school dropout through multiple channels, with a greater likelihood of dropout for girls than for boys.

Bhugra (2004) reviews over 100 studies that examine the relationship between migration and mental health, highlighting the complexity of the process of adjusting to a different socio-cultural context. The evidence presented here highlights the fact that the relationship between individual resilience and coping mechanisms, social factors and social support is essential for understanding responses to migration, so it is unlikely that one should expect all members of a particular group (i.e., forced migrants) to develop similar stresses associated with its migration episode.

Vollebergh et al. (2005) further report on the heterogeneity of these reports. Self-reported measures show that immigrant children's mental health problems are similar to those of non-immigrant children. However, immigrant parents tend to report higher problem rates for their daughters than were reported by the daughters themselves. Finally, teachers perceived higher levels of behavioural problems but fewer social problems, or problems associated with withdrawn/depressed behaviour, for immigrant children.

A study by the Instituto Especializado de Salud Mental (2003) shows that terrorism was an important tension-generating stressor in the adult population of Ayacucho, Cajamarca and Huaraz, three of the cities most affected by the Peruvian internal war. As the report highlights, the effect was significantly greater for women. About 31 per cent of the individuals surveyed experienced a personal loss associated with terrorism or state counter-subversive actions. The study estimated that the prevalence of post-traumatic stress disorder (PTSD) was twice as high in the sample that had been affected by the loss of a family member through death or disappearance as amongst those who had not faced such a loss.

Spencer and Le (2006) study the intergenerational transmission of immigration stressors for Southeast Asian youth. Parents' refugee status is shown to be a positive predictor of delinquency among youngsters. This kind of work, however, does little to control for unobserved characteristics in migrants that may bias the results.

In a recent paper, Stillman and McKenzie (2007) discuss the effect of migration on mental health, taking advantage of a 'natural experiment' to control for pre-existing differences between migrants and natives in the destination territory. By examining a migrant lottery programme, the study was able to show that migration led to improvements in mental health, particularly for those women with poor mental health registered in their home country.

## 2.2 Migration and child-care patterns

Changes in child-care patterns are amongst the mechanisms through which migration can affect child well-being. UNICEF (1990) considers care to be the practices of caregivers that affect nutrient intake, health, and the cognitive and psychosocial development of the child. Care practices can be defined through two dimensions: quantity of care (associated with the time spent) and quality of care (associated with the nature of the activities undertaken). As Engle et al. (1999) reports, there is little evidence that correlates time spent in care activities with child well-being. However, specific child-rearing practices have been shown to generate positive child well-being outcomes. Among the child-care practices that have been shown to positively affect child well-being are: (1) adequate child feeding practices (including breastfeeding and complementary feeding when appropriate); and (2) psychosocial care, associated with 'the provision of affection and warmth, responsiveness to the child, and the encouragement of autonomy and exploration' (Engle et al. 1999: 1327). The authors suggest three categories of measures of psychosocial care: direct measurement of child-caregiver interaction, assessment of the home environment and assessment of the child's appearance.

Engle et al. (1999) extend the UNICEF concept of care to define the resources the caregiver needs to provide care, and the characteristics of the child that could also play a role in the care that he or she receives. This extension allows for the incorporation of a large range of factors that may be thought of as inputs in the 'care production process'. These factors include caregiver's education, her knowledge and beliefs, her physical health and nutritional status, her mental health and self confidence, her own autonomy and control of resources, her workload and time availability, and the social support available to her.

Chapman and Scott (2001) also focus on intergenerational risk factors affecting children's developmental outcomes. The literature review shows that these factors affect child development through changes in the child-rearing environment. The works calls for a broadening of the time frame of analysis to include women's health status and circumstances prior to conception. When looking at possible causal pathways, the study recognises that intergenerational effects are not limited to physical effects coming from the prenatal period, as cultural values, beliefs and practices, as well as prenatal stressors, may affect future parenting practices. A parental history of abuse and neglect, for example, has been related to child maltreatment in many studies, as reported by Chapman and Scott (2001).

Wiig et al. (2005) use information on displacement and return in Peru, claiming that it represents a 'natural experiment'. Stating that there is no self-selection process between displaced and resistant communities affected by the Peruvian internal war in the 1980s and 1990s, the authors are able to test empirically the effect of a displacement and return experience on income, finding that returnees become better adapted and more capable of exploiting the new possibilities that come with market integration. Kondylis (2005) uses a similar strategy of using forced migration as a 'natural experiment' to evaluate the cost of civil conflict in Rwanda. The author shows that conflict-induced migration has a negative impact on returnees' stock of human capital.

Grove and Zwi (2006) use an in-depth qualitative analysis to describe a variety of mechanisms that may explain exclusion practices used against those affected by forced migration.

Rousseau et al. (1999) also evaluate the intergenerational transmission of mental health problems of those affected by displacement. Trauma suffered by the parents before leaving their homeland is shown to be positively associated with risk behaviour and school failure in boys who were born after the forced migration had occurred. In the case of girls, this family trauma is associated with positive social adjustment. Given the cross-sectional nature of the study, which is based on recall questions to assess pre-migration stressors, results should be taken with caution.

Ethnicity also plays a major role in the way child-care arrangements are established. Radey and Brewster (2007) show that ethnic and cultural backgrounds are highly correlated with the type of child-care arrangement chosen by parents.

### **2.3 Migration and income**

The economic literature around the effects of migration tends to assess the size and significance of the income channel, through which migration may positively affect different household outcome indicators. The effect of migration on income opportunities is clearly heterogeneous. Using longitudinal analysis, Chiswick (2005) shows that, after controlling for the selectivity of migration, there is a clear positive impact of migration on income. Other studies, like that of Laszlo and Santor (2004), show that when self-selection is controlled for, migrants do not necessarily earn more than non-migrants.

The importance of the income channel in terms of the way migration affects child well-being has scarcely been studied, although there is ample evidence that connects migration to increases in income, as well as evidence for the positive effect of income on child health outcomes. One of the few papers that connect both strands of the literature is that of Hildebrandt and McKenzie (2005). Using data from Mexico, these authors show that children from migrated parents are better off than those whose parents did not migrate, owing to the additional income and health knowledge that migration brings. The study evaluates the robustness of these results by correcting for endogeneity of migration, finding that there is indeed substantial evidence in favour of a positive effect of migration on child health. The paper controls the potential bias due to the self-selection of migrants through an instrumental variable approach. Historic state level migration rates that go back beyond the birth of the migrants are used as an instrument. This should capture the prevalence of migration networks that are available to potential migrants.

### **2.4 Migration and access to information and public services**

Brockerhoff (1995) uses cross-sectional data from 15 developing countries and finds that children of female rural–urban immigrants have much lower survival chances than other urban children. Residential segregation is reported as an important factor that may explain such a pattern. The paper also contends that this survival gap is more pronounced when mothers migrate to big cities than when they migrate to small cities. This might be due to discrimination in the provision of health services against migrants. Although the evidence presented is informative, the conclusion needs to be taken with caution as no attempt is made to control for characteristics prior to migration, something that is crucial, as migration to small cities or to big cities may have very distinct characteristics.

Waddington (2003) reports that exclusion can also occur in school, as children suffer discrimination by teachers because of their social identity. In the case of forced migration,

there is evidence that discrimination against displaced persons can be particularly strong. For example, Ibanez and Velez (2008) report that in Colombia, people may believe that displaced households belong to illegal armed groups, affecting the likelihood of their accessing public services. A similar experience is reported by Alcalde (2006) in the case of Peru.

On the other hand, discrimination in access to services may also come about through self-discrimination. For example, Cerci (2007) discusses the importance of ethnicity and cultural background in the relationship between migration and child health. The author highlights the fact that health perceptions and different concepts of disease and therapy, rooted in culture and ethnicity, may affect the probability of the migrant accessing health services. Language barriers can also play a role, affecting the quality of the service provided.

However, migration can also mean a higher probability of accessing improved health services. Hildebrandt and McKenzie (2005) have studied how the effects of migration on child health can be associated with a health-knowledge effect, as mothers increase their access to information about positive child-rearing practices.

## 2.5 Not all migration is equal for child well-being

Ssengonzi et al. (2002), using the DHS survey from Uganda, show that not all streams of migration are equally related to child well-being. Only urban–urban migration seemed to be positively correlated with child well-being after parents' and contextual characteristics were controlled for. The relationship between migration and child health outcomes is not clear cut: it may be positive for certain groups and negative for others. Warfa et al. (2006) reviews several reasons why migration may be associated with poor mental health outcomes, and reports how poor mental health may affect health service use. Migration in certain contexts may be seen as stressful and undesirable, disrupting family life and child development.

Brockerhoff (1994b) discusses the impact of rural–urban migration on child survival. He suggests that before migration, children of migrated mothers had similar mortality rates to children of mothers who did not migrate. He looks into children who were born after their mothers' migration to urban areas and finds that the mortality risk of these children gradually reduced in comparison to that of children born to mothers who stayed in their villages of origin. Although the paper does control for the mother's education and age, it is subject to a potential identification bias since there may be a number of important characteristics that made migration more likely to affect their children's survival odds. For example, if mothers who migrate are typically healthier than those who do not, it will be very likely that the higher odds of survival may be related to characteristics intrinsic to the mother and not to the migration episode.

Further, it is common in the literature to identify key correlates without advancing to an identification of the causal mechanism behind the effect that the mother's migration may have on child well-being. For example, it may be found that migration correlates positively with child survival odds or health, but it is not known whether the effect comes from improved access to safe water or sanitation services; to the greater pool of knowledge accessible to the migrant; to the fact that there is greater availability of health services; or any other potential causal path.

Alati et al. (2003) did a 14-year follow-up of a cohort of mothers, starting just before their children were born in Australia. They show convincing evidence that there were no significant differences between the mental health of 'second generation' children and those born to Australian-born parents. The problem of self-selection in migration was addressed controlling for age, education, income level and marital state at the first clinic visit.

Similarly, Chang et al. (2007), using a nationally representative sample of US children, find that the adverse effect of maternal depressive symptoms become negligible after controlling for parental involvement and child, mother and household characteristics. However, it does find that the effect of maternal depression at the baseline varies with the amount of positive involvement the father has in child-rearing practices.

The effect of rural to urban migration in an Andean context is studied by Bender et al. (1993). They discuss the problems of adaptation to urban areas. As expected, they find that positive child-rearing practices are more likely in urban mothers than in those who migrated from rural settings. Although the estimation controls for child, mother and household characteristics, no effort is made to control for unobserved characteristics that may have triggered the migration episode.

One of the few papers that addresses the intergenerational effect of migration in a framework that controls for the endogeneity of migration is that of Chen et al. (2007). This paper uses 'differences in differences' matching techniques and shows that children from rural-rural migrant families in China do not have a lower average school performance than those coming from non-migrants families. Moreover, they show that children's school performance after their parent's migration tends to improve on average.

## 2.6 Forced migration as an identification strategy

Few papers have dealt with the problem of endogeneity when addressing the relationship between child-rearing practices and child well-being. Kan and Tsai (2005) explore the influence of child-rearing practices, specifically the effect of encouragement (positive reinforcements, e.g., verbal encouragement and awards) and punishment (negative reinforcements, e.g., scolding, physical punishment, or negative pecuniary incentives) in adolescents' educational expectations and aspirations. In order to deal with the endogeneity problem arising – because encouragement and punishment could be endogenous – the authors use a Generalised Method of Moments (GMM) specification, including the health status of both parents as well as their hours of work and the number of siblings, as variables that may be uncorrelated with the unobservable determinants of education outcomes but correlated with encouragement and punishment. They find that positive reinforcement practices do indeed positively affect children's educational outcomes, while negative reinforcement practices are harmful to children's education outcomes. Kan and Tsai (2005) make advances in dealing with potential endogeneity biases. However, given the cross-sectional nature of their sample, their paper is still unable to control for time invariant unobservables that may affect parent's time allocation, parental practices and child well-being outcomes.

Although there are a number of methodological problems that prevent an estimation of the risk rate associated with the intergenerational transmission of maltreatment, it is clear that such intervening factors do play a role in child-rearing practices.

Shemyakina and Student (2006) also use exposure to conflict as an important determinant of future child welfare outcomes. They show that girls are now significantly less likely to complete school than those who had the opportunity before the Tajikistan 1992-1998 civil conflict started.

Ruscio (2001) tackles the impact of childhood victimisation on the later child-rearing practices of adult survivors. The author finds that sexual abuse survivors and children of alcoholics have greater permissive parental practices than a control group, based on a community sample of mothers. Although the methodology used in the analysis lacks an identification strategy, the results viewed as profiles nonetheless highlight the fact that these may be very important correlates.

Even if the causal role is not clearly established in many instances, the literature does provide important insights around the possible pathways through which maternal migration may affect child well-being. We have seen that there might be positive impacts, associated with new income earning opportunities, access to information (especially about child rearing) and access to key public services that migration may bring about. We have also shown that there may be non-negligible negative effects, which may be related to the stress that migration brings to mother and household, or through discrimination in the provision of services. Whether the net effect is positive or negative, and which channels are most important, is clearly an empirical question, which we will try to address in the following sections.

## 3. Evaluating the effect of mother's migration on child well-being outcomes

### 3.1 Proposed methodology

The estimation method used to evaluate the impact of migration on child well-being outcomes closely follows Becker and Ichino (2002). We used stratified propensity score matching as a way of estimating the average effect of treatment on the treated (ATT). The aim of the method is to construct a counterfactual to approach the question of what the child's well-being would have been if his or her mother had not migrated.

Instead of matching the treated (i.e., those whose mothers migrated) and the comparison group (i.e., those whose mothers decided not to migrate) on each observable, we match treatment and control groups in terms of the observables, as summarised by the propensity score. The propensity score is defined as the conditional probability of receiving a treatment given pre-treatment characteristics:

$$p(X) \equiv \Pr(D = 1|X) = E(D|X) \quad (1)$$

$D$  is the 'treatment' (in our case, the migration background of the mother).  $Y$  is the outcome (for example, a nutritional indicator for the children) and  $X$  is a vector of pre-treatment characteristics.

ATT can be estimated as follows:

$$\begin{aligned} \tau &\equiv E[Y_{1i} - Y_{0i} | D_i = 1] = E[E\{Y_{1i} - Y_{0i} | D_i = 1, p(X_i)\}] \\ &= E[E\{Y_{1i} | D_i = 1, p(X_i)\} - E\{Y_{0i} | D_i = 0, p(X_i)\} | D_i = 1] \end{aligned} \quad (2)$$

As Becker and Ichino (2002) show, two conditions are needed to estimate the ATT:

- (i) **Pre-treatment variables should be balanced, given the propensity score.** That is,  $D \perp X | p(X)$ . If this is the case, observations with the same propensity scores must have the same distribution of observable (and unobservable) characteristics independent of treatment status. In our case, this means that, after controlling for the pre-treatment variables included in the propensity score, the probability of migrating should be random.

**(ii) Assignment to treatment is unconfounded, given the propensity score.** That is,  $Y_1, Y_0 \perp D \mid p(X)$ . In our case, this means that, after controlling for the pre-treatment variables included in the propensity score, child well-being outcomes do not affect migration.

Although (ii) is easily met in the context of our study, meeting (i) is more complex and needs further analysis. As we have mentioned, migration is clearly not random. The mother's pre-migration characteristics can affect the decision to migrate. Maternal education, marital status, the education of her partner and wealth status prior to migration, to mention a few, are typically important factors influencing the likelihood of the mother having migrated. In addition to factors affecting the individual, context characteristics of the regions of origin and destiny may serve as push and pull factors that also influence migration.

There are many variants of propensity score matching that can be used to identify the counterfactual. In this paper, we have used a stratified Propensity Score Matching (PSM) technique, which splits the propensity into several blocks and ensures that the balancing property holds within blocks.

We will estimate the ATT using the same blocks used to construct the propensity score. To ensure the results are not driven by any particular matching technique, we will check the robustness of our results by comparing them with both kernel and nearest neighbour matching.

## 4. The data

The information used in this paper comes from the first two rounds of data for Peru from Young Lives' longitudinal study. Young Lives has been tracking 2,000 Peruvian children who were aged between 6 and 17 months in 2002, at the time of enrolment.<sup>1</sup> A second visit was carried out in late 2006 to early 2007, and subsequent visits are scheduled every three years starting in August 2009. Although the study uses a pro-poor rather than a nationally representative sample, the data reflects the diversity of the country's population. As with the other Young Lives samples (i.e., those of Ethiopia, India and Vietnam), the study followed a multistage sampling procedure, whereby 20 sentinel sites were selected and 100 households within each sentinel site were chosen randomly. While the Peru sample followed the general principles laid out by Young Lives, there are some differences that affected the way the sample relates to the entire population. In Peru, the sentinel sites were chosen using a multistage, cluster-stratified, random sampling. The clusters or sentinel sites were chosen using a Peruvian district-level poverty map. After ranking districts by their poverty level and randomly choosing the first district, the other districts were then chosen systematically along the poverty distribution. Further details on the sampling approach can be found in Escobal and Flores (2008).

The Young Lives survey collects comprehensive information about: a) households' economic circumstances, livelihoods, assets and social capital; b) coping strategies; c) the extent to which children and their parents and carers use private and public services (e.g. healthcare, pre-school care or education programmes). The survey contrasts this information with a large

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<sup>1</sup> This group is known as the Younger Cohort. Young Lives also tracks an Older Cohort of about 700 children who were aged between 7.5 years old and 8.5 years old in 2002. They are not included in this study.



array of well-being indicators for the children, including physical health, nutrition, education and the material wealth of their parents, as well as maternal psychosocial well-being (self-esteem and sense of self-efficacy, sense of being subject to discrimination, etc.) and similar indicators for the children as they grow up.

## 4.1 Defining the treatment

The second round of data collection in Peru included detailed information on the migration history of the mother, from her birth up to her enrolment in the project in 2002. Using this data, we were able to confirm the high mobility of the sample. We found that 38 per cent of the mothers in the sample were living in a different region to that in which they were born (see Table 1).<sup>2</sup>

**Table 1.** *Children according to their Mother's Migration Background (Younger Cohort)*

|                 | 'Low' intensity conflict Areas | 'High' intensity conflict Areas | Total |
|-----------------|--------------------------------|---------------------------------|-------|
| Migrated        | 624                            | 153                             | 777   |
| Did not migrate | 969                            | 306                             | 1275  |
| Total           | 1593                           | 459                             | 2052  |

Source: Young Lives data and CVR(2003)

Table 1 also depicts the distribution of migration depending on origin. We have divided migration origin according to whether or not a mother was born in an area of the country where conflict associated with the Peruvian internal war was prevalent. Before discussing which may be the proper comparison group for evaluating the effect of forced migration, a detailed discussion about how we can separate conflict-induced migration from other migration waves is necessary.

It is important to note that the estimation only includes migration episodes up to about 1999, before the mother was pregnant with the index child. The aim of this is to rule out the possibility that the circumstances of pregnancy or birth were the cause of migration. This correction of the migration variable reduced the sample by 50 observations (of the original 777 observations).

### 4.1.2 *The conflict-induced migration variable*

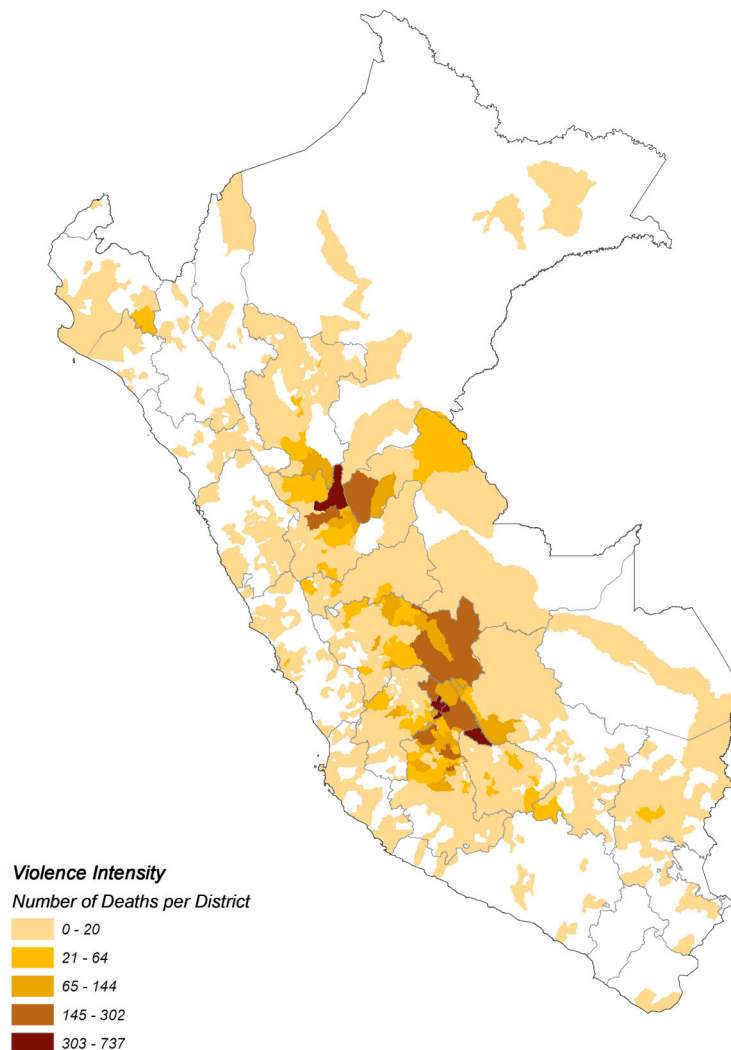
To evaluate the effects of migration on child well-being, we need to define the treated group and a comparison group from which the counterfactual will be constructed. As we have mentioned, we can compare migrants to non-migrants or, alternatively, select a subgroup of migrants who are more likely to have been forced to migrate and compare them to those who have not migrated.

To identify migrant mothers and evaluate whether or not they come from an area where high intensity conflict prevailed, we have systematised the information collected by the Peruvian Truth and Reconciliation Commission (CVR 2003).

2 The definition of migration is always arbitrary. Here we have considered as 'migrant' all those who are living in a different district to the one they were born, except in regional capitals where moving to another district within the capital is considered as moving and not migration. If this adjustment is not made, migration increases to almost 47 per cent.

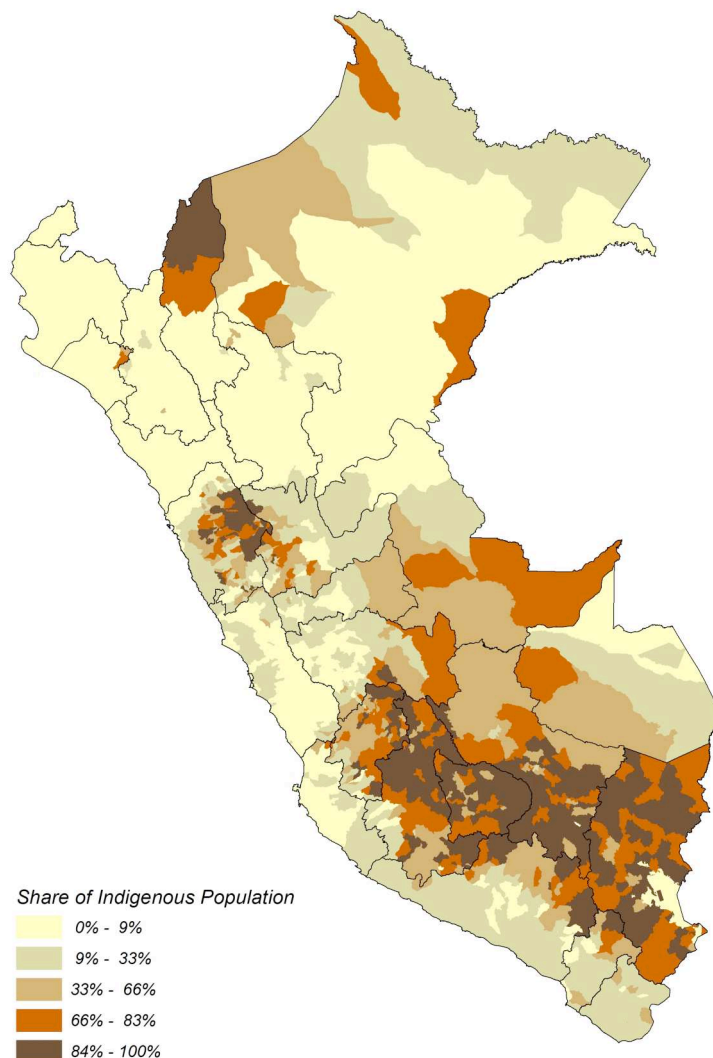
The armed conflict that took place in Peru between the State and the self-denominated Communist Party, Shining Path, during the 1980s and first half of the 1990s led entire communities in the central and southern highlands to abandon their land and homes and flee to more secure territories. Figure 1 maps the intensity of violent crimes during this period. In a country of 27 million inhabitants, around 40,000 were killed, at least 6,000 disappeared, and as many as 600,000 people were forced to migrate away from their home communities. Violence arising from the Peruvian armed conflict was heavily concentrated in the Andean regions. As the Truth Commission recognises, most of the tens of thousands of victims were indigenous peasants living in the Andean region. According to Wiig et al., 'This displacement (i.e., forced emigration) of entire communities depended more on location than the income level of the population. Furthermore, nearly all communities are now repopulated again' (2005: 3). This line of reasoning favours the argument that there is no self-selection problem at an individual level in the decision to leave or remain in the place of origin.

**Figure 1.** *Violence during Peru's internal conflict*



Displacement during this period of political violence was massive. The Truth Commission reports that about half a million people abandoned the localities where they lived for fear of being caught up in the violence related to the conflict (CVR 2003: 627). Although most of the displaced were native Quechua speakers, it is also true that a largest proportion of native Quechua speakers who lived in the rural Andes were not displaced. According to the Peruvian population censuses of 1993 and 2007, between 3.2 and 3.3 million Peruvians were native Quechua speakers. Figure 2 shows how the indigenous population is distributed within Peru. It is evident that, although forced migration is correlated with indigenous origin, there are many areas in Peru where indigenous background is high that were not subject to high levels of violence. This being the case, these areas may potentially be good comparison groups from which to construct the counterfactual.

**Figure 2.** *Distribution of Population with Indigenous Background*



We recognise that the strength of the estimation relies on the plausibility of the argument that forced migration can be considered exogenous. To evaluate the robustness of our results, we could consider as an alternative the possibility that the migration decision, even if it is labelled 'forced', may be a combination of both exogenous and endogenous factors. If this is the case, splitting the sample by conflict-related migration and non-migration may contain some endogeneity that could bias our results. On the other hand, if expulsion factors prevail then we may indeed be able to capture the pure effect of migration on child well-being.

### 4.1.3 Pre-treatment variables

As we mentioned in Section 3, although neither migration nor forced migration are totally random, we do contend that after controlling for the pre-treatment variables included in the propensity score, the probability of migrating should be random.

To control for pre-migration characteristics, we have included the following variables in the estimation of the propensity score:

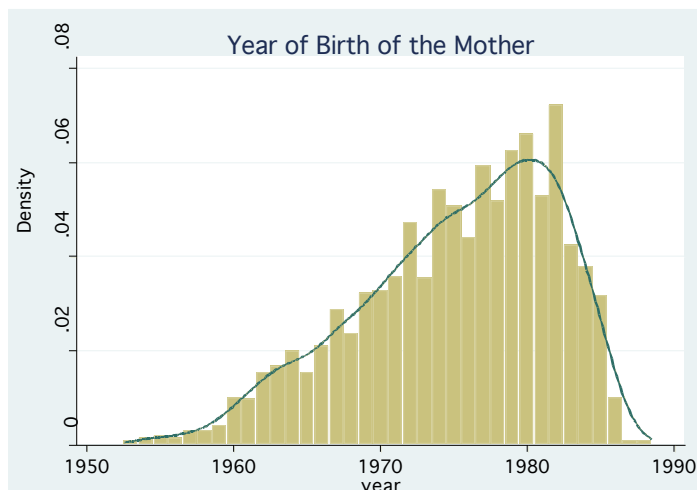
- Mother's age in years
- Mother's years of education
- Mother's height in centimetres
- Mother maternal language: Spanish/Quechua/Aymara/Other (Native from Jungle)
- Mother was or was not beaten as a child
- Mother's province of birth is different to that of the grandmother
- Emigration rate of the birth province
- Whether or not the district can be considered part of a high intensity conflict area.

By introducing these variables, we aim to control for the characteristics of the mother prior to her first migration episode and the characteristics of the birthplace.

We have added mother's height as a way of capturing genetic factors. One variable that may proxy pre-migration wealth is maternal education. We do not have additional pre-treatment variables to control for. Although the literature shows a high correlation between education and wealth, we must recognise that not all wealth variability may be captured by education so some care is required in interpreting our findings.

It is interesting to highlight the emigration rate of the birth province, which acts as a proxy for the networks available for migration. Larger migration networks may reduce the potential discrimination upon arrival and may increase the likelihood of a successful migration effort. To construct this instrument for migration, we collected information at the province level using the 1972 household and population censuses. Figure 3 shows the kernel density estimation for the year of birth of the children's mothers: as can be seen, most of the mothers (82 per cent) were born after 1972.

**Figure 3.** Kernel density estimation for mothers' year of birth



We also include the mother's height in centimetres collected in Round 1 to control for the genetic component/circumstances prior to the mother's migration and child's birth.<sup>3</sup> This variable could also bring some of the maternal grandparent's rearing practices and nutritional history into the propensity score estimation. Nevertheless, it is the best proxy available.

## 4.2 Key outcome variables

We concentrate our attention on child well-being variables associated with nutritional and cognitive development outcomes.

For nutritional indicators, we used the anthropometric indicators captured in the survey on weight at birth, stunting and malnutrition. Weight at birth is typically a very robust indicator of long-term health (Cogswell and Yip 1995). It is affected by a number of maternal factors, like pregnancy surveillance, immunisations, conditions of delivery, altitude of the birth place, etc. A second anthropometric indicator used here is height-for-age, a measure of the chronic nutritional status of the child. Using the World Health Organization (WHO) 2006 reference population, z-scores (HAZ) were computed.<sup>4</sup> Children with a HAZ of less than -2 were classified as stunted in growth (i.e., chronically malnourished). This short stature is related to chronic nutritional deficiency and/or previous acute malnutrition, which affects the child's growth and, eventually, limits his or her intellectual capacity. Finally, we construct an indicator of global malnutrition using weight-for-age z-scores.

As a proxy of cognitive development, we use the Peabody Picture Vocabulary Test (PPVT). The PPVT is a norm-referenced test of receptive vocabulary that can be used to evaluate the relative scores for children whose mothers have migrated against those whose have not. Its main objective is to measure vocabulary acquisition in people from 2.5 years old to adulthood. A detailed analysis of the validation of the PPVT instrument can be found in Cueto et al. (2008).<sup>5</sup>

## 4.3 Other key variables used in the analysis

Our study concerns not just child well-being indicators but also the ways in which they may be affected by different channels of migration. As we have found in the literature review, the channels that are typically considered are four: a) migration may affect the income opportunities of the child's parents; b) migration may bring the mother knowledge about better child-rearing practices, c) migration may positively or negatively affect access to public services; d) migration may generate stress, affecting the caregiver's perception and attitudes and ultimately her children's well-being.

To assess access to new economic opportunities and whether or not migration has brought an increase in household economic well-being in general, we explore the impact of migration on household per-capita income, per-capita expenditures and per-capita food consumption.

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3 The literature often shows the link between the mother's height and the child's nutritional outcomes. See Cameron and Lim (2007).

4 The WHO reference population was purposely designed to reflect the growth curve of healthy children living in conditions adequate for the fulfillment of their genetic growth potential.

5 Young Lives acknowledge that bias may arise when testing children with different languages and cultures using the same instruments, although measures were taken to adapt them to local contexts and languages and in no case were original standard scores used. Bias is an especially important consideration in testing children who speak minority languages. Reliability and validity results for test administrations and concerns are presented and discussed in Young Lives Technical Note 15. In particular, it is recommended that results should not be compared across countries, or across groups with different maternal languages within countries.

To explore maternal and child-rearing practices, we use the following indicators, which were captured in the first round:

- Did you receive prenatal care?
- Did you breastfeed?
- Did you receive a tetanus shot during pregnancy?
- Has the child got a vaccination card?
- When the child cries, what do you do? (breastfeed him/her; shout at or threaten him/her verbally; use physical violence; use other negative behaviours; do nothing)?
- Did the child attend a Care Centre?

Additionally, to explore child rearing practices in the second round, the following question was included:

- When the child cries, what do you do? (talk to him/her, scold him/her; ground him/her; shout or threaten him/her verbally; use physical violence; do nothing)

To explore access to public services, we look at access to electricity, drinkable water and sanitation, as well as access to pre-school facilities. Finally, to explore potential stressors, we look at the caregivers' perception and attitudes. In particular, we look at a 6-item scale that relates to trust; a 5-item scale that relates to self-efficacy; a 5-item scale that relates to pride/shame; and a 3-item scale that relates to discrimination. The items are based on statements made by people living in poverty gathered through qualitative work (e.g., Woodhead 1998; Narayan et al. 2000; Feeny and Boyden 2003; Caplan 2003).

## 5. Main results: Evaluating the impact of mother's migration background on child well-being outcomes

Table 2 shows the main descriptive statistics for child welfare outcomes for the children of migrated and non-migrated mothers, depending on whether or not the mothers were born in areas of the country where high intensity conflict prevailed when they were living there (i.e., the mid-eighties).

It is interesting to note that in general, those children born to mothers with a migration background are better off in most well-being indicators. They show a significantly lower level of stunting than those children whose mothers did not migrate. In addition, they show significantly higher levels of cognitive achievement as proxied by the Peabody test. These results, however, are accompanied by a few other indicators that may paint a more complex scenario: those children whose mother had a migration background before they were born show lower pre-school enrolment rates than those children whose mothers never migrated.

**Table 2.** *Child welfare outcomes according to migration origin*

|   | High intensity conflict areas |                     |              | Low intensity conflict areas |                     |              | Total sample    |                     |
|---|-------------------------------|---------------------|--------------|------------------------------|---------------------|--------------|-----------------|---------------------|
|   | (1)<br>Migrated               | (2)<br>Not Migrated | (3)<br>Total | (4)<br>Migrated              | (5)<br>Not Migrated | (6)<br>Total | (7)<br>Migrated | (8)<br>Not Migrated |
| <b>Round 1</b>                              |                               |                     |              |                              |                     |              |                 |                     |
| Weight at birth                             | 3243                          | 3084 ***            | 3138         | 3227                         | 3213                | 3219 ***     | 3230            | 3183 *              |
| Stunting                                    | 24.8%                         | 36.9% ***           | 32.9%        | 23.6%                        | 29.1% **            | 26.9% **     | 23.8%           | 31.0% ***           |
| Global malnutrition                         | 9.8%                          | 6.9%                | 7.8%         | 5.4%                         | 7.6% *              | 6.8%         | 6.3%            | 7.5%                |
| <b>Round 2</b>                              |                               |                     |              |                              |                     |              |                 |                     |
| Stunting                                    | 27.3%                         | 47.6% ***           | 40.8%        | 26.6%                        | 33.7% ***           | 31.0% ***    | 26.8%           | 37.0% ***           |
| Global malnutrition                         | 6.0%                          | 6.5%                | 6.3%         | 4.5%                         | 5.8%                | 5.3%         | 4.8%            | 5.9%                |
| Changes between rounds: Stunting            | -0.43                         | -0.30               | -0.35        | -0.22                        | -0.26               | -0.24 *      | -0.26           | -0.27               |
| Changes between rounds: Global malnutrition | -0.22                         | -0.27               | -0.25        | -0.43                        | -0.34 *             | -0.38 **     | -0.39           | -0.33               |
| Peabody test score                          | 31.0                          | 22.8 ***            | 25.5         | 31.3                         | 29.6 *              | 30.2 ***     | 31.2            | 27.9 ***            |
| Pre-school enrolment                        | 74.7%                         | 74.5%               | 74.6%        | 79.4%                        | 90.3% **            | 86.1% ***    | 78.4%           | 86.5% ***           |
| <b>Valid cases (N)</b>                      | <b>153</b>                    | <b>306</b>          | <b>459</b>   | <b>624</b>                   | <b>969</b>          | <b>1593</b>  | <b>777</b>      | <b>1275</b>         |

In general, these results carry over when we divide the sample according to those mothers who migrated and those who did not. In general, an important part of the variability in the sample can be attributed to the differences in well-being between those living in high intensity and low intensity conflict areas (column 3 versus column 6 in Table 2). However, even within these two groups, migrants show significantly higher nutritional indicators than those observed in children whose mother did not migrate before they were born. In the case of the indicator for cognitive development, the difference between children whose mothers have a migration background and those whose do not is significantly higher for the first group. But once the sample is divided among those mothers born in high intensity conflict areas and those who were not, we face another complex scenario where children with mothers from low intensity conflict areas have higher cognitive scores than those with mothers from high intensity conflict areas.

**Table 3.** *Main mother and child characteristics*

|                                      | High intensity conflict areas |                     |              | Low intensity conflict areas |                     |              | (7)<br>Migrated | (8)<br>Not Migrated |
|--------------------------------------|-------------------------------|---------------------|--------------|------------------------------|---------------------|--------------|-----------------|---------------------|
|                                      | (1)<br>Migrated               | (2)<br>Not Migrated | (3)<br>Total | (4)<br>Migrated              | (5)<br>Not Migrated | (6)<br>Total |                 |                     |
| <b>Round 1</b>                       |                               |                     |              |                              |                     |              |                 |                     |
| Index child is male                  | 55.6%                         | 46.7% *             | 49.7%        | 48.6%                        | 51.2%               | 50.2%        | 50.2%           | 50.0%               |
| Birth order                          | 2.85                          | 2.93                | 2.90         | 2.56                         | 2.50                | 2.52 ***     | 2.62            | 2.60                |
| Mother's age in years                | 27.32                         | 26.42               | 26.72        | 27.47                        | 26.43 ***           | 26.84        | 27.44           | 26.43 ***           |
| Mother's years of education          | 7.961                         | 6.838 ***           | 7.214        | 8.315                        | 7.931 *             | 8.081 ***    | 8.245           | 7.67 ***            |
| Mother's body mass index (BMI)       | 24.67                         | 24.22               | 24.37        | 24.95                        | 24.71               | 24.81 **     | 24.9            | 24.59 *             |
| Father was named in HH roster        | 83.0%                         | 82.4%               | 82.6%        | 87.3%                        | 81.8% ***           | 84.0%        | 86.5%           | 82.0% ***           |
| Head of HH is female                 | 13.1%                         | 15.4%               | 14.6%        | 11.5%                        | 11.6%               | 11.6% *      | 11.8%           | 12.5%               |
| Single mother                        | 8.5%                          | 10.5%               | 9.8%         | 5.9%                         | 10.9% ***           | 9.0%         | 6.4%            | 10.8% ***           |
| Wanted pregnancy                     | 51.3%                         | 56.8%               | 55.0%        | 53.9%                        | 54.0%               | 54.0%        | 53.4%           | 54.7%               |
| Violence in paternal grandparents HH | 34.0%                         | 23.2% **            | 26.8%        | 28.0%                        | 27.1%               | 27.5%        | 29.2%           | 26.2%               |

**Table 3.** *Main mother and child characteristics – continued*

|   | High intensity conflict areas |                        |              | Low intensity conflict areas |                        |              | (7)<br>Migrated | (8)<br>Not<br>Migrated |
|---|-------------------------------|------------------------|--------------|------------------------------|------------------------|--------------|-----------------|------------------------|
|   | (1)<br>Migrated               | (2)<br>Not<br>Migrated | (3)<br>Total | (4)<br>Migrated              | (5)<br>Not<br>Migrated | (6)<br>Total |                 |                        |
| <b>Round 1</b>                                    |                               |                        |              |                              |                        |              |                 |                        |
| Violence in maternal grandparents HH              | 43.1%                         | 31.1% **               | 35.1%        | 37.2%                        | 34.7%                  | 35.7%        | 38.4%           | 33.8%                  |
| Mother was slapped as a child                     | 60.1%                         | 42.8% ***              | 48.6%        | 54.2%                        | 45.9% ***              | 49.2%        | 55.3%           | 45.2% ***              |
| Mother is beaten by partner while drunk           | 52.3%                         | 49.7%                  | 50.5%        | 51.8%                        | 50.6%                  | 51.0%        | 51.9%           | 50.4%                  |
| Lives in rural area                               | 30.7%                         | 47.4% ***              | 41.8%        | 29.3%                        | 32.8%                  | 31.5% ***    | 29.6%           | 36.3% ***              |
| Wealth index                                      | 0.4361                        | 0.3144 ***             | 0.355        | 0.4631                       | 0.4239 ***             | 0.4392 ***   | 0.458           | 0.398 ***              |
| FONCODES poverty index 2000                       | 22.51                         | 27.69 ***              | 25.96        | 23.24                        | 24.4 ***               | 23.95 ***    | 23.1            | 25.19 ***              |
| Emigration rate in 1972                           | 27.4%                         | 29.2% **               | 28.6%        | 27.7%                        | 25.4% ***              | 26.3% ***    | 27.7%           | 26.3% ***              |
| Per capita expenditure in 1981                    | 1189                          | 1163                   | 1172         | 1258                         | 1314 ***               | 1292 ***     | 1285            | 1323 ***               |
| Growth rate between 72-81: Per capita expenditure | -34.5%                        | -62.0% **              | -52.8%       | -32.8%                       | -32.4%                 | -32.5% **    | 1245            | 1278 ***               |
| <b>Valid cases (N)</b>                            | <b>153</b>                    | <b>306</b>             | <b>459</b>   | <b>624</b>                   | <b>969</b>             | <b>1593</b>  | <b>777</b>      | <b>1255</b>            |

Some context-specific characteristics of the regions where the mothers of our sample were born also show a very distinctive pattern we need to control for. Firstly, as expected for the full sample, mothers who have migrated come from provinces that have higher emigration rates than those where mothers had no migration background. If we recognise that migration networks reduce the cost of migration, it could be expected that in those areas where migration is more prevalent, it is more likely that new migrants will take advantage of this. However, it is interesting to note that although this pattern emerges for the whole sample, it is basically driven by the difference observed in low intensity conflict areas. In areas where conflict was more pronounced, those who had migrated were born in areas where emigration rates are lower. This is consistent with the hypothesis that forced migration may be more exogenous.

Similarly, Table 3 shows that migrants are less likely to come from rural areas, and are more likely to come from areas that are worse off than those in which non-migrant mothers were born. Finally, we have some evidence that those mothers who have migrated are more likely to have suffered from domestic violence when they were young. Although this may not be causally related to migration, it is important to control for these pre-migration conditions, as they may be correlated with some intermediate welfare outcomes, in particular child-rearing practices. In general, these differences in characteristics may affect maternal migration and need to be accounted for in order to have a better assessment of what the intergenerational effects of migration might be.

## 5.1 Looking at multiple-cause migration

In order to control for the potential endogeneity of migration, we have included in the propensity score estimation several characteristics of the mother and of the region where she was born to try to capture the migration decision rule. The propensity score estimates can be found in Annex 3. This score was divided into blocks properly balanced. Robustness checks were executed between and within each block obtained to evaluate treated and controls. The variables were also tested against each other for balancing properties.



Using the propensity score, it is possible to construct a counterfactual, based on the information of those who have no migration background, to assess the average effect of migration on those who migrated (average treatment on the treated, or ATT). Table 4 shows the average outcome for both children whose mother migrated and comparable children whose mother did not migrate. To assure comparability, control and migrant mothers are compared only if their propensity falls within the common support. Annex 4 shows the characteristics of those who have fallen outside of the common support. As a result of these comparisons, 32 of the 2,052 children sampled were dropped from the analysis because, amongst other reasons, their mothers had much lower levels of education than did similar mothers in the control group.<sup>6</sup>

To control for an unobserved correlation of observations within sentinel sites in our sample, we estimate all of our equations including cluster fixed effects. This sentinel site fixed effect allows us to control for any remaining unobserved community characteristics that are constant across households, mothers or children within sentinel sites. Furthermore, in all of our estimations, we report robust standard errors to control for unobserved heterogeneity in the variance.

The results show that after controlling for pre-migration factors, children born to mothers who have migrated are likely to be less stunted than children whose mothers did not migrate. This effect is less robust in the case of global malnutrition where the differences, although in favour of those who migrated, are not statistically significant. However, changes in the z score for weight-for-age do show an improvement between Round 1 and Round 2.

It is interesting to note that the difference in nutritional outcome is not captured by the indicator we have at birth (weight at birth) and is only captured by stunting in Round 1 and Round 2, which is related to height for age. Although we do not have length at birth, it is apparent that this is one potential channel through which health can be improved. This will be pursued further below.

**Table 4.** *The impact of maternal migration on child welfare outcomes*

|  | Migrated | Controls | Average Treatment Effect (ATT) |     |
|--|----------|----------|--------------------------------|-----|
| Weight at birth                                  | 3230.0   | 3192.3   | 37.7                           |     |
| Stunting (OMS 2006) R1                           | 23.8%    | 30.0%    | -6.23%                         | *** |
| Stunting (OMS 2006) R2                           | 26.8%    | 35.3%    | -8.52%                         | *** |
| Changes between rounds in Z-scores of Height/Age | -0.263   | -0.239   | -0.025                         |     |
| Global malnutrition (OMS 2006) R1                | 6.3%     | 7.1%     | -0.78%                         |     |
| Global malnutrition (OMS 2006) R2                | 4.8%     | 6.0%     | -1.22%                         |     |
| Changes between rounds in Z-scores of Weight/Age | -0.391   | -0.323   | -0.07                          | ~   |
| Pre-school enrolment                             | 78.4%    | 88.2%    | -9.82%                         | *** |
| Peabody test score                               | 31.2     | 29.2     | 1.97                           | **  |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*). Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

Our results show that the higher cognitive development shown by the raw data when comparing children from migrant and non-migrant mothers carries over when we match migrant mothers with similar non-migrant mothers and control for pre-migration individual and context specific characteristics. Finally, it is somewhat surprising that pre-school enrolment is

6 Annex 5 presents the differences in pre-treatment variables before and after the common support was imposed and before and after matching.

lower for children of migrant mothers, as all migration episodes occurred before the child was born. This needs to be explored further as there are typically greater opportunities for pre-school attendance in areas of migration destiny.

Although the evidence of the average positive nutritional and cognitive development effects of migration are robust after controlling for pre-migration individual and contextual characteristics, it is important to understand the channels through which these positive effects are transmitted. To pursue this, we look at each of the channels examined in the literature (i.e., the income channel, the access to services channel, the information channel and the perception and attitudes channel).

Table 5 shows some basic indicators of access to services in both Round 1 and Round 2 for treatment and control groups. Here, it is evident that migrants have indeed gained access to key public infrastructure services, like electricity, piped and safe drinking water and sanitation facilities. The Young Lives questionnaire also included a general assessment of how clean and hygienic the dwelling was in Round 1. It was found that the home conditions of children of migrant mothers were better than those of children of non-migrant mothers.

One additional indicator shown in Table 5 deserves closer attention. The altitude of the districts where the children of migrant mothers live is significantly lower than the altitude of the districts where the children of non-migrant mothers live. This fact is particularly interesting since several authors have documented the critical role that altitude can play at birth (see, for example, Andrea 1994; Wilcox 2001; Thomas 2004). Cueto (2005) mentions that a recent review of the literature on high altitude and development concluded, among other things, that 'height and weight at birth are usually lower in high altitude'. The evidence shows that these differences are important, especially at altitudes of over 3,500 metres. As Table 5 indicates, the differences in the proportion of children above this threshold from migrated mothers and the control group are large and highly significant. This may be yet another channel through which migration may have had an effect on the observed nutritional outcomes.

Table 5 also shows that the income channel may be operating, as income and consumption per capita are greater in those households where the mother has a migration background.

**Table 5.** *The impact of maternal migration on access to public services and economic well-being*

|  | Migrated | Controls | Average Treatment Effect (ATT) |     |
|--|----------|----------|--------------------------------|-----|
| <b>Round 1</b>   |          |          |                                |     |
| District altitude over 3500m                                     | 10.6%    | 3.9%     | 6.70%                          | *** |
| Household hygiene ratio  | 0.74     | 0.70     | 0.05                           | *** |
| Has electricity  | 70.5%    | 64.7%    | 5.81%                          | *** |
| Has access to piped water into dwelling                          | 79.2%    | 78.4%    | 0.71%                          |     |
| Has access to sanitation facilities: Flush toilet or septic tank | 51.2%    | 43.0%    | 8.24%                          | *** |
| <b>Round 2</b>   |          |          |                                |     |
| Has electricity  | 77.9%    | 77.1%    | 0.78%                          |     |
| Has access to piped water into dwelling                          | 74.2%    | 69.4%    | 4.80%                          | **  |
| Has access to safe drinking water                                | 81.2%    | 76.8%    | 4.33%                          | **  |
| Has access to sanitation facilities: Flush toilet or septic tank | 54.4%    | 48.5%    | 5.84%                          |     |
| Asset value at median prices                                     | 1348.0   | 1170.6   | 177.40                         | ~   |
| Consumption per capita   | 194.3    | 176.3    | 18.04                          | **  |
| Income per capita  | 239.7    | 184.3    | 55.38                          | *   |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*\*) Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

Table 6 presents some evidence about the information channel. Here we summarise a number of child-rearing practices in Round 1, when the index child was between six and 18 month old. Table 7 shows the effect of migration on child-rearing practices in Round 2, when the child was between 4.5 and 5.5 years old. For Round 1, we have some evidence that mothers with a migration background use more positive caring practices when the child cries (holding him/her, calming him/her down, rocking him/her in her arms, giving him/her something to drink, taking him/her for a walk, giving him/her a toy, etc.) and fewer that include physical or verbal violence. For the second round, this effect is distributed among positive and negative rearing practices, showing no significant differences.

**Table 6.** *The impact of maternal migration on parental child-rearing practices (Round 1)*

|  | Migrated | Controls | Average Treatment Effect (ATT) |    |
|--|----------|----------|--------------------------------|----|
| <b>Round 1</b>                             |          |          |                                |    |
| Mother received prenatal care              | 93.3%    | 92.5%    | 0.81%                          |    |
| Received tetanus shot during pregnancy     | 71.4%    | 71.9%    | -0.51%                         |    |
| Child was breastfed                        | 99.2%    | 99.2%    | 0.01%                          |    |
| Child ever received any vaccine            | 98.7%    | 98.1%    | 0.62%                          |    |
| Child has a vaccination card               | 88.6%    | 89.3%    | -0.72%                         |    |
| Family uses detergent                      | 80.3%    | 76.3%    | 3.99%                          | ** |
| Child-care practices                       |          |          |                                |    |
| Positive/caring behaviours <sup>a</sup>    | 73.5%    | 70.4%    | 3.09%                          | ~  |
| Mother breastfeeds him/her when s/he cries | 41.7%    | 46.2%    | -4.54%                         | *  |
| Negatives behaviours                       |          |          |                                |    |
| Child suffered physical violence           | 1.2%     | 1.9%     | -0.77%                         | ~  |
| Child suffered verbal violence             | 0.6%     | 1.1%     | -0.41%                         |    |
| Mother did not attend him/her at all       | 2.1%     | 2.5%     | -0.43%                         |    |
| Other negatives behaviours <sup>b</sup>    | 0.6%     | 0.2%     | 0.43%                          |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*). Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

a This category includes: Holding him/her, calming him/her down, rocking him/her in her arms, giving him/her something to drink, taking him/her for a walk, giving him/her a toy.

b This category includes: Placing him/her face down on the mattress to stop him/her crying, forcibly restraining him/her using a blanket.

**Table 7.** *The impact of maternal migration on parental child-rearing practices (Round 2)*

|   | Migrated | Controls | Average Treatment Effect (ATT) |    |
|---|----------|----------|--------------------------------|----|
| <b>Round 2</b>                          |          |          |                                |    |
| Child has a vaccination card            | 96.7%    | 97.2%    | -0.52%                         |    |
| Child consumed proteins in past 24h     | 93.0%    | 91.3%    | 1.72%                          |    |
| Child-care Practices                    |          |          |                                |    |
| Positive/caring behaviours <sup>c</sup> | 29.3%    | 28.0%    | 1.33%                          |    |
| Child gets grounded                     | 15.1%    | 12.9%    | 2.20%                          |    |
| Negatives Behaviours                    |          |          |                                |    |
| Child suffered physical violence        | 29.5%    | 30.9%    | -1.42%                         |    |
| Child suffered verbal violence          | 13.2%    | 14.7%    | -1.53%                         |    |
| Mother did not attend him/her at all    | 0.4%     | 1.5%     | -1.12%                         | ** |
| Child is scolded                        | 12.6%    | 12.1%    | 0.55%                          |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*). Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

c This category includes: Talking to the child regarding his/her actions, advising him/her not to repeat his/her behaviour.

Yet another channel through which migration may explain the estimated positive child well-being outcomes is through changes in the mother's perceptions and attitudes. Table 8 presents the effects of migration on these variables, comparing mothers with a migration background with suitable controls and controlling for pre-migration factors that may affect these perceptions and attitudes. What we find here is an interesting mixed panorama, as mothers with a migration background are more likely to mistrust their neighbours and the environment they live in, but may have a stronger sense of pride than non-migrant mothers. This is true even where migrant mothers show a significantly higher sense of self-efficacy than mothers with no migration background. Although two of three indicators of discrimination show a higher rate for mothers who have migrated, these differences are not statistically significant.

In summary, our results show that, after controlling for pre-migration factors, mothers who have migrated have children whose nutritional and cognitive development outcomes are higher than those of children whose mother has not migrated. Further, there is evidence that several channels may be operating to generate these results, as higher income, greater access to services and more information about improved child-rearing practices may play a role. Finally, there may be other less positive outcomes associated with migration – such as reduced trust – that may generate migration stressors.

**Table 8.** *The impact of maternal migration on mother's perceptions and attitudes*

|  | Migrated | Controls | Average Treatment Effect (ATT) |     |
|--|----------|----------|--------------------------------|-----|
| <b>Round 2</b>   |          |          |                                |     |
| Trust  |          |          |                                |     |
| Thinks government's decisions are good for the people              | 41.9%    | 41.3%    | 0.63%                          |     |
| Trusts in local authorities to do their job properly               | 53.3%    | 52.9%    | 0.41%                          |     |
| Trusts neighbours to look after her home while out                 | 65.9%    | 69.4%    | -3.45%                         | ~   |
| Trusts neighbours to look after her children                       | 35.3%    | 42.2%    | -6.89%                         | *** |
| Thinks it is safe for her child to be out in the street            | 21.1%    | 24.6%    | -3.53%                         | *   |
| Efficacy   |          |          |                                |     |
| Could improve her current situation if she tried to                | 95.7%    | 95.4%    | 0.30%                          |     |
| Likes to plan for the future                                       | 96.5%    | 94.4%    | 2.15%                          | **  |
| Does not have a choice in picking child's school                   | 41.8%    | 49.0%    | -7.20%                         | *** |
| Could do little or nothing to help if her child was ill            | 21.7%    | 23.3%    | -1.54%                         |     |
| Can do little or nothing to help her child to do better at school  | 16.7%    | 23.3%    | -6.55%                         | *** |
| Pride and Shame  |          |          |                                |     |
| Feels proud of showing her home to relatives/friends               | 89.0%    | 90.0%    | -0.99%                         |     |
| Feels ashamed of the clothes she wears                             | 10.2%    | 14.2%    | -4.02%                         | **  |
| Feels proud of her partner/spouse's work                           | 93.9%    | 95.0%    | -1.09%                         |     |
| Feels proud of the work she does                                   | 96.1%    | 96.0%    | 0.06%                          |     |
| Feels proud of her children  | 98.5%    | 98.0%    | 0.46%                          |     |
| Discrimination   |          |          |                                |     |
| Is usually treated fairly and respectfully by others when shopping | 91.1%    | 90.0%    | 1.13%                          |     |
| People in the community look with disdain upon her family          | 15.6%    | 14.8%    | 0.85%                          |     |
| The teachers at pre-school/school are rude and hostile to her      | 7.3%     | 8.2%     | -0.97%                         |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*) Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

## 5.2 Looking at forced migration

As we have mentioned, people may self-select for migration, and the inclusion of pre-migration variables in the propensity estimation may be insufficient to adjust for the endogeneity of the migration decision. To evaluate whether these effects are truly the result of migration and not the effect of other variables, we now examine one particular migration group which, as we have mentioned, may be considered more exogenously driven: those who have undergone forced migration. By exploiting the uneven geographical spread of violence in Peru during the eighties and first half of the nineties as an exogenous source of variation in migration (conditional on some pre-treatment characteristics), we try to tackle the common problem of missing data on the counterfactual. This is done by comparing outcomes of children born to ‘mothers who migrated from high-violence areas before pregnancy’ to those of ‘mothers who did not migrate from low-violence areas before pregnancy’.

As we have seen in Section 4.1, forced migration was widespread during the period of internal war that affected Peru during the eighties and first half of the nineties, especially in the highlands. One may contend, however, that the level of violence faced by a community is unlikely to be independent of the characteristics of this community, thus potentially creating a problem of comparability between high-violence and low-violence areas. To evaluate if this is true, we have calculated the correlation between the level of violence at the district level and district level characteristics, like poverty, access to key public services and remoteness. As is apparent from Table 9, most of the correlations are low and not significant. Only remoteness, measured by the distance between the district and province capital, is marginally significant at the 10 per cent level. It is important to stress that the absence of correlation between district socioeconomic characteristics and violence intensity does not mean that violence was not heavily concentrated in poor areas, as is the case and is convincingly documented by many (e.g., CVR 2003). What the absence of correlation shows is that there were many other districts in Peru that were as poor but were not as heavily touched by the internal war. If this is the case, they may indeed be candidates for being part of the counterfactual.

**Table 9.** *Correlation between violence intensity and key socioeconomic variables (at the district level)*

|  |                     |
|--|---------------------|
| Poverty                                    | -0.017<br>(0.462)   |
| Malnutrition                               | 0.012<br>(0.605)    |
| Health post deficit                        | -0.009<br>(0.706)   |
| Remoteness: Kilometres to province capital | -0.045 *<br>(0.060) |
| Drinkable water under coverage (%)         | 0.009<br>(0.719)    |
| Sewerage under coverage (%)                | -0.006<br>(0.801)   |
| Electricity under coverage (%)             | -0.015<br>(0.521)   |

Note: Values in parenthesis are the significance level of each correlation coefficient. \* significant at 10%.

Sources: For socioeconomic data, Foncodes (2000) Poverty Map; for violence data, CVR (2003).

Non-migrant mothers living in high-intensity conflict areas may not be a sensible control group, as they – under the assumption that some endogeneity is still present – may have conditions that make them less likely to move. We therefore decided to use as a potential control group those mothers who did not migrate but lived in areas where low-conflict intensity prevailed. To construct the counterfactual, we needed to estimate the propensity score. This estimation is shown in Annex 3.

To ensure comparability, control and migrant mothers are compared only if their propensity falls within the common support. Annex 4 shows the characteristics of those to whom this applies. In the case of forced migration, a relatively large group (230 of the 1,122 cases) was left behind as they were, among other things, more educated and of non-indigenous origin compared to mothers from the control group.

Table 10 reproduces the same outcome indicators as those presented for the full sample. Here, it is again evident that children born to mothers who have migrated (in this case, mothers who have been forced to migrate) have improved nutritional outcomes compared to children whose mothers have no migration background.

**Table 10.** *The impact of maternal forced migration on child welfare outcomes*

|  | Migrated | Controls | Average Treatment Effect (ATT) |     |
|--|----------|----------|--------------------------------|-----|
| Weight at birth                                  | 3243     | 3115.7   | 127.3                          | **  |
| Stunting (OMS 2006) R1                           | 24.8%    | 42.3%    | -17.45%                        | *** |
| Stunting (OMS 2006) R2                           | 27.3%    | 42.0%    | -14.64%                        | *** |
| Changes between rounds in Z-scores of height/age | -0.430   | -0.142   | -0.287                         | *** |
| Global malnutrition (OMS 2006) R1                | 9.8%     | 12.0%    | -2.19%                         |     |
| Global malnutrition (OMS 2006) R2                | 6.0%     | 8.7%     | -2.67%                         |     |
| Changes between rounds in Z-scores of weight/age | -0.223   | -0.261   | 0.038                          |     |
| Pre-school enrolment                             | 74.7%    | 89.3%    | -14.66%                        | *** |
| Peabody test score                               | 31.0     | 28.8     | 2.175                          |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*). Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

It is interesting to note that in this case, the effect of migration on weight at birth is significant, with children of mothers forced to migrate having a weight at birth around 4 per cent greater than that of comparable children born to mothers with no migration background. Further, there is clear evidence of a catch-up in growth, as children of migrant mothers tend to falter less in growth than the children from the control group.

Regarding the second dimension of well-being under analysis, the results are not as clear as they were for overall migration. Here, the Peabody test scores from those children whose mothers were forced to migrate are not statistically different to those of children whose mothers have not migrated. Although the score continues to be higher, there is a much greater variability in the results, which means that this effect is not statistically significant. As we will see in the next section, however, there may be a sub-population for whom this effect continues to be significant.

**Table 11.** *The impact of maternal forced migration on access to public services and economic well-being*

|  | Migrated | Controls | Average Treatment Effect (ATT) |     |
|--|----------|----------|--------------------------------|-----|
| <b>Round 1</b>   |          |          |                                |     |
| District altitude over 3500m                                     | 3.92%    | 12.76%   | -8.84%                         | *** |
| Household hygiene ratio  | 0.74     | 0.66     | 0.083                          | *** |
| Has electricity  | 71.2%    | 65.0%    | 6.25%                          |     |
| Has access to piped water into dwelling                          | 78.4%    | 76.6%    | 1.82%                          |     |
| Has access to sanitation facilities: Flush toilet or septic tank | 41.8%    | 43.9%    | -2.07%                         |     |
| <b>Round 2</b>   |          |          |                                |     |
| Has electricity  | 78.7%    | 76.2%    | 2.52%                          |     |
| Has access to piped water into dwelling                          | 73.3%    | 65.7%    | 7.68%                          | ~   |
| Has access to safe drinking water                                | 78.7%    | 73.9%    | 4.78%                          |     |
| Has access to sanitation facilities: Flush toilet or septic tank | 44.7%    | 49.1%    | -4.4%                          |     |
| Asset value at median prices                                     | 1483     | 1314.21  | 168.79                         |     |
| Consumption per capita   | 191.0    | 163.9    | 27.06                          | ~   |
| Income per capita  | 179.9    | 172.8    | 7.11                           |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*). Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

To explore the channels that may be behind the result obtained here, Table 11 shows the effect of forced migration on access to public services and to income opportunities. Here, it is evident that the effect is only marginally significant in terms of improved access to safe drinking water. In addition, although there is no significant income effect, there may be a marginally significant impact on consumption per capita. What is robust is that significantly fewer of the children born at lower altitudes to mothers who have migrated are stunted. This suggests that the channel through which migration improves well-being may simply be that the children are more likely to have higher length at birth (all other things being equal).

When we look at the effect of forced migration on child-rearing practices for Round 1 (when the children were between 6 and 18 months) and for Round 2 (between 4.5 and 5.5 years), we see that the effect on improved practices is evident only in Round 2 data (see Tables 12 and 13).

**Table 12.** *The impact of maternal forced migration on parental child-rearing practices (Round 1)*

|   | Migrated | Controls | Average Treatment Effect (ATT) |     |
|---|----------|----------|--------------------------------|-----|
| <b>Round 1</b>                                |          |          |                                |     |
| Mother received prenatal care                 | 94.1%    | 92.2%    | 1.85%                          |     |
| Mother received tetanus shot during pregnancy | 68.0%    | 74.9%    | -6.89%                         |     |
| Child was breastfed                           | 100.0%   | 99.4%    | 0.64%                          | *** |
| Child ever received any vaccine               | 99.4%    | 98.0%    | 1.36%                          |     |
| Child has a vaccination card                  | 88.9%    | 89.4%    | -0.48%                         |     |
| Family uses detergent                         | 72.4%    | 78.4%    | -6.07%                         | *   |
| Child-care Practices                          |          |          |                                |     |
| Positive/caring behaviours                    | 73.2%    | 69.1%    | 4.15%                          |     |
| Mother breastfeeds him/her when s/he cries    | 48.4%    | 52.2%    | -3.80%                         |     |
| Negatives Behaviours                          |          |          |                                |     |
| Child suffered physical violence              | 1.3%     | 2.1%     | -0.79%                         |     |
| Child suffered verbal violence                | 0.7%     | 0.4%     | 0.24%                          |     |
| Mother did not attend him/her at all          | 0.7%     | 2.9%     | -2.20%                         | *   |
| Other negatives behaviours <sup>b</sup>       | 0.0%     | 0.0%     | 0.00%                          |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*). Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

a This category includes: Holding him/her, calming him/her down, rocking him/her in arms, giving him/her something to drink, taking him/her for a walk, giving him/her a toy.

b This category includes: Placing him/her face down on the mattress to stop him/her crying, forcibly restraining him/her using a blanket.

**Table 13.** *The impact of maternal forced migration on parental child-rearing practices (Round 2)*

|   | Migrated | Controls | Average Treatment Effect (ATT) |    |
|---|----------|----------|--------------------------------|----|
| <b>Round 2</b>                          |          |          |                                |    |
| Child has a vaccination card            | 97.3%    | 98.0%    | -0.63%                         |    |
| Child consumed proteins in past 24h     | 92.7%    | 85.9%    | 6.81%                          | ** |
| Child-care Practices                    |          |          |                                |    |
| Positive/caring behaviours <sup>c</sup> | 31.3%    | 28.7%    | 2.61%                          |    |
| Child gets grounded                     | 18.0%    | 8.0%     | 10.05%                         | ** |
| Negatives Behaviours                    |          |          |                                |    |
| Child suffered physical violence        | 29.3%    | 38.5%    | -9.16%                         | *  |
| Child suffered verbal violence          | 9.3%     | 14.4%    | -5.07%                         | *  |
| Mother did not attend him/her at all    | 0.0%     | 1.5%     | -1.51%                         | ** |
| Child is scolded                        | 12.0%    | 8.9%     | 3.09%                          |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*). Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

c This category includes: Talking to the child regarding his/her actions, advising him/her not to repeat his/her behaviour.



Finally, Table 14 shows the impact of forced migration on the mother's perception and attitudes. Again, the sense of distrust of neighbours is clear; while the positive effect of migration on efficacy, which was observed in the sample that included all migrants, has vanished.

In summary, the results show that forced migrant mothers have children with better nutritional outcomes than those without a migration background. The channels that may be operating to generate this effect may be related to improved access to public services and to the information channel through improved child-rearing practices. In this case, the income channel seems not to operate. In addition, other well-being impacts, such as improved cognitive abilities, do not seem to occur as they did for the full sample.

**Table 14.** *The impact of maternal forced migration on mother's perceptions/attitudes*

|  | Migrated | Controls | Average Treatment Effect (ATT) |    |
|--|----------|----------|--------------------------------|----|
| <b>Round 2</b>   |          |          |                                |    |
| Trust  |          |          |                                |    |
| Thinks government's decisions are good for the people              | 42.3%    | 40.6%    | 1.73%                          |    |
| Trusts in local authorities to do their job properly               | 55.0%    | 54.0%    | 0.99%                          |    |
| Trusts neighbours to look after her home while out                 | 66.7%    | 66.8%    | -0.08%                         |    |
| Trusts neighbours to look after her children                       | 31.7%    | 45.3%    | -13.60%                        | ** |
| Thinks it is safe for her child to be out in the street            | 22.0%    | 22.8%    | -0.82%                         |    |
| Efficacy   |          |          |                                |    |
| Could improve her current situation if she tried to                | 96.0%    | 93.8%    | 2.17%                          |    |
| Likes to plan for the future                                       | 95.7%    | 94.4%    | 1.27%                          |    |
| Does not have a choice in picking child's school                   | 43.3%    | 47.9%    | -4.58%                         |    |
| Could do little or nothing to help if her child was ill            | 25.7%    | 22.5%    | 3.20%                          |    |
| Can do little or nothing to help her child to do better at school  | 19.3%    | 24.4%    | -5.09%                         |    |
| Pride and Shame  |          |          |                                |    |
| Feels proud of showing her home to relatives/friends               | 90.7%    | 87.9%    | 2.74%                          |    |
| Feels ashamed of the clothes she wears                             | 10.7%    | 18.9%    | -8.25%                         | ** |
| Feels proud of her partner/spouse's work                           | 93.0%    | 94.5%    | -1.57%                         |    |
| Feels proud of the work she does                                   | 96.0%    | 95.7%    | 0.34%                          |    |
| Feels proud of her children  | 98.7%    | 98.2%    | 0.44%                          |    |
| Discrimination   |          |          |                                |    |
| Is usually treated fairly and respectfully by others when shopping | 90.7%    | 89.0%    | 1.71%                          |    |
| People in the community look with disdain upon her family          | 18.3%    | 15.8%    | 2.53%                          |    |
| The teachers at pre-school/school are rude and hostile to her      | 6.1%     | 7.8%     | -1.62%                         |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*\*). Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

### 5.3 Impact heterogeneity

As we have seen in the literature review, there is ample evidence highlighting the fact that the impact of migration may not be homogenous across groups or across migration trajectories. Given this, it is worthwhile exploring whether or not this is the case for our sample.

Table 15 shows the different kinds of migration patterns that can be observed in the Young Lives data if we differentiate them according to their urban/rural origin and destiny. Here, it is evident that urban to urban migration and rural to urban migration are the two most important

migration flows, although the other ones (urban to rural and rural to rural) do have some importance, especially when one looks at the full sample. As could be expected, in high intensity conflict areas, migration from urban to rural areas is much less common than the other migration trajectories.

**Table 15.** *Young Lives' maternal migration trajectories*

|   |       | TO    |       |        |
|---|-------|-------|-------|--------|
|   |       | Urban | Rural | Total  |
| <b>A. All Migrants</b>                                |       |       |       |        |
| FROM  | Urban | 32.5% | 11.5% | 44.0%  |
|   | Rural | 32.8% | 23.2% | 56.0%  |
|   | Total | 65.3% | 34.7% | 100.0% |
| <b>B. Migrants from High Intensity Conflict Areas</b> |       |       |       |        |
|   |       | TO    |       |        |
|   |       | Urban | Rural | Total  |
| FROM  | Urban | 27.6% | 6.3%  | 33.9%  |
|   | Rural | 40.9% | 25.2% | 66.1%  |
|   | Total | 68.5% | 31.5% | 100.0% |
| <b>C. Migrants from Low Intensity Conflict Areas</b>  |       |       |       |        |
|   |       | TO    |       |        |
|   |       | Urban | Rural | Total  |
| FROM  | Urban | 33.7% | 12.7% | 46.5%  |
|   | Rural | 30.8% | 22.7% | 53.5%  |
|   | Total | 64.5% | 35.5% | 100.0% |

Source: Young Lives Peru. Younger Cohort

How different are the results shown in the last section when we further divide the sample according to migration trajectories? Table 16 summarises the evidence for the overall migration group and for each of the four migration trajectories. Detailed results based on the propensity matching estimation can be seen in Annex 6.

First, the results indicate that the effect of migration on children's nutritional well-being is positive for most migration subgroups, but is particularly strong for those who migrate from rural to urban areas. For those who have followed other migration trajectories, the effects are less strong but are still statistically significant. There is also some evidence of catch-up growth, as those migrating from urban to urban and from rural to urban areas show a smaller deviation from the normal growth curve than that observed for similar groups who have not migrated.

**Table 16.** *Heterogeneity of impacts of maternal migration*

| Migration Trajectories | Child Well-being  | Income/ Expenditure                            | Access to Public Services  | Child-rearing Practices      | Mother's Perceptions & Attitudes  |
|------------------------|---|--|--|------------------------------|---|
| Urban $\diamond$ Urban | Nutrition (height/age) +<br>catch-up<br>Cognitive achievement score $\approx$                 | Income $\approx$<br>Consumption $\approx$      | Prenatal care access $\approx$<br>Pre-school enrolling –<br>Access to water R2 +<br>Access to sewerage R1 +          | R1 +<br>R2 +                 | Sense of trust –<br>Sense of efficacy +<br>Sense of pride +<br>Sense of discrimination $\approx$                            |
| Rural $\diamond$ Urban | Nutrition (height/age) R2 +<br>Cognitive achievement score +                                  | Income +<br>Consumption +                      | Prenatal care access +<br>Pre-school enrolling –<br>Access to electricity & sewerage R1 +<br>Access to sewerage R2 + | R1 –<br>R2 –                 | Sense of trust $\approx$<br>Sense of efficacy +<br>Sense of pride +<br>Sense of discrimination $\approx$                    |
| Urban $\diamond$ Rural | Nutrition (height/age) $\approx$<br>weight-for-age –<br>Cognitive achievement score $\approx$ | Income $\approx$<br>Consumption + (marginally) | Prenatal care access + (marginally)<br>Access to public services $\approx$   | R1 $\approx$<br>R2 $\approx$ | Sense of trust +<br>Sense of efficacy $\approx$<br>Sense of pride –<br>Sense of discrimination $\approx$                    |
| Rural $\diamond$ Rural | Weight at birth +<br>Nutrition (height/age) R1 +  | Income $\approx$<br>Consumption $\approx$      | Pre-school enrolling –<br>Access to sewerage R1 –<br>Access to water R2 – (marginally)                               | $\pm$ R1 –<br>R2 –           | Sense of trust $\approx$<br>Sense of efficacy $\approx$ (marginally)<br>Sense of pride –<br>$\pm$ Sense of discrimination – |

Note: + means statistically significant positive impact; - means statistically significant negative impact;  $\approx$  means the treated and control groups have statistically similar outcome values.

As for overall migration, the income channel seems to operate only where the migration is rural to urban, in which case both income and consumption are positively and significantly affected by migration. For all other migration trajectories, income per capita and consumption per capita of migrants are not significantly higher than those of non-migrants. In the case of access to public services, the effects are again strong for rural to urban migration. This effect also includes improved access to prenatal services. Those who have migrated from urban to urban regions (typically from a small town to a larger city), the effect of migration on access to public services is positive but less strong, being important in the case of access to improved water services. Finally, the results indicate that effects on positive child-rearing practices are significant only in the group following an urban to urban trajectory.

## 5.4 Other robustness checks

### 5.4.1 Potential selectivity bias due to attrition

One may contend that some of the differences we have obtained when looking at second round data may be due to potential selectivity bias resulting from attrition between the first and second rounds. In Annex 7, we show the differences in key observables between those who are part of the panel and those who we could not trace in Round 2. In general, very few variables are statistically different between these two groups. However, we can see that, on average, children later lost through attrition have a slightly higher global malnutrition rate and were less likely to have received any prenatal care.

Following Fitzgerald et al. (1998), we test potential selectivity problems due to attrition by comparing the significance of the first round outcome variables with a model that uses whether or not the child outcome variable was measured in Round 2 as a left hand side variable. Results show that, although global malnutrition rate may be statistically lower, once we control for observable characteristics the difference vanishes.

#### 5.4.2 *Alternative definitions of high intensity conflict areas*

A second robustness check we performed is that of changes in the definition of who is considered to have undergone forced migration. In Annex 8, we present the comparison between the definition of high-intensity conflict area used in the study and a stricter definition (expanding from 2.5 to 3 standard deviation of the log of violent cases as the threshold for considering a district as violent). The results clearly show that the positive effect of migration on child well-being is robust to this change in definition.

#### 5.4.3 *Alternative matching techniques*

We may assert that the matching method could account for some of the effects that we have shown here. To evaluate this, we present in Annex 9 an alternative estimation of the average treatment effect on the treated using kernel matching and nearest neighbour matching. Again, although the results change a little between methods, the main results hold.

#### 5.4.4 *Pre-treatment tendencies are statistically similar in both high intensity conflict districts and low intensity conflict districts. In particular, we compared 1972-1981 growth.*

Finally, it must be considered that, although we control for the level of economic activity observed in the districts in which the mother was born, it may be that the economic growth in the district before migration occurred may have taken place at different rates. If this was the case, the results may not be valid. To test this, we have evaluated pre-treatment growth for the districts in which mothers were born. It is interesting to note that growth between 1972 and 1981 was not statistically different on average between those districts which were subject to high violence during the 1980-1992 period and those which were not (average growth was -0.3 per cent in high intensity conflict areas and 0.0 per cent in the other areas). This being the case, we can be confident that the results obtained here are not subject to this bias.

## 6. Discussion

The goal of this paper has been to identify the impact of maternal migration (before the child was born) on different dimensions of child well-being. To do this, we approached maternal migration as a sort of 'treatment', with child outcomes being the result of this treatment, conditional on other observables. Due to the common problem of missing data on the counterfactual, we rely on propensity score matching to identify a suitable comparison group to estimate the average treatment effect on the treated. Since selection on unobservables is presumed, the paper also exploits the uneven geographical spread of violence which occurred in Peru during the eighties and first half of the nineties as an exogenous source of variation in migration (conditional on pre-treatment characteristics). More explicitly, we test differences between the average outcomes of children born to 'mothers who migrated from

high-violence areas before pregnancy' and outcomes of children born to 'mothers who did not migrate from low-violence areas before pregnancy'.

Migration can affect not only those who migrate but may also have intergenerational effects. Looking at those mothers in the Young Lives longitudinal project with a migration history, and comparing them to suitable controls, we find that the mothers' migration has had a positive impact on the nutritional outcomes of their offspring.

However, we also found that there is an important impact heterogeneity, as different types of migration trajectories (rural to rural; rural to urban – to intermediate cities or to the capital, Lima) can be associated with the prevalence of different channels through which migration affects child well-being. Those channels are the income channel, as migration may help find new income-generating opportunities; the information channel, as migration allows for gathering information about child-care and health related practices; and the access to services channel, as migration may facilitate or hinder (through exclusion) access to key public services.

We have shown that, overall, several channels may be operating to generate the positive impact of migration on child well-being, as higher income, better access to services and more information about improved child-rearing practices may be playing a role. However, there may be other less positive outcomes associated with migration, like lower trust, that may generate migration stressors that reduce the positive effect of migration.

We have shown that forced migration has an effect on the intergenerational transmission of poverty by affecting children's well-being outcomes. However, the results only carry over in the case of nutrition (lower stunting). In the case of cognitive development, there is no evidence that forced maternal migration has a positive effect on child outcome. We have shown that it is through the effect that forced migration may have on child-rearing practices that child nutrition may be positively affected. Migration to lower-altitude areas may also play a role through its impact in terms of greater length at birth.

Finally, although we do not have conclusive evidence on the relative importance of each of the channels through which migration affects child well-being, we do have evidence that points out that there is considerable impact heterogeneity. This highlights the fact that different migration trajectories may be associated with higher child well-being impacts and different channels through which migration affects child well-being outcomes. There is evidence that the income channel only operates in the case of rural to urban migration. In the other cases, the effect of improved access to services and improved child-rearing practices may be behind the observed effect.

We have shown that the heterogeneity of the results masks some negative effects, especially those related to the mother's perception and attitudes (lower sense of trust and efficacy for some subsamples). These negative stressors, together with the fact that the income channel may not be operating for those who follow the rural to rural and urban to rural trajectories, may open the door for complementary policies to tackle such vulnerabilities.

The Peruvian Truth and Reconciliation Commission was established by a government mandate to discover the root causes of the political violence; to aid the courts in clarifying crimes involving human rights abuses and determining criminal responsibility; to elaborate proposals for reparation for the victims and their families; to make recommendations for improving human rights protection; and to establish mechanisms to follow up implementation of its recommendations. Through the conclusions of the Commission, an Integral

Reparations Plan was proposed. After two years of debate, the Integral Reparations Plan was approved by Congress on July 20, 2005.

The allocated fund contemplates individual and collective reparations to those affected by the Peruvian internal war. Our findings suggest that part of this fund could be allocated to improve access to basic public services, access to prenatal care, immunisation and pre-school facilities, all of which may have significant positive effects on child well-being.

## **6.1 Further research**

One of the problems of splitting the sample according to those who have been exposed to a substantial level of violence derived from conflict and those who have had little or no exposure is that the division may be somewhat arbitrary. Information captured directly from the household Peruvian Young Lives questionnaire includes questions which aim to capture the main reasons for the mother's migration. This information shows clearly that the reported reason for migration, even in cases where extreme conditions prevailed, was not necessarily conflict-related. However, we know that conflict-related motivations may be masked or may interact with other reasons for migrating. This evidence alerts us to the need to complement the analysis to be performed with complementary qualitative analysis, based on a carefully selected subsample, to try to identify diverse migration experiences.

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# Annex 1:

## Definition of main variables used in this study

### 1. Mother who has migrated

Mother who has moved to a district of residence different to where she was born and which is not a regional capital. In the latter case, we consider it to be a move between different locations within the city and not migration.

### 2. High intensity conflict district

Among those districts that have a non-zero number of violent acts, auxiliary variables were used. Population density was also taken into account. Taking a logarithmic function of violent cases per 1,000 inhabitants, we use as a threshold of 2.5 standard deviations of this logarithmic function. Sensibility analyses were also made, testing for 2 SD and 3 SD of the log of violent cases. The data was obtained from CVR (2003).

### 3. Low intensity conflict district

Defined by those districts that do not account for a significant number of violent episodes as a complement to those districts that show high intensity of conflict.

### 4. Ever received any vaccine

Children who have received any shot of the following vaccines: BCG (1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup>), polio (new born, 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup>), hep. B (1<sup>st</sup> or 2<sup>nd</sup>), measles (1<sup>st</sup> or 2<sup>nd</sup>), yellow fever. Information collected using first round data.

### 5. Child-care practices

**For Round 1:** Positive/caring behaviours (holding him/her, calming him/her down, rocking him/her in arms, giving him/her something to drink, taking him/her for a walk, giving him/her a toy); mother breastfeeds him/her when s/he cries; negative behaviours (placing him/her face down on the mattress to stop him/her crying, forcibly restraining him/her using a blanket).

**For Round 2:** Positive/caring behaviours (talking to the child regarding his/her actions, advising him/her not to repeat his/her behaviour); child gets grounded; negative behaviours (child is scolded, suffers verbal and physical violence, mother does not attend him/her at all).

### 6. Chronic malnutrition (stunting)

Dummy variable that equals one for those children who have a z-score of height-for-age (H/A) lower than -2 standard deviations. Obtained according to the WHO 2006 standards.

### 7. Global malnutrition

Dummy variable that equals one for those children who have a z-score of weight-for-age (W/A) lower than -2 standard deviations. Obtained according to the WHO 2006 new standards.

### **8. Peabody score**

This corrected score measures receptive vocabulary children aged 2.5 years and above. Delivered orally and individually, this has no time frame. The score is proved to have a strong correlation with some IQ measures (Wechsler and McCarthy). In the Young Lives survey, some items were eliminated due to not having the proper psychometric characteristics.

### **9. Emigration rate**

Percentage of native people who left the province where they were born, according to the 1972 Population Census.

### **10. Altitude**

We measure altitude by the elevation of the district capital.

### **11. Monthly consumption per capita**

**For Round 2:** The sum of food expenditure (including self-consumption), utilities expenditure, extraordinary expenditure (licenses, car insurance, carnivals, house taxes, furniture, etc.) divided by the number of family members living at home.

### **12. Monthly income per capita**

**For both rounds:** The sum of agricultural and non-agricultural earnings. This includes monetary and non-monetary income, wage and non-wage income, transfers, donations and the estimated value of self-consumption. The aggregate income is divided by the number of family members living at home.

## Annex 2:

### Alternative definitions of conflict-induced migration variable

To evaluate the robustness of the relationship between conflict-related migration, child-rearing practices and child well-being outcomes, we have constructed four indicators of conflict-related migration relating to the intensity of the conflict. First we transformed the variable 'number of victims', standardising it by square kilometre and per inhabitant. If we consider only those for whom each of the transformed variables are strictly positive, we can show that a log transformation of these variables achieves normality. The transformed variables allow us to define high intensity conflict areas as those where both transformed indicators had a value greater than 2.5 standard deviations above the mean. To evaluate the robustness of our results, we establish different cutting points, starting with 2 standard deviations above the mean and going up to 3.5 standard deviations.

Table A.1 shows how the Young Lives sample is distributed between migrants and non-migrants, and between migrations from high and low intensity areas. We distinguish between those who changed residence within a district (moved) and those who moved to a residence away from their district of origin (migrated).

**Table A.2.1** *Definition of Conflict-related Migration Episodes (Sensitivity Analysis)*

| Alternative cutting points | High Intensity Conflict area |       |        |       | Low Intensity Conflict area |       |        |       |
|----------------------------|------------------------------|-------|--------|-------|-----------------------------|-------|--------|-------|
|                            | Migrated                     | Moved | Stayed | Total | Migrated                    | Moved | Stayed | Total |
| 2 St Dev.                  | 299                          | 173   | 212    | 684   | 656                         | 325   | 387    | 1368  |
| 2.5 St Dev.                | 176                          | 140   | 143    | 459   | 779                         | 358   | 456    | 1593  |
| 3 St Dev.                  | 90                           | 64    | 65     | 219   | 865                         | 434   | 534    | 1833  |

Note: We used Log(Violence cases) for those areas with strictly positive violence episodes and calculated the standard deviation (normality was not rejected).

# Annex 3:

## Propensity score estimates

**Table A.3.1** *Propensity Score Estimates: Mother Migrated vs. Mother did not Migrate*

| <b>Migrated (Dependant)</b>                                   | <b>Alternative included</b> |     |
|---|-----------------------------|-----|
| Province of birth is different for the mother and grandmother | 0.075<br>(0.063)            |     |
| Emigration rate of the birth province                         | 1.464<br>(0.322)            | *** |
| Mother's age in years (Round 1)                               | 0.008<br>(0.004)            | **  |
| Mother's years of education (Round 1)                         | 0.021<br>(0.008)            | **  |
| Mother's height in cms. (Round 1)                             | -0.024<br>(0.005)           | *** |
| Mother language: Spanish                                      | 0.196<br>(0.072)            | *** |
| Mother was beaten as a child                                  | 0.184<br>(0.058)            | *** |
| Maternal grandparents' household was violent                  | 0.104<br>(0.060)            | *   |
| Constant  | 2.304<br>(0.821)            | *** |
| <b>Cases (N)</b>  | <b>2020</b>                 |     |

Standard Errors in parenthesis. \* significant at 5% level; \*\* significant at 1% level

**Table A.3.2** *Propensity Score Estimates: Mother Migrated from a High-intensity Conflict Area vs. Mother did not Migrate from a Low-intensity Conflict Area*

| <b>Migrated from High Intensity Violent districts (Dependant)</b> | <b>Alternative included</b> |  |
|---|-----------------------------|--|
| Province of birth is different for the mother and grandmother     | -0.011<br>(0.128)           |  |
| Altitude (m.o.s.l)  | 0.000<br>(0.000)            |  |
| Emigration rate of the birth province                             | -1.177<br>(0.901)           |  |
| Change rate: Birth province per capita expenditure '72-'81        | 0.1259<br>(0.041)           |  |
| Mother's age in years (Round 1)                                   | 0.013<br>(0.008)            |  |
| Mother's years of education (Round 1)                             | -0.006<br>(0.020)           |  |
| Mother's height in cms. (Round 1)                                 | -0.025<br>(0.011)           |  |
| Father's years of education (Round 1)                             | 0.075<br>(0.021)            |  |
| Mother language: Spanish  | -0.111<br>(0.167)           |  |
| Mother was beaten as a child                                      | 0.300<br>(0.117)            |  |
| Maternal grandparents' household was violent                      | 0.242<br>(0.116)            |  |
| Constant  | 1.181<br>(1.689)            |  |
| <b>Cases (N)</b>  | <b>899</b>                  |  |

Standard Errors in parenthesis. \* significant at 5% level; \*\* significant at 1% level

# Annex 4:

## Differences in characteristics between those who were left out of common support and those included

**Table A.4.1** *Mother Migrated vs. Mother did not Migrate*

|   | Alternative |           |
|---|-------------|-----------|
|   | Included    | Missing   |
| Migrated  | 37.9%       | 37.5%     |
| Province of birth is different for the mother and grandmother | 36.3%       | 28.1%     |
| Emigration rate of the birth province                         | 26.8%       | 27.6%     |
| Mother's age in years (Round 1)                               | 26.8        | 24.9      |
| Mother's years of education (Round 1)                         | 7.902       | 6.316     |
| Mother's height in cms. (Round 1)                             | 149.9       | 148       |
| Mother language: Spanish                                      | 68.2%       | 65.6%     |
| Mother was beaten as a child                                  | 49.0%       | 53.1%     |
| Maternal grandparents' household was violent                  | 35.4%       | 46.9%     |
| District was high intensity violent                           | 22.2%       | 34.4%     |
| <b>Cases (N)</b>  | <b>2020</b> | <b>32</b> |

Full sample differences are significant at: 10% (\*\*); 5% (\*) and at 1% (\*\*\*)

**Table A.4.2** *Mother Migrated from a High-intensity Conflict Area vs. Mother did not Migrate from a Low-intensity Conflict Area*

|   | Alternative |            |     |
|---|-------------|------------|-----|
|   | Included    | Missing    |     |
| Migrated from high intensity violent districts                | 13.9%       | 12.6%      |     |
| Province of birth is different for the mother and grandmother | 35.9%       | 39.6%      |     |
| Altitude (m.a.s.l)  | 1468        | 1382       |     |
| Emigration rate of the birth province                         | 25.6%       | 25.9%      |     |
| Change rate: Birth province per capita expenditure '72-'81    | -0.3074     | -0.4006    |     |
| Mother's age in years (Round 1)                               | 27.3        | 23.4       | *** |
| Mother's years of education (Round 1)                         | 7.872       | 8.182      |     |
| Mother's height in cms. (Round 1)                             | 150.20      | 149.70     |     |
| Father's years of education (Round 1)                         | 8.93        | 4.69       | *** |
| Mother language: Spanish                                      | 71.9%       | 78.3%      | *   |
| Mother was beaten as a child                                  | 53.5%       | 26.1%      | *** |
| Maternal grandparents' household was violent                  | 35.3%       | 37.8%      |     |
| <b>Cases (N)</b>  | <b>892</b>  | <b>230</b> |     |

Full sample differences are significant at: 10% (\*\*); 5% (\*) and at 1% (\*\*\*)



# Annex 5:

## Difference in pre-treatment characteristics before and after matching

**Table A.5.1.** *Pre-Treatment Characteristics*

|   | Ever migrated |          |     | Migration from high violence areas |          |     |
|---|---------------|----------|-----|------------------------------------|----------|-----|
|   | Treatment     | Controls |     | Treatment                          | Controls |     |
| Province of birth is different for the mother and grandmother | 37.6%         | 35.4%    |     | 32.0%                              | 37.4%    |     |
| Altitude (metres over sea level)                              | -             | -        |     | 2214                               | 1330     | *** |
| Emigration rate of the birth province                         | 27.7%         | 26.3%    | *** | 27.4%                              | 25.4%    | **  |
| Change rate: Birth province per capita expenditure '72-'81    | -             | -        |     | -34.5%                             | -32.4%   |     |
| Mother's age in years (Round 1)                               | 27.4          | 26.4     | *** | 27.3                               | 26.4     |     |
| Mother's years of education (Round 1)                         | 8.2           | 7.7      | *** | 8.0                                | 7.9      |     |
| Mother's height in cms. (Round 1)                             | 149.5         | 150.2    | *** | 148.5                              | 150.4    | *** |
| Father's years of education (Round 1)                         | -             | -        |     | 9.6                                | 8.7      | **  |
| Mother's language: Spanish                                    | 72.7%         | 65.4%    | *** | 60.1%                              | 75.2%    | *** |
| Mother was beaten as a child                                  | 55.3%         | 45.2%    | *** | 60.1%                              | 45.9%    | *** |
| Maternal grandparents' household was violent                  | 38.4%         | 33.8%    | **  | 43.1%                              | 34.7%    | **  |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)

**Table A.5.2.** *Pre-Treatment Characteristics after Excluding Those Not in the Common Support*

|   | Ever migrated |          |     | Migration from high violence areas |          |     |
|---|---------------|----------|-----|------------------------------------|----------|-----|
|   | Treatment     | Controls |     | Treatment                          | Controls |     |
| Province of birth is different for the mother and grandmother | 37.9%         | 35.4%    |     | 30.7%                              | 36.7%    |     |
| Altitude (m.o.s.l.)   | -             | -        |     | 2217                               | 1347     | *** |
| Emigration rate of the birth province                         | 27.6%         | 26.3%    | *** | 27.3%                              | 25.3%    | **  |
| Change rate: Birth province per capita expenditure '72-'81    | -             | -        |     | -35.7%                             | -29.9%   |     |
| Mother's age in years (Round 1)                               | 27.5          | 26.5     | *** | 28.1                               | 27.2     |     |
| Mother's years of education (Round 1)                         | 8.2           | 7.7      | *** | 7.8                                | 7.9      |     |
| Mother's height in cms. (Round 1)                             | 149.5         | 150.2    | *** | 148.8                              | 150.5    | *** |
| Father's years of education (Round 1)                         | -             | -        |     | 9.6                                | 8.8      | **  |
| Mother language: Spanish                                      | 72.4%         | 65.7%    | *** | 58.1%                              | 74.1%    | *** |
| Mother was beaten as a child                                  | 55.2%         | 45.2%    | *** | 64.5%                              | 51.7%    | *** |
| Maternal grandparents' household was violent                  | 38.0%         | 33.7%    | **  | 46.0%                              | 33.6%    | *** |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)

**Table A.5.3.** *Pre-Treatment Characteristics after Balancing by Block (Treatment 1: Mother Migrated)*

|   | <b>Block 1</b> | <b>Block 2</b> | <b>Block 3</b> | <b>Block 4</b> | <b>Block 5</b> | <b>Block 6</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|
| Province of birth is different for the mother and grandmother | -2.65 ***      | -1.42          | 1.12           | 1.18           | -0.14          | 0.66           |
| Emigration rate of the birth province                         | 1.19           | 2.53 **        | -2.11 **       | -1.07          | -1.68 *        | -1.92 *        |
| Mother's age in years (Round 1)                               | 1.75 *         | -1.86 *        | 0.62           | 2.15 **        | 0.12           | -1.77 *        |
| Mother's years of education (Round 1)                         | -1.24          | -2.09 **       | 1.46           | 0.29           | 0.59           | 2.08 **        |
| Mother's height in cms. (Round 1)                             | -0.30          | -0.24          | 1.25           | 0.04           | 0.34           | -0.37          |
| Mother language: Spanish                                      | -0.47          | -0.40          | 0.22           | -2.09 **       | 0.48           | 0.99           |
| Mother was beaten as a child                                  | 0.44           | -1.34          | 0.66           | 0.33           | -0.40          | -0.54          |
| Maternal grandparents' household was violent                  | -0.21          | -1.51          | 0.43           | -0.45          | 1.96 **        | 0.61           |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*\*)

**Table A.5.4** *Pre-Treatment Characteristics after Balancing by Block (Treatment 2: Mother Migrated from High Intensity Conflict Areas)*

|   | <b>Block 1</b> | <b>Block 2</b> | <b>Block 3</b> | <b>Block 4</b> | <b>Block 5</b> | <b>Block 6</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|
| Province of birth is different for the mother and grandmother | 0.69           | -0.16          | -0.22          | -0.50          | 1.11           | .              |
| Altitude (m.o.s.l)  | -1.00          | -0.47          | 1.70 *         | -2.20 **       | -1.18          | 4.40 ***       |
| Emigration rate of the birth province                         | -0.15          | -0.64          | 1.94 *         | -0.90          | -0.64          | -1.45          |
| Change rate: Birth province per capita expenditure '72-'81    | -1.73 *        | -1.93 *        | 0.66           | 1.33           | -0.37          | -0.35          |
| Mother's age in years (Round 1)                               | 0.02           | -0.34          | -0.72          | 0.43           | 0.91           | -0.27          |
| Mother's years of education (Round 1)                         | 1.27           | 1.67 *         | -0.72          | 0.43           | -1.43          | -0.47          |
| Mother's height in cms. (Round 1)                             | -0.02          | -0.31          | 0.13           | 0.43           | 0.57           | 5.27 ***       |
| Father's years of education (Round 1)                         | 1.08           | 0.92           | -1.42          | 0.04           | -1.04          | 0.20           |
| Mother language: Spanish                                      | -0.67          | 0.49           | -0.92          | 1.56           | -0.77          | .              |
| Mother was beaten as a child                                  | 0.02           | 0.68           | -1.65 *        | 0.35           | 2.10 **        | -1.00          |
| Maternal grandparents' household was violent                  | 1.19           | 0.81           | -1.69 *        | 0.35           | 0.21           | 1.00           |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*\*)

# Annex 6:

## Average treatment effects on the treated (ATT) of migration for different migration waves

### A. OVERALL SAMPLE (forced and non-forced migrants)

#### 1. ATT: Migration for Urban to Urban

##### 1.1 Child Well-being

|  | Migrated   | Control    | ATT        |
|--|------------|------------|------------|
| Weight at birth                                  | 3217       | 3242.1     | -25.1      |
| Stunting (OMS 2006) R1                           | 12.6%      | 17.7%      | -5.11% *   |
| Stunting (OMS 2006) R2                           | 15.0%      | 21.1%      | -6.14% **  |
| Changes between rounds in Z-scores of height/age | -0.329     | -0.174     | -0.155 ~   |
| Global malnutrition (OMS 2006) R1                | 5.3%       | 2.8%       | 2.52%      |
| Global malnutrition (OMS 2006) R2                | 0.5%       | 2.9%       | -2.46% **  |
| Changes between rounds in Z-scores of weight/age | -0.307     | -0.379     | 0.072      |
| Pre-school enrolment                             | 85.0%      | 94.5%      | -9.45% *** |
| Peabody test score                               | 37.4       | 37.3       | 0.015      |
| <b>Total Cases (N)</b>                           | <b>207</b> | <b>530</b> |            |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)

Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

##### 1.2 Child-rearing Practices

|   | Migrated   | Control    | ATT       |
|---|------------|------------|-----------|
| <b>Round 1</b>                                |            |            |           |
| Mother received prenatal care                 | 96.1%      | 93.5%      | 2.67%     |
| Mother received tetanus shot during pregnancy | 74.9%      | 71.0%      | 3.93%     |
| Child was breastfed                           | 99.0%      | 98.7%      | 0.37%     |
| Child received any vaccine                    | 98.6%      | 98.1%      | 0.48%     |
| Child has a vaccination card                  | 93.2%      | 91.8%      | 1.42%     |
| Takes her child to a care centre (WWWS)       | 6.3%       | 6.9%       | -0.60%    |
| Family uses soap                              | 100.0%     | 98.9%      | 1.12% *** |
| Family uses detergent                         | 89.4%      | 86.2%      | 3.13%     |
| Child-care Practices                          | 100.0%     | 99.9%      | 0.11%     |
| Positive/caring behaviours <sup>a</sup>       | 77.8%      | 76.9%      | 0.90%     |
| Mother breastfeeds him/her when s/he cries    | 34.8%      | 31.5%      | 3.24%     |
| Negatives Behaviours                          |            |            |           |
| Child suffered physical violence              | 1.0%       | 3.7%       | -2.74% ** |
| Child suffered verbal violence                | 1.0%       | 2.2%       | -1.28%    |
| Mother did not attend him/her at all          | 1.9%       | 2.2%       | -0.27%    |
| Other negatives behaviours <sup>b</sup>       | 0.0%       | 0.2%       | -0.21%    |
| <b>Round 2</b>                                |            |            |           |
| Child has a vaccination card                  | 97.6%      | 97.1%      | 0.48%     |
| Takes her child to a care centre (WWWS)       | 25.1%      | 32.2%      | -7.09% *  |
| Child consumed proteins in past 24h           | 99.0%      | 96.0%      | 2.99% *** |
| Child-care Practices                          |            | 0.0%       |           |
| Positive/caring behaviours <sup>c</sup>       | 27.2%      | 18.5%      | 8.72% **  |
| Child gets grounded                           | 19.4%      | 18.8%      | 0.58%     |
| Negatives Behaviours                          |            | 0.0%       |           |
| Child suffered physical violence              | 24.8%      | 29.9%      | -5.16%    |
| Child suffered verbal violence                | 14.1%      | 19.0%      | -4.89%    |
| Mother did not attend him/her at all          | 1.5%       | 1.7%       | -0.24%    |
| Child is scolded                              | 13.1%      | 12.1%      | 0.99%     |
| <b>Total Cases (N)</b>                        | <b>207</b> | <b>530</b> |           |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*) Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

a This category includes: Holding him/her, calming him/her down, rocking him/her in arms, giving him/her something to drink, taking him/her for a walk, giving him/her a toy.

b This category includes: Placing him/her face down on the mattress to stop him/her crying, forcibly restraining him/her using a blanket.

c This category includes: Talking to the child regarding his/her actions, advising him/her not to repeat his/her behaviour.

**1.3 Access to Public Services and Household Economic Outcomes**

|  | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |     |
|--|-----------------|----------------|------------|-----|
| <b>Round 1</b>   |                 |                |            |     |
| District altitude over 3500m.                                    | 8.21%           | 1.55%          | 6.66%      | *** |
| Household hygiene ratio  | 0.83            | 0.78           | 0.047      | **  |
| Has electricity  | 91.8%           | 91.3%          | 0.47%      |     |
| Has access to piped water into dwelling                          | 84.5%           | 89.2%          | -4.65%     | *   |
| Has access to sanitation facilities: Flush toilet or septic tank | 72.5%           | 65.7%          | 6.79%      | ~   |
| <b>Round 2</b>   |                 |                |            |     |
| Has electricity  | 95.2%           | 95.6%          | -0.45%     |     |
| Has access to piped water into dwelling                          | 89.9%           | 84.2%          | 5.65%      | *   |
| Has access to safe drinking water                                | 92.3%           | 86.9%          | 5.42%      | **  |
| Has access to sanitation facilities: Flush toilet or septic tank | 77.3%           | 73.6%          | 3.7%       |     |
|  | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |     |
| <b>Round 2</b>   |                 |                |            |     |
| Asset value at median prices                                     | 1557            | 1523.51        | 33.49      |     |
| Consumption per capita   | 238.9           | 211.8          | 27.112     |     |
| Income per capita  | 268.3           | 243.3          | 24.997     |     |
| <b>Total Cases (N)</b>   | <b>207</b>      | <b>530</b>     |            |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

**1.4 Mother's Perceptions/Attitudes**

|  | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |    |
|--|-----------------|----------------|------------|----|
| <b>Round 2</b>   |                 |                |            |    |
| Trust  |                 |                |            |    |
| Thinks government's decisions are good for the people              | 34.3%           | 33.6%          | 0.72%      |    |
| Trusts in local authorities to do their job properly               | 38.9%           | 45.0%          | -6.11%     |    |
| Trusts neighbours to look after her home while out                 | 63.3%           | 61.2%          | 2.06%      |    |
| Trusts neighbours to look after her children                       | 22.0%           | 31.6%          | -9.66%     | ** |
| Thinks it is safe for her child to be out in the street            | 9.7%            | 14.3%          | -4.66%     | *  |
| Efficacy   |                 |                |            |    |
| Could improve her current situation if she tried to                | 94.9%           | 96.8%          | -1.90%     |    |
| Likes to plan for the future                                       | 96.4%           | 93.2%          | 3.16%      | ~  |
| Does not have a choice in picking child's school                   | 36.5%           | 35.3%          | 1.15%      |    |
| Could do little or nothing to help if her child was ill            | 13.8%           | 16.3%          | -2.49%     |    |
| Can do little or nothing to help her child to do better at school  | 11.4%           | 18.9%          | -7.52%     | ** |
| Pride and Shame  |                 |                |            |    |
| Feels proud of showing her home to relatives/friends               | 86.7%           | 86.6%          | 0.07%      |    |
| Feels ashamed of the clothes she wears                             | 6.0%            | 7.9%           | -1.90%     |    |
| Feels proud of her partner/spouse's work                           | 93.5%           | 94.8%          | -1.28%     |    |
| Feels proud of the work she does                                   | 98.3%           | 95.8%          | 2.56%      | *  |
| Feels proud of her children  | 98.6%           | 97.7%          | 0.87%      |    |
| Discrimination   |                 |                |            |    |
| Is usually treated fairly and respectfully by others when shopping | 87.7%           | 90.2%          | -2.47%     |    |
| People in the community look with disdain upon her family          | 9.7%            | 9.9%           | -0.28%     |    |
| The teachers at pre-school/school are rude and hostile to her      | 6.0%            | 6.7%           | -0.69%     |    |
| <b>Total Cases (N)</b>   | <b>207</b>      | <b>530</b>     |            |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

## 2. ATT: Migration for Urban to Rural

### 2.1 Child Well-being

|  | Migrated  | Control   | ATT    |    |
|--|-----------|-----------|--------|----|
| Weight at birth                                  | 3173      | 3156.3    | 16.7   |    |
| Stunting (OMS 2006) R1                           | 28.8%     | 26.2%     | 2.55%  |    |
| Stunting (OMS 2006) R2                           | 32.9%     | 37.0%     | -4.10% |    |
| Changes between rounds in Z-scores of height/age | -0.046    | -0.472    | 0.426  | ~  |
| Global malnutrition (OMS 2006) R1                | 9.6%      | 3.6%      | 5.95%  |    |
| Global malnutrition (OMS 2006) R2                | 6.8%      | -0.3%     | 7.14%  | ** |
| Changes between rounds in Z-scores of weight/age | -0.431    | -0.475    | 0.044  |    |
| Pre-school Enrolment                             | 84.9%     | 81.6%     | 3.33%  |    |
| Peabody test score                               | 26.7      | 25.8      | 0.892  |    |
| <b>Total Cases (N)</b>                           | <b>70</b> | <b>33</b> |        |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
 Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

### 2.2 Child-rearing Practices

|   | Migrated  | Control   | ATT     |    |
|---|-----------|-----------|---------|----|
| <b>Round 1</b>                                |           |           |         |    |
| Mother received prenatal care                 | 95.9%     | 85.3%     | 10.57%  | ~  |
| Mother received tetanus shot during pregnancy | 76.7%     | 79.0%     | -2.29%  |    |
| Child was breastfed                           | 98.6%     | 98.6%     | 0.00%   |    |
| Child received any vaccine                    | 97.3%     | 98.7%     | -1.43%  |    |
| Child has a vaccination card                  | 86.3%     | 89.2%     | -2.86%  |    |
| Takes her child to a care centre (WWWS)       | 0.0%      | 0.0%      | 0.00%   |    |
| Family uses soap                              | 98.6%     | 98.6%     | -1.43%  |    |
| Family uses detergent                         | 78.1%     | 85.7%     | -7.64%  |    |
| Child-care Practices                          |           |           | 0.00%   |    |
| Positive/caring behaviours <sup>a</sup>       | 68.5%     | 67.3%     | 1.17%   |    |
| Mother breastfeeds him/her when s/he cries    | 45.2%     | 50.2%     | -4.95%  |    |
| Negatives Behaviours                          |           |           |         |    |
| Child suffered physical violence              | 1.4%      | -0.1%     | 1.43%   |    |
| Child suffered verbal violence                | 1.4%      | -0.1%     | 1.43%   |    |
| Mother did not attend him/her at all          | 0.0%      | 4.1%      | -4.05%  |    |
| Other negatives behaviours <sup>b</sup>       | 0.0%      | 0.0%      | 0.00%   |    |
| <b>Round 2</b>                                |           |           |         |    |
| Child has a vaccination card                  | 93.2%     | 93.2%     | -7.14%  | ** |
| Takes her child to a care centre (WWWS)       | 16.4%     | 23.3%     | -6.86%  |    |
| Child consumed proteins in past 24h           | 90.4%     | 97.4%     | -7.02%  |    |
| Child-care Practices                          |           |           |         |    |
| Positive/caring behaviours <sup>c</sup>       | 34.3%     | 36.5%     | -2.21%  |    |
| Child gets grounded                           | 12.3%     | 3.5%      | 8.81%   |    |
| Negatives Behaviours                          |           |           |         |    |
| Child suffered physical violence              | 28.8%     | 32.5%     | -3.74%  |    |
| Child suffered verbal violence                | 16.4%     | 8.3%      | 8.10%   |    |
| Mother did not attend him/her at all          | 0.0%      | 0.0%      | 0.00%   |    |
| Child is scolded                              | 8.2%      | 19.2%     | -10.95% |    |
| <b>Total Cases (N)</b>                        | <b>70</b> | <b>33</b> |         |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
 Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

a This category includes: Holding him/her, calming him/her down, rocking him/her in arms, giving him/her something to drink, taking him/her for a walk, giving him/her a toy.

b This category includes: Placing him/her face down on the mattress to stop him/her crying, forcibly restraining him/her using a blanket.

c This category includes: Talking to the child regarding his/her actions, advising him/her not to repeat his/her behaviour.

**2.3 Access to Public Services and Household Economic Outcomes**

|  | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |
|--|-----------------|----------------|------------|
| <b>Round 1</b>   |                 |                |            |
| District altitude over 3500m                                     | 1.37%           | -0.06%         | 1.43%      |
| Household hygiene ratio  | 0.69            | 0.78           | -0.096 ~   |
| Has electricity  | 63.0%           | 66.3%          | -3.24%     |
| Has access to piped water into dwelling                          | 75.3%           | 81.2%          | -5.83%     |
| Has access to sanitation facilities: Flush toilet or septic tank | 32.9%           | 32.7%          | 0.17%      |
| <b>Round 2</b>   |                 |                |            |
|  |                 | 0.0%           |            |
| Has electricity  | 64.4%           | 66.8%          | -2.43%     |
| Has access to piped water into dwelling                          | 61.6%           | 63.7%          | -2.05%     |
| Has access to safe drinking water                                | 79.5%           | 72.5%          | 7.00%      |
| Has access to sanitation facilities: Flush toilet or septic tank | 31.5%           | 39.8%          | -8.3%      |
|  | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |
| <b>Round 2</b>   |                 |                |            |
| Asset value at median prices                                     | 935.5           | 718.6          | 216.95     |
| Consumption per capita   | 162.1           | 163.7          | -1.572     |
| Income per capita  | 223.7           | 138.3          | 85.416 ~   |
| <b>Total Cases (N)</b>   | <b>70</b>       | <b>33</b>      |            |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

**2.4 Mother's Perceptions/Attitudes**

|  | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |
|--|-----------------|----------------|------------|
| <b>Round 2</b>   |                 |                |            |
| Trust  |                 |                |            |
| Thinks government's decisions are good for the people              | 41.1%           | 25.5%          | 15.57% ~   |
| Trusts in local authorities to do their job properly               | 55.5%           | 34.2%          | 21.31% **  |
| Trusts neighbours to look after her home while out                 | 65.1%           | 53.0%          | 12.07%     |
| Trusts neighbours to look after her children                       | 37.0%           | 32.2%          | 4.79%      |
| Thinks it is safe for her child to be out in the street            | 21.2%           | 13.1%          | 8.12%      |
| Efficacy   |                 |                |            |
| Could improve her current situation if she tried to                | 91.8%           | 89.8%          | 2.00%      |
| Likes to plan for the future                                       | 91.1%           | 92.4%          | -1.31%     |
| Does not have a choice in picking child's school                   | 45.2%           | 44.4%          | 0.79%      |
| Could do little or nothing to help if her child was ill            | 31.5%           | 33.2%          | -1.64%     |
| Can do little or nothing to help her child to do better at school  | 25.0%           | 29.6%          | -4.61%     |
| Pride and Shame  |                 |                |            |
| Feels proud of showing her home to relatives/friends               | 85.6%           | 96.2%          | -10.60% *  |
| Feels ashamed of the clothes she wears                             | 16.4%           | 20.1%          | -3.67%     |
| Feels proud of her partner/spouse's work                           | 89.7%           | 95.7%          | -5.95%     |
| Feels Proud of the work she does                                   | 95.9%           | 93.2%          | 2.71%      |
| Feels proud of her children  | 98.6%           | 100.1%         | -1.43%     |
| Discrimination   |                 |                |            |
| Is usually treated fairly and respectfully by others when shopping | 92.5%           | 87.2%          | 5.32%      |
| People in the community look with disdain upon her family          | 15.1%           | 25.9%          | -10.81%    |
| The teachers at pre-school/school are rude and hostile to her      | 12.5%           | 9.8%           | 2.68%      |
| <b>Total Cases (N)</b>   | <b>70</b>       | <b>33</b>      |            |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

### 3. ATT: Migration for Rural to Urban

#### 3.1 Child Well-being

|  | Migrated   | Control   | ATT     |    |
|--|------------|-----------|---------|----|
| Weight at birth                                  | 3222       | 3229.9    | -7.9    |    |
| Stunting (OMS 2006) R1                           | 19.1%      | 29.4%     | -10.26% |    |
| Stunting (OMS 2006) R2                           | 18.2%      | 29.6%     | -11.37% | ** |
| Changes between rounds in Z-scores of height/age | -0.248     | -0.454    | 0.206   |    |
| Global malnutrition (OMS 2006) R1                | 4.8%       | 4.7%      | 0.08%   |    |
| Global malnutrition (OMS 2006) R2                | 3.8%       | 4.6%      | -0.76%  |    |
| Changes between rounds in Z-scores of weight/age | -0.429     | -0.307    | -0.123  |    |
| Pre-school enrolment                             | 83.3%      | 90.8%     | -7.52%  | *  |
| Peabody test score                               | 37.5       | 30.4      | 7.048   | ** |
| <b>Total Cases (N)</b>                           | <b>204</b> | <b>61</b> |         |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

#### 3.2 Child-rearing Practices

|   | Migrated        | Control        | ATT        |    |
|---|-----------------|----------------|------------|----|
| <b>Round 1</b>                                |                 |                |            |    |
| Mother received prenatal care                 | 94.2%           | 71.8%          | 22.38%     | ** |
| Mother received tetanus shot during pregnancy | 67.9%           | 58.3%          | 9.69%      |    |
| Child was breastfed                           | 99.5%           | 100.0%         | -0.49%     |    |
| Child received any vaccine                    | 98.1%           | 95.6%          | 2.50%      |    |
| Child has a vaccination card                  | 84.2%           | 79.3%          | 4.90%      |    |
| Takes her child to a care centre (WWWS)       | 4.8%            | 2.2%           | 2.56%      |    |
| Family uses soap                              | 95.7%           | 98.9%          | -3.24%     | ~  |
| Family uses detergent                         | 83.7%           | 82.5%          | 1.11%      |    |
| Child-care Practices                          |                 |                |            |    |
| Positive/caring behaviours <sup>a</sup>       | 73.2%           | 81.4%          | -8.23%     |    |
| Mother breastfeeds him/her when s/he cries    | 38.3%           | 37.2%          | 1.08%      |    |
| Negatives Behaviours                          |                 |                |            |    |
| Child suffered physical violence              | 1.9%            | 0.0%           | 1.96%      | *  |
| Child suffered verbal violence                | 1.0%            | 0.0%           | 0.98%      |    |
| Mother did not attend him/her at all          | 3.3%            | 1.1%           | 2.26%      |    |
| Other negatives behaviours <sup>b</sup>       | 1.0%            | 0.0%           | 0.98%      |    |
|   | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |    |
| <b>Round 2</b>                                |                 |                |            |    |
| Child has a vaccination card                  | 97.6%           | 98.8%          | -1.14%     |    |
| Takes her child to a care centre (WWWS)       | 17.7%           | 15.6%          | 2.10%      |    |
| Child consumed proteins in past 24h           | 97.6%           | 94.6%          | 2.99%      |    |
| Child-care Practices                          |                 |                |            |    |
| Positive/caring behaviours <sup>c</sup>       | 27.9%           | 40.3%          | -12.45%    | ~  |
| Child gets grounded                           | 16.8%           | 11.5%          | 5.31%      |    |
| Negatives Behaviours                          |                 |                |            |    |
| Child suffered physical violence              | 24.5%           | 19.1%          | 5.42%      |    |
| Child suffered verbal violence                | 13.9%           | 11.2%          | 2.70%      |    |
| Mother did not attend him/her at all          | 0.0%            | 1.2%           | -1.17%     |    |
| Child is scolded                              | 16.8%           | 16.6%          | 0.19%      |    |
| <b>Total Cases (N)</b>                        | <b>204</b>      | <b>61</b>      |            |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

a This category includes: Holding him/her, calming him/her down, rocking him/her in arms, giving him/her something to drink, taking him/her for a walk, giving him/her a toy.

b This category includes: Placing him/her face down on the mattress to stop him/her crying, forcibly restraining him/her using a blanket.

c This category includes: Talking to the child regarding his/her actions, advising him/her not to repeat his/her behaviour.

**3.3 Access to Public Services and Household Economic Outcomes**

|  | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |     |
|--|-----------------|----------------|------------|-----|
| <b>Round 1</b>   |                 |                |            |     |
| District altitude over 3500m                                     | 19.62%          | 10.22%         | 9.40%      | ~   |
| Household hygiene ratio  | 0.78            | 0.68           | 0.097      | *   |
| Has electricity  | 83.3%           | 68.0%          | 15.24%     | *   |
| Has access to piped water into dwelling                          | 82.8%           | 75.4%          | 7.40%      |     |
| Has access to sanitation facilities: Flush toilet or septic tank | 69.9%           | 40.8%          | 29.09%     | *** |
| <b>Round 2</b>   |                 |                |            |     |
| Has electricity  | 89.0%           | 93.5%          | -4.47%     |     |
| Has access to piped water into dwelling                          | 85.7%           | 77.8%          | 7.89%      |     |
| Has access to safe drinking water                                | 87.1%           | 81.4%          | 5.71%      |     |
| Has access to sanitation facilities: Flush toilet or septic tank | 71.8%           | 53.5%          | 18.3%      | **  |
|  | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |     |
| <b>Round 2</b>   |                 |                |            |     |
| Asset value at median prices                                     | 1820            | 1082.16        | 737.84     | **  |
| Consumption per capita   | 214.6           | 151.2          | 63.384     | *** |
| Income per capita  | 230.3           | 157.8          | 72.472     | *** |
| <b>Total Cases (N)</b>   | <b>204</b>      | <b>61</b>      |            |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

**3.4 Mother's Perceptions**

|  | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |     |
|--|-----------------|----------------|------------|-----|
| <b>Round 2</b>   |                 |                |            |     |
| Trust  |                 |                |            |     |
| Thinks government's decisions are good for the people              | 47.4%           | 54.2%          | -6.87%     |     |
| Trusts in local authorities to do their job properly               | 55.3%           | 55.1%          | 0.16%      |     |
| Trusts neighbours to look after her home while out                 | 62.3%           | 66.2%          | -3.94%     |     |
| Trusts neighbours to look after her children                       | 33.2%           | 30.9%          | 2.23%      |     |
| Thinks it is safe for her child to be out in the street            | 20.2%           | 14.7%          | 5.49%      |     |
| Efficacy   |                 |                |            |     |
| Could improve her current situation if she tried to                | 98.6%           | 94.2%          | 4.40%      | ~   |
| Likes to plan for the future                                       | 97.4%           | 96.5%          | 0.86%      |     |
| Does not have a choice in picking child's school                   | 29.8%           | 59.0%          | -29.21%    | *** |
| Could do little or nothing to help if her child was ill            | 16.3%           | 24.4%          | -8.14%     |     |
| Can do little or nothing to help her child to do better at school  | 15.6%           | 31.1%          | -15.52%    | **  |
| Pride and Shame  |                 |                |            |     |
| Feels proud of showing her home to relatives/friends               | 91.1%           | 88.7%          | 2.39%      |     |
| Feels ashamed of the clothes she wears                             | 6.3%            | 19.9%          | -13.65%    | *   |
| Feels proud of her partner/spouse's work                           | 95.7%           | 97.4%          | -1.71%     |     |
| Feels proud of the work she does                                   | 97.4%           | 98.2%          | -0.81%     |     |
| Feels proud of her children  | 98.6%           | 98.9%          | -0.31%     |     |
| Discrimination   |                 |                |            |     |
| Is usually treated fairly and respectfully by others when shopping | 93.8%           | 94.8%          | -1.08%     |     |
| People in the community look with disdain upon her family          | 13.5%           | 25.1%          | -11.66%    |     |
| The teachers at pre-school/school are rude and hostile to her      | 6.4%            | 8.2%           | -1.89%     |     |
| <b>Total Cases (N)</b>   | <b>204</b>      | <b>61</b>      |            |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.



#### 4. ATT: Migration for Rural to Rural

##### 4.1 Child Well-being

|  | Migrated   | Control    | ATT     |     |
|--|------------|------------|---------|-----|
| Weight at birth                                  | 3246       | 3124.3     | 121.7   | **  |
| Stunting (OMS 2006) R1                           | 32.4%      | 40.9%      | -8.51%  | *   |
| Stunting (OMS 2006) R2                           | 48.7%      | 50.4%      | -1.75%  |     |
| Changes between rounds in Z-scores of height/age | -0.416     | -0.302     | -0.115  |     |
| Global malnutrition (OMS 2006) R1                | 7.4%       | 10.6%      | -3.14%  |     |
| Global malnutrition (OMS 2006) R2                | 10.1%      | 8.5%       | 1.62%   |     |
| Changes between rounds in Z-scores of weight/age | -0.500     | -0.313     | -0.188  | **  |
| Pre-school enrolment                             | 64.9%      | 81.7%      | -16.84% | *** |
| Peabody test score                               | 18.0       | 19.1       | -1.052  |     |
| <b>Total Cases (N)</b>                           | <b>144</b> | <b>518</b> |         |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

##### 4.2 Child-rearing Practices

|   | Migrated        | Control        | ATT        |    |
|---|-----------------|----------------|------------|----|
| <b>Round 1</b>                                |                 |                |            |    |
| Mother received prenatal care                 | 93.9%           | 93.4%          | 0.64%      |    |
| Mother received tetanus shot during pregnancy | 71.0%           | 73.1%          | -2.34%     |    |
| Child was breastfed                           | 98.6%           | 99.8%          | -1.15%     |    |
| Child received any vaccine                    | 99.3%           | 98.8%          | 0.71%      |    |
| Child has a vaccination card                  | 89.2%           | 87.3%          | 1.37%      |    |
| Takes her child to a care centre (WWWS)       | 3.4%            | 4.0%           | -0.65%     |    |
| Family uses soap                              | 99.3%           | 99.3%          | 0.04%      |    |
| Family uses detergent                         | 66.2%           | 65.0%          | 2.82%      |    |
| Child-care Practices                          |                 |                |            |    |
| Positive/caring behaviours <sup>a</sup>       | 71.6%           | 63.8%          | 5.56%      | *  |
| Mother breastfeeds him/her when s/he cries    | 49.3%           | 61.5%          | -12.15%    | ** |
| Negatives Behaviours                          |                 |                |            |    |
| Child suffered physical violence              | 0.0%            | 0.7%           | -0.58%     | ** |
| Child suffered verbal violence                | 0.0%            | 0.2%           | -0.22%     |    |
| Mother did not attend him/her at all          | 2.7%            | 3.0%           | -0.11%     |    |
| Other negatives behaviours <sup>b</sup>       | 0.7%            | 0.1%           | 0.46%      |    |
|   | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |    |
| <b>Round 2</b>                                |                 |                |            |    |
| Child has a vaccination card                  | 96.6%           | 96.7%          | 0.44%      |    |
| Takes her child to a care centre (WWWS)       | 7.5%            | 13.4%          | -3.64%     | ** |
| Child consumed proteins in past 24h           | 83.8%           | 84.9%          | -2.51%     |    |
| Child-care Practices                          |                 |                |            |    |
| Positive/caring behaviours <sup>c</sup>       | 37.2%           | 36.1%          | -1.37%     |    |
| Child gets grounded                           | 4.1%            | 5.8%           | -0.75%     |    |
| Negatives Behaviours                          |                 |                |            |    |
| Child suffered physical violence              | 42.6%           | 33.5%          | 8.20%      | ** |
| Child suffered verbal violence                | 8.8%            | 10.9%          | -2.82%     |    |
| Mother did not attend him/her at all          | 0.0%            | 2.0%           | -1.23%     |    |
| Child is scolded                              | 7.4%            | 11.7%          | -2.03%     | *  |
| <b>Total Cases (N)</b>                        | <b>144</b>      | <b>518</b>     |            |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

a This category includes: Holding him/her, calming him/her down, rocking him/her in arms, giving him/her something to drink, taking him/her for a walk, giving him/her a toy.

b This category includes: Placing him/her face down on the mattress to stop him/her crying, forcibly restraining him/her using a blanket.

c This category includes: Talking to the child regarding his/her actions, advising him/her not to repeat his/her behaviour.

**4.3 Access to Public Services and Household Economic Outcomes**

|  | Migrated        | Control        | ATT        |     |
|--|-----------------|----------------|------------|-----|
| <b>Round 1</b>   |                 |                |            |     |
| District altitude over 3500m                                     | 0.00%           | 5.96%          | -5.96%     | *** |
| Household hygiene ratio  | 0.65            | 0.60           | 0.051      | *   |
| Has electricity  | 34.5%           | 35.6%          | -1.10%     |     |
| Has access to piped water into dwelling                          | 71.6%           | 68.5%          | 3.15%      |     |
| Has access to sanitation facilities: Flush toilet or septic tank | 14.2%           | 20.9%          | -6.75%     | **  |
| <b>Round 2</b>   |                 |                |            |     |
| Has electricity  | 49.3%           | 55.0%          | -5.65%     |     |
| Has access to piped water into dwelling                          | 46.6%           | 53.9%          | -7.32%     | ~   |
| Has access to safe drinking water                                | 60.1%           | 66.6%          | -6.44%     |     |
| Has access to sanitation facilities: Flush toilet or septic tank | 16.9%           | 21.7%          | -4.8%      |     |
|  | <b>Migrated</b> | <b>Control</b> | <b>ATT</b> |     |
| <b>Round 2</b>   |                 |                |            |     |
| Asset value at median prices                                     | 705.6           | 708.75         | -3.15      |     |
| Consumption per capita   | 127.0           | 137.3          | -10.277    |     |
| Income per capita  | 258.1           | 122.3          | 135.817    |     |
| <b>Total Cases (N)</b>   | <b>144</b>      | <b>518</b>     |            |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

**Mother's Perceptions**

|  | Migrated   | Control    | ATT    |    |
|--|------------|------------|--------|----|
| <b>Round 2</b>   |            |            |        |    |
| Trust  |            |            |        |    |
| Thinks government's decisions are good for the people              | 46.6%      | 49.0%      | -2.37% |    |
| Trusts in local authorities to do their job properly               | 64.2%      | 63.7%      | 0.47%  |    |
| Trusts neighbours to look after her home while out                 | 75.3%      | 77.6%      | -2.24% |    |
| Trusts neighbours to look after her children                       | 50.7%      | 55.7%      | -5.04% |    |
| Thinks it is safe for her child to be out in the street            | 34.8%      | 35.2%      | -0.41% |    |
| Efficacy   |            |            |        |    |
| Could improve her current situation if she tried to                | 96.0%      | 93.9%      | 2.07%  |    |
| Likes to plan for the future                                       | 98.0%      | 95.9%      | 2.06%  |    |
| Does not have a choice in picking child's school                   | 58.8%      | 62.1%      | -3.33% |    |
| Could do little or nothing to help if her child was ill            | 32.1%      | 30.7%      | 1.43%  |    |
| Can do little or nothing to help her child to do better at school  | 24.3%      | 28.4%      | -4.14% |    |
| Pride and Shame  |            |            |        |    |
| Feels proud of showing her home to relatives/friends               | 88.9%      | 92.3%      | -3.41% |    |
| Feels ashamed of the clothes she wears                             | 14.5%      | 18.6%      | -4.04% |    |
| Feels proud of her partner/spouse's work                           | 93.6%      | 95.2%      | -1.57% |    |
| Feels proud of the work she does                                   | 92.2%      | 96.8%      | -4.54% | ** |
| Feels proud of her children  | 98.7%      | 97.8%      | 0.84%  |    |
| Discrimination   |            |            |        |    |
| Is usually treated fairly and respectfully by others when shopping | 90.5%      | 90.7%      | -0.18% |    |
| People in the community look with disdain upon her family          | 25.7%      | 19.1%      | 6.61%  | *  |
| The teachers at pre-school/school are rude and hostile to her      | 5.8%       | 11.8%      | -5.99% | *  |
| <b>Total Cases (N)</b>   | <b>144</b> | <b>518</b> |        |    |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)  
Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

# Annex 7:

## Testing for attrition

|   | Stunting            |                        | Global Malnutrition  |                        |
|---|---------------------|------------------------|----------------------|------------------------|
| Stunting (OMS 2006) R1  | -0.1454<br>(0.0968) | -0.1805<br>(0.1258)    |                      |                        |
| Global malnutrition (OMS 2006) R1                                     |                     |                        | -0.3636<br>(0.1810)  | ** -0.3716<br>(0.2312) |
| Index child is male   |                     | 0.1090<br>(0.1179)     |                      | 0.1066<br>(0.1130)     |
| Weight at birth   |                     | 0.0000<br>(0.0001)     |                      | 0.0000<br>(0.0001)     |
| Mother received prenatal care   |                     | 0.3017<br>(0.2354)     |                      | 0.3209<br>(0.2316)     |
| Child ever received any vaccine                                       |                     | 0.0670<br>(0.5102)     |                      | 0.0309<br>(0.5209)     |
| Child has a vaccination card  |                     | 0.0937<br>(0.1938)     |                      | 0.1162<br>(0.1907)     |
| Mother thinks her child's health is worse than that of other children |                     | 0.0297<br>(0.1824)     |                      | 0.0525<br>(0.1686)     |
| Mother thought at any time that her child might die                   |                     | -0.1022<br>(0.1554)    |                      | -0.1082<br>(0.1563)    |
| Positive/caring behaviours  |                     | 0.1048<br>(0.1590)     |                      | 0.1124<br>(0.1621)     |
| Child suffered physical violence                                      |                     | -0.0509<br>(0.5299)    |                      | 0.0164<br>(0.5076)     |
| Mother breastfeeds him/her when s/he cries                            |                     | -0.0480<br>(0.1174)    |                      | -0.0390<br>(0.1171)    |
| Negatives behaviours  |                     | -0.5522<br>(0.5544)    |                      | -0.6019<br>(0.5498)    |
| Takes her child to a care centre (WWWS)                               |                     | 0.0723<br>(0.2552)     |                      | 0.0376<br>(0.2591)     |
| Wanted pregnancy  |                     | 0.0223<br>(0.1005)     |                      | 0.0312<br>(0.1053)     |
| Father was named in HH roster   |                     | 0.2210<br>(0.1736)     |                      | 0.2296<br>(0.1719)     |
| Head of HH is female  |                     | 0.0133<br>(0.1210)     |                      | 0.0086<br>(0.1238)     |
| Mother's age in years   |                     | 0.0095<br>(0.0083)     |                      | 0.0103<br>(0.0086)     |
| Mother's years of education   |                     | 0.0135<br>(0.0243)     |                      | 0.0158<br>(0.0255)     |
| Mother's body mass index (BMI)  |                     | -0.0062<br>(0.0095)    |                      | -0.0072<br>(0.0101)    |
| Was violence in maternal grandparents' HH                             |                     | 0.0195<br>(0.1020)     |                      | 0.0127<br>(0.1026)     |
| Partner/father was slapped as child                                   |                     | -0.1460<br>(0.1220)    |                      | -0.1407<br>(0.1253)    |
| Mother is beaten by partner while drunk                               |                     | -0.2715<br>(0.2342)    |                      | -0.2669<br>(0.2270)    |
| Presence of children under 2 years                                    |                     | -0.1938<br>(0.1357)    |                      | -0.1685<br>(0.1380)    |
| Presence of children between 3 and 18 years                           |                     | 0.2140<br>(0.1483)     |                      | 0.2141<br>(0.1471)     |
| Wealth index  |                     | -0.4844<br>(0.4127)    |                      | -0.5139<br>(0.4325)    |
| Lives in rural area   |                     | 0.1956<br>(0.2166)     |                      | 0.1910<br>(0.2022)     |
| FONCODES poverty index 2000   |                     | -0.0162<br>(0.0149)    |                      | -0.0176<br>(0.0148)    |
| Constant  | 1.7577<br>(0.0944)  | *** 1.3491<br>(0.8129) | * 1.7466<br>(0.0966) | *** 1.3363<br>(0.8452) |
| Valid Cases (N)   | 2052                | 1546                   | 2052                 | 1546                   |
| Pseudo-R2   | 0.0026              | 0.0436                 | 0.0066               | 0.0457                 |

(1) Standard errors adjusted for 20 clusters

(2) Standard errors in parentheses

# Annex 8:

## Robustness check: Changes in the definition of high intensity conflict areas

|  | Average<br>Treatment<br>on Treated<br>2.5 sd |     | Average<br>Treatment<br>on Treated<br>3 sd |     |
|--|--|-----|--|-----|
| <b>Child-rearing Practices</b>                   |  |     |  |     |
| <b>Round 1</b>                                   |  |     |  |     |
| Mother received prenatal care                    | 1.9%   |     | 0.5%                                       |     |
| Mother received tetanus shot during pregnancy    | -6.9%  |     | -7.3%                                      |     |
| Child was breastfed                              | 0.6%   | *** | 0.9%                                       | *** |
| Child received any vaccine                       | 1.4%   |     | 0.7%                                       |     |
| Child has a vaccination card                     | -0.5%  |     | -0.1%                                      |     |
| Takes her child to a care centre (WWWS)          | -2.7%  | ~   | -3.9%                                      | **  |
| Family uses soap                                 | 0.1%   |     | -0.5%                                      |     |
| Family uses detergent                            | -6.1%  |     | -5.1%                                      |     |
| Child-care Practices                             |  |     | -1.2%                                      |     |
| Positive/caring behaviours <sup>a</sup>          | 4.2%   |     | 8.5%                                       | ~   |
| Mother breastfeeds him/her when s/he cries       | -3.8%  |     | -1.9%                                      |     |
| Negatives Behaviours                             |  |     |  |     |
| Child suffered physical violence                 | -0.8%  |     | 1.2%                                       |     |
| Child suffered verbal violence                   | 0.2%   |     | 0.8%                                       |     |
| Mother did not attend him/her at all             | -2.2%  | *   | -2.9%                                      | *** |
| Other negatives behaviours <sup>b</sup>          | 0.0%   |     | -0.1%                                      |     |
| <b>Round 2</b>                                   |  |     |  |     |
| Child has a vaccination card                     | -0.6%  |     | -0.4%                                      |     |
| Takes her child to a care centre (WWWS)          | -17.3%                                       | *** | -13.7%                                     | *** |
| Child consumed proteins in past 24h              | 6.8%   | **  | 7.2%                                       | **  |
| Child-care Practices                             |  |     |  |     |
| Positive/caring behaviours <sup>c</sup>          | 2.6%   |     | 2.8%                                       |     |
| Child gets grounded                              | 10.1%  | **  | -0.4%                                      |     |
| Negatives Behaviours                             |  |     |  |     |
| Child suffered physical violence                 | -9.2%  | *   | 4.3%                                       |     |
| Child suffered verbal violence                   | -5.1%  | *   | -6.5%                                      | **  |
| Mother did not attend him/her at all             | -1.5%  | **  | -1.5%                                      | **  |
| Child is scolded                                 | 3.1%   |     | 1.3%                                       |     |
| <b>Child Well-being</b>                          |  |     |  |     |
| Weight at birth                                  | 127.34                                       | **  | 135.33                                     | **  |
| Stunting (OMS 2006) R1                           | -17.5%                                       | *** | -15.0%                                     | *** |
| Stunting (OMS 2006) R2                           | -14.6%                                       | *** | -12.2%                                     | **  |
| Changes between rounds in Z-scores of height/age | -0.29  | *** | -0.43                                      | *** |
| Global malnutrition (OMS 2006) R1                | -2.2%  |     | -1.8%                                      |     |
| Global malnutrition (OMS 2006) R2                | -2.7%  |     | -1.8%                                      |     |
| Changes between rounds in Z-scores of weight/age | 0.04   |     | -0.12                                      |     |
| Pre-school enrolment                             | -14.7%                                       | *** | -9.1%                                      | **  |
| Peabody test score                               | 2.18   |     | 1.92                                       |     |
| <b>Total Cases (N)</b>                           | <b>124</b>                                   |     | <b>63</b>                                  |     |

|  | <b>Average<br/>Treatment<br/>on Treated<br/>2.5 sd</b> |     | <b>Average<br/>Treatment<br/>on Treated<br/>3 sd</b> |     |
|--|--|-----|--|-----|
| <b>Mother's Perceptions/Attitudes</b>                              |  |     |  |     |
| <b>Round 2</b>   |  |     |  |     |
| Trust  |  |     |  |     |
| Thinks government's decisions are good for the people              | 1.7%   |     | 1.2%   |     |
| Trusts in local authorities to do their job properly               | 1.0%   |     | 3.7%   |     |
| Trusts neighbours to look after her home while out                 | -0.1%  |     | -3.0%  |     |
| Trusts neighbours to look after her children                       | -13.6%   | ~   | -12.2%   | *   |
| Thinks it is safe for her child to be out in the street            | -0.8%  |     | 2.0%   |     |
| Efficacy   |  |     |  |     |
| Could improve her current situation if she tried to                | 2.2%   |     | 3.7%   | *** |
| Likes to plan for the future                                       | 1.3%   |     | 1.7%   |     |
| Does not have a choice in picking child's school                   | -4.6%  |     | -16.0%   | **  |
| Could do little or nothing to help if her child was ill            | 3.2%   |     | 5.0%   |     |
| Can do little or nothing to help her child to do better at school  | -5.1%  |     | -9.0%  | *   |
| Pride and Shame  |  |     |  |     |
| Feels proud of showing her home to relatives/friends               | 2.7%   |     | -2.1%  |     |
| Feels ashamed of the clothes she wears                             | -8.3%  | **  | -1.6%  |     |
| Feels proud of her partner/spouse's work                           | -1.6%  |     | -0.6%  |     |
| Feels proud of the work she does                                   | 0.3%   |     | 1.7%   |     |
| Feels proud of her children  | 0.4%   |     | -0.4%  |     |
| Discrimination   |  |     |  |     |
| Is usually treated fairly and respectfully by others when shopping | 1.7%   |     | 5.4%   | ~   |
| People in the community look with disdain upon her family          | 2.5%   |     | 1.7%   |     |
| The teachers at pre-school/school are rude and hostile to her      | -1.6%  |     | -4.6%  |     |
| <b>Access to Public Services and Household Economic Outcomes</b>   |  |     |  |     |
| <b>Round 1</b>   |  |     |  |     |
| District Altitude over 3500m                                       | -8.8%  | *** | -7.9%  | **  |
| Household hygiene ratio  | 0.08   | *** | 0.08   | **  |
| Has electricity  | 6.3%   |     | 4.3%   |     |
| Has access to piped water into dwelling                            | 1.8%   |     | 5.1%   |     |
| Has access to sanitation facilities: Flush toilet or septic tank   | -2.1%  |     | 3.8%   |     |
| <b>Round 2</b>   |  |     |  |     |
| Has electricity  | 2.5%   |     | 2.5%   |     |
| Has access to piped water into dwelling                            | 7.7%   | ~   | -0.3%  |     |
| Has access to safe drinking water                                  | 4.8%   |     | -4.2%  |     |
| Has access to sanitation facilities: Flush toilet or septic tank   | -4.4%  |     | 0.6%   |     |
| Asset value at median prices                                       | 168.8  |     | 681.0  | **  |
| Consumption per capita   | 27.1   | ~   | 27.9   | ~   |
| Income per capita  | 7.1  |     | 7.3  |     |
| <b>Total Cases (N)</b>   | <b>124</b>   |     | <b>63</b>  |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*)

Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

a This category includes: Holding him/her, calming him/her down, rocking him/her in arms, giving him/her something to drink, taking him/her for a walk, giving him/her a toy.

b This category includes: Placing him/her face down on the mattress to stop him/her crying, forcibly restraining him/her using a blanket.

c This category includes: Talking to the child regarding his/her actions, advising him/her not to repeat his/her behaviour.

# Annex 9:

## Comparison of alternative matching methods

|  | Stratified<br>Matching | Nearest<br>Neighbour<br>Matching | Kernel<br>Matching |            |
|--|------------------------|----------------------------------|--------------------|------------|
| <b>Child-rearing Practices</b>                   |                        |                                  |                    |            |
| <b>Round 1</b>                                   |                        |                                  |                    |            |
| Mother received prenatal care                    | 0.81%                  | 0.4%                             | 0.5%               |            |
| Mother received tetanus shot during pregnancy    | -0.51%                 | -1.6%                            | -0.9%              |            |
| Child was breastfed                              | 0.01%                  | 0.3%                             | 0.1%               |            |
| Child received any vaccine                       | 0.62%                  | 0.3%                             | 0.6%               |            |
| Child has a vaccination card                     | -0.72%                 | -0.4%                            | -0.7%              |            |
| Takes her child to a care centre (WWWS)          | -0.27%                 | -1.1%                            | -0.3%              |            |
| Family uses soap                                 | -1.21%                 | **                               | -0.7%              | -1.3%      |
| Family uses detergent                            | 3.99%                  | **                               | 2.1%               | 4.4%       |
| Child-care Practices                             |                        | 0.3%                             |                    | -0.1%      |
| Positive/caring behaviours <sup>a</sup>          | 3.1%                   | ~                                | 5.4%               | * 3.6%     |
| Mother breastfeeds him/her when s/he cries       | -4.5%                  | *                                | -2.8%              | -5.3%      |
| Negatives Behaviours                             |                        |                                  |                    |            |
| Child suffered physical violence                 | -0.8%                  | ~                                | -0.8%              | -0.9%      |
| Child suffered verbal violence                   | -0.4%                  |                                  | -0.7%              | -0.5%      |
| Mother did not attend him/her at all             | -0.4%                  |                                  | -0.7%              | -0.4%      |
| Other negatives behaviours <sup>b</sup>          | 0.4%                   |                                  | 0.3%               | 0.4%       |
| <b>Round 2</b>                                   |                        |                                  |                    |            |
| Child has a vaccination card                     | -0.5%                  |                                  | 0.1%               | -0.6%      |
| Takes her child to a care centre (WWWS)          | -5.1%                  | ***                              | -7.4%              | *** -4.4%  |
| Child consumed proteins in past 24h              | 1.7%                   |                                  | 2.1%               | 1.9%       |
| Child-care Practices                             |                        |                                  |                    |            |
| Positive/caring behaviours <sup>c</sup>          | 1.3%                   |                                  | 4.3%               | ~ 0.7%     |
| Child gets grounded                              | 2.2%                   |                                  | 0.9%               | 2.6%       |
| Negatives Behaviours                             |                        |                                  |                    |            |
| Child suffered physical violence                 | -1.4%                  |                                  | -0.6%              | -1.2%      |
| Child suffered verbal violence                   | -1.5%                  |                                  | -0.6%              | -1.6%      |
| Mother did not attend him/her at all             | -1.1%                  | **                               | -2.4%              | *** -1.0%  |
| Child is scolded                                 | 0.6%                   |                                  | -1.5%              | 0.5%       |
| <b>Child Well-being</b>                          |                        |                                  |                    |            |
| Weight at birth                                  | 37.74                  |                                  | 46.08              | 37.35      |
| Stunting (OMS 2006) R1                           | -6.2%                  | ***                              | -5.0%              | ~ -6.2%    |
| Stunting (OMS 2006) R2                           | -8.5%                  | ***                              | -9.7%              | *** -8.8%  |
| Changes between rounds in Z-scores of height/age | -0.02                  |                                  | 0.01               | -0.02      |
| Global malnutrition (OMS 2006) R1                | -0.8%                  |                                  | -1.1%              | -0.7%      |
| Global malnutrition (OMS 2006) R2                | -1.2%                  |                                  | -2.5%              | ~ -0.9%    |
| Changes between rounds in Z-scores of weight/age | -0.07                  | ~                                | -0.02              | -0.08      |
| Pre-school enrolment                             | -9.8%                  | ***                              | -7.5%              | *** -9.7%  |
| Peabody test score                               | 1.97                   | **                               | 1.39               | 2.19       |
| <b>Total Cases (N)</b>                           | <b>815</b>             |                                  | <b>765</b>         | <b>765</b> |

|  | <b>Stratified<br/>Matching</b> |     | <b>Nearest<br/>Neighbour<br/>Matching</b> |     | <b>Kernel<br/>Matching</b> |     |
|--|--------------------------------|-----|---|-----|----------------------------|-----|
| <b>Mother's Perceptions/Attitudes</b>                              |                                |     |   |     |                            |     |
| <b>Round 2</b>   |                                |     |   |     |                            |     |
| Trust  |                                |     |   |     |                            |     |
| Thinks government's decisions are good for the people              | 0.6%                           |     | -0.9%                                     |     | 0.7%                       |     |
| Trusts in local authorities to do their job properly               | 0.4%                           |     | -2.1%                                     |     | 1.1%                       |     |
| Trusts neighbours to look after her home while out                 | -3.5%                          | ~   | -2.0%                                     |     | -3.8%                      | *   |
| Trusts neighbours to look after her children                       | -6.9%                          | *** | -6.5%                                     | *   | -7.3%                      | *** |
| Thinks it is safe for her child to be out in the street            | -3.5%                          | *   | -6.9%                                     | **  | -3.2%                      | *   |
| Efficacy   |                                |     |   |     |                            |     |
| Could improve her current situation if she tried to                | 0.3%                           |     | 0.5%                                      |     | 0.5%                       |     |
| Likes to plan for the future                                       | 2.2%                           | **  | 2.7%                                      | *   | 2.2%                       | **  |
| Does not have a choice in picking child's school                   | -7.2%                          | *** | -6.7%                                     | **  | -6.7%                      | *** |
| Could do little or nothing to help if her child was ill            | -1.5%                          |     | -3.4%                                     |     | -2.4%                      |     |
| Can do little or nothing to help her child to do better at school  | -6.6%                          | *** | -6.1%                                     | *   | -7.3%                      | *** |
| Pride and Shame  |                                |     |   |     |                            |     |
| Feels proud of showing her home to relatives/friends               | -1.0%                          |     | -3.1%                                     |     | -0.8%                      |     |
| Feels ashamed of the clothes she wears                             | -4.0%                          | **  | -4.8%                                     | **  | -4.4%                      | *** |
| Feels proud of her partner/spouse's work                           | -1.1%                          |     | -0.2%                                     |     | -1.0%                      |     |
| Feels proud of the work she does                                   | 0.1%                           |     | -0.5%                                     |     | 0.2%                       |     |
| Feels proud of her children  | 0.5%                           |     | 0.4%                                      |     | 0.4%                       |     |
| Discrimination   |                                |     |   |     |                            |     |
| Is usually treated fairly and respectfully by others when shopping | 1.1%                           |     | 0.6%                                      |     | 1.4%                       |     |
| People in the community look with disdain upon her family          | 0.9%                           |     | 2.7%                                      |     | 0.5%                       |     |
| The teachers at pre-school/school are rude and hostile to her      | -1.0%                          |     | -3.6%                                     | ~   | -1.3%                      |     |
| <b>Access to Public Services and Household Economic Outcomes</b>   |                                |     |   |     |                            |     |
| <b>Round 1</b>   |                                |     |   |     |                            |     |
| District altitude over 3500m                                       | 6.7%                           | *** | 6.4%                                      | *** | 6.9%                       | *** |
| Household hygiene ratio  | 0.05                           | *** | 0.05                                      | *** | 0.04                       | *** |
| Has electricity  | 5.8%                           | *** | 8.2%                                      | *** | 5.9%                       | *** |
| Has access to piped water into dwelling                            | 0.7%                           |     | 3.3%                                      |     | 0.3%                       |     |
| Has access to sanitation facilities: Flush toilet or septic tank   | 8.2%                           | *** | 10.7%                                     | *** | 8.2%                       | *** |
| <b>Round 2</b>   |                                |     |   |     |                            |     |
| Has electricity  | 0.8%                           |     | 0.6%                                      |     | 1.7%                       |     |
| Has access to piped water into dwelling                            | 4.8%                           | **  | 4.6%                                      | ~   | 4.7%                       | **  |
| Has access to safe drinking water                                  | 4.3%                           | **  | 4.4%                                      | ~   | 5.3%                       | **  |
| Has access to sanitation facilities: Flush toilet or septic tank   | 5.8%                           |     | 8.3%                                      | **  | 7.2%                       | *** |
| Asset value at median prices                                       | 177.4                          | ~   | 308.1                                     | **  | 121.2                      |     |
| Consumption per capita   | 18.0                           | **  | 21.2                                      | **  | 15.8                       | **  |
| Income per capita  | 55.4                           | *   | 60.0                                      | *   | 52.5                       | *   |
| <b>Total Cases (N)</b>   | <b>765</b>                     |     | <b>765</b>                                |     | <b>765</b>                 |     |

Full sample differences are significant at: 15% (~); 10% (\*\*); 5% (\*\*\*) and at 1% (\*\*\*\*)

Standard Error and T-Statistic were obtained after applying bootstrapping of 100 reps.

a This category includes: Holding him/her, calming him/her down, rocking him/her in arms, giving him/her something to drink, taking him/her for a walk, giving him/her a toy.

b This category includes: Placing him/her face down on the mattress to stop him/her crying, forcibly restraining him/her using a blanket.

c This category includes: Talking to the child regarding his/her actions, advising him/her not to repeat his/her behaviour.





**Young Lives is an innovative long-term international research project investigating the changing nature of childhood poverty.**

The project seeks to:

- improve understanding of the causes and consequences of childhood poverty and to examine how policies affect children's well-being
- inform the development and implementation of future policies and practices that will reduce childhood poverty.

Young Lives is tracking the development of 12,000 children in Ethiopia, India (Andhra Pradesh), Peru and Vietnam through quantitative and qualitative research over a 15-year period.

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Young Lives is coordinated by a small team based at the University of Oxford, led by Jo Boyden.

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Save the Children – Bal Raksha Bharat, India

Sri Padmavathi Mahila Visvavidyalayam (Women's University), Andhra Pradesh, India

Grupo de Análisis para el Desarrollo (Group for the Analysis of Development), Peru

Instituto de Investigación Nutricional (Institute for Nutritional Research), Peru

Centre for Analysis and Forecast, Vietnamese Academy of Social Sciences, Vietnam

General Statistics Office, Vietnam

Save the Children, Vietnam

The Institute of Education, University of London, UK

Child and Youth Studies Group (CREET), The Open University, UK

Department of International Development University of Oxford, UK

Save the Children UK (staff in the Policy Department in London and programme staff in Ethiopia).



**Young Lives**   
An International Study of Childhood Poverty

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