Seasonal Migration and Early Childhood Development

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Abstract

This paper provides unique evidence of the positive consequences of seasonal migration for investments in early childhood development. We analyze migration in a poor shock-prone border region in rural Nicaragua where it offers one of the main household income diversification and risk coping strategies. IV estimates show, somewhat surprisingly, that in particular mother’s migration has a positive effect on early cognitive development. We attribute these findings to changes in income and to the intra-household empowerment gains resulting from mother’s migration, which offset potential negative ECD effects from temporary lack of parenting. This paper, hence, illustrates how increased opportunities in seasonal migration due to higher South-South mobility might positively affect early childhood development and as such long-term poverty reduction.

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1. Introduction

Globalization not only drastically changes the flow of goods, capital, technologies and ideas across borders, it can also have a substantial impact on the flow of people. The important role of the international movement of people during the first era of globalization has been discussed by O'Rourke and Williamson (1999). More recently, focus has shifted to international migration in the current globalization debate. While the post–World War II era has been an experiment in “everything but labor” globalization, Pritchett (2006) argues that once everything else is global, the losses from cross-border mobility to the mover become smaller and the gains from increased labor movements become increasingly obvious and less possible to resist. Indeed in recent years there is a renewed attention to migration issues both among researchers, and among policy makers.

While most people associate the migration debate with South-North migration, recent work indicates that South-South migration is large, increasing in magnitude, and important in terms of it’s impacts (Ratha and Shaw, 2006). Goldin and Beath (2007) estimate the world’s flows of people, and find that the main recipients of low-skill legal migrants are not industrial countries but rather other countries in the South. In recognition of the importance of South-South migration, regional economic integration initiatives (such as the West African Economic and Monetary Union, and MERCOSUR) now include regulations favoring the free movement of labor (Adepoju 2005; Ratha and Shaw, 2006). For Nicaragua, Guatemala, El Salvador and Honduras (the CA-4), the Plan de Integracion Migratoria Centroamericana, approved in 2004, facilitates the free movement of people between these countries.

Labor migration is hence becoming a more important aspect of the regional integration dimension of globalization. Much of this South-South migration is seasonal, as economies are more agricultural based, and borders might be more porous (Ratha and Shaw, 2006). Seasonal migration has long been an important income diversification and risk coping strategy in many agriculture-based economies in the developing world. In locations where access to non-agricultural employment is limited or climate (or technology) prevents a continuous cultivation of agricultural land, seasonal migration is often key for household’s
income strategies during the lean season. With increases in international mobility, large
cross-border wage differences, and restrictions on long-term residence, international
seasonal migration can become an important income source for many poor rural
households.

Because unskilled labor is a primary asset of many of the poor, migration policies and
changes in both South-North and South-South migration opportunities are predicted to
affect poverty in a major way. Most of the existing evidence considers however the impact of
South-North migration. For example, experimental estimates at the micro-level by McKenzie
et al (2006) show that non-experimental estimates might overstate migration gains, but still
find 263% increase in income for the case of migration of Tongans to New Zealand. Taylor,
Mora, and Adams (2005) find that international remittances account for 15 percent of per
capita household income in rural Mexico and conclude that an increase in international
remittances would reduce both the poverty headcount and the poverty gap. A number of
micro studies also have looked at the impact of remittances on different poverty indicators
directly. A review by Lopez-Cordova and Olmedo (2006) of the literature for Latin America
indicates that generally studies have found moderate effects on the poverty head count, but
also find that remittances decreases the depth and severity of poverty quite strongly (see also
Adams, 2004; Adams and Page, 2005). Based on analysis of more aggregate data, Winters et
al. (2002), Jasso et al. (2003), and the World Bank’s Global Economic Prospects report for 2006
all find very large welfare gains from increased labor mobility. The IADB (2005) estimates
indicate that remittances flows to Latin America are now larger than FDI and ODA.

In addition to effects on income poverty, there is also increasing evidence of the positive
effects of remittances on human capital outcomes. In El Salvador, remittances are estimated
to reduce the probability of children leaving school by 10 times the effect of other sources of
income in urban areas and by 2.6 times in rural areas (Cox Edwards and Ureta, 2003).
Similarly, Yang (2006) and Mansuri (2006) find positive effects of remittances on schooling
in the Philippines and Pakistan.3 Considering other investments in human capital, there
exists evidence of positive effects on health expenditures (Amuedo-Dorantes and Pozo,

3 McKenzie and Rapoport (2006), Hanson and Woodruff (2003) have pointed out however that migration
might also work as a disincentive for teenagers to finish higher levels of education.
2005), and in infant mortality and birthweights (Hildebrand and McKenzie, 2005; Duryea et al., 2005).

Migration, however, often also comes with a human or social cost, which has received much less attention. These costs might be particularly large when those that migrate are young adults, who have to leave their children behind. McKenzie (2006) shows that people below 30 years of age account for half of the migrant flows in a wide sample of countries and that 50% are female. Migrants to other developing countries are particularly more likely to be young. The 2007 World Development Report shows, for example, that 50 percent of Nicaraguans migrating to Costa Rica are less than 25 years old, and about half of them are women (World Bank, 2006).

The temporary absence of parents can have potential important consequences for the cognitive development and long-term human capital accumulation of the young children that are left behind, and as such might have negative consequences for their long-term income perspectives. Indeed, emerging literature on early childhood development (ECD) and ECD programs in Latin America emphasizes the role of parenting and supportive home environments (e.g. Behrman, Cheng and Todd, 2004; Gertler and Fernald, 2004; Fernald et al., 2005, Paxson and Schady, 2006; and Schady, 2006). Given that absence of parents is arguably the most extreme form of lack of parenting, this would suggest a potential strong negative effect of migration on early childhood development.

Based on the above, the overall effect of seasonal migration on early childhood development is therefore not clear ex-ante. This paper tries to explore these issues for the case of Nicaragua. Nicaragua offers an interesting case study for an analysis of seasonal migration as it is an extremely common household strategy in Central America. Historically, laborers have migrated seasonally to other regions in their country, attracted to the large coffee, sugar or other export crop estates that could provide income during the off-season or during emergency periods. More recently cross-border seasonal migration has increased (World Bank, 2005).
In order to disentangle the potential trade-off that short-term migration might imply, we study early childhood development outcomes in a context where seasonal migration is one of the main household income diversification and risk coping strategies. We focus on children of pre-school ages for whom direct parental care and stimulation is arguably the most important. The data comes from a detailed household survey collected in 6 municipalities in Nicaragua in a poor rural border region where seasonal migration to other Central American countries is widespread. More than half of all sampled households with pre-school children rely on seasonal migration to complement and diversify their incomes, and migration by the mothers and/or the fathers of the pre-school children is extremely common.

We first explore the relationship between seasonal migration and early childhood development outcomes and find that the overall correlation is negative. We then investigate the heterogeneity of outcomes between the households with different migration patterns. In particular, we instrument migration duration using information on exogenous shocks and show that mother’s migration has in fact a positive effect on early childhood development outcomes, while we find no significant effect for other household members. This leads us to infer that the relatively large household income gains that result from mother’s migration are large enough to compensate any potential negative effects from absenteeism. This suggests that the trade-off might in fact be limited in the specific regions studied.

To our knowledge, this paper is unique in that it contributes to the literature by focusing on the impact of migration on cognitive development of preschool children, instead of considering schooling outcomes directly. It also contributes in focusing on the impacts of South-South migration, an area in which empirical evidence is scarce (Ratha and Shaw, 2006). Moreover, the impacts of permanent and seasonal migration might be quite different, as seasonal migrants are more likely to keep control of the migration income, which they bring home themselves as opposed to remittances from permanent migration that are send to family members. This paper explicitly distinguishes seasonal from permanent migration, as both determinants and effects might be very different.
The paper proceeds as follows: in the next section we discuss the different potential effects seasonal migration might have on early childhood development and investigate the correlation between ECD and seasonal migration in the region studied. In section 3 we use an instrumental variable estimation to show that the impact of mother’s seasonal migration on early childhood development is positive, in contrast to seasonal migration of fathers and other household members. In section 4, we discuss different explanations for these findings. Section 5 concludes.

2. Seasonal Migration and ECD outcomes

Seasonal migration might affect ECD outcomes through a number of channels. Indeed, nutrition, stimulation, home inputs, micro-nutrients, health, parent’s socio-economic status, and pre-school programs all can be determinants or correlates of cognitive development. The literature on Early Childhood Development from both the developed and the developing world has brought to light a wide variety of factors that might affect early cognitive development (Schady, 2006). Evidence from the US indicates the importance of early stimulation through pre-school programs (see overview articles by Barnett, 1992; Currie 2001) but many authors have also emphasized the role of home inputs (e.g. Todd and Wolpin, 2003) and parent’s socio-economic status (including income, e.g., Blau (1999) and Taylor et al, 2004). Evidence from Ecuador suggests that both parenting (the home environment) and income might play an important role (Paxson and Schady, 2006). A strong relationship between income and ECD is also found in Brazil (Halpern et al., 1996). In these empirical studies, income might be a proxy for factors as nutrition, access to micro-nutrients, and health outcomes. A set of studies for Jamaica shed more direct light on the key role of nutrition, and consider the impact of particular nutritional interventions on ECD outcomes (Grantham-McGregor, et al., 1991, 1997; Grantham-McGregor and Ani, 2001; Powell et al. 2004). Nevertheless these same studies also provide evidence of the impact of early stimulation. The role of nutrition is particularly important for our paper given that chronic child malnutrition is as prevalent in the poorer Central American countries as it is in Africa or South Asia (World Bank, 2006b). Income gains from seasonal migration could potentially
be important to address such malnutrition, in particular when such income gains accrue to mothers.

Nevertheless, given that cognitive development outcomes are likely to depend on a combination of many different factors, the effect of seasonal migration, which might affect many of these factors simultaneously, is a priori unknown. While augmented income can have a positive effect on nutrition and health, the temporary absence of one or both parents may decrease stimulation and parental care. Given the traditional role of mothers’ to provide nutrition, educational and health care in rural Nicaragua, the absence of the mothers in particular might affect the quality of the diet, food preparation, illness prevention and cure. On the other hand, migration can also lead to knowledge and skill acquisition, e.g. through exposure to improved nutritional and health practices. Given these offsetting effects, the outcome of migration on early cognitive development is not only uncertain, but might also depend on the relationship between the child and the migrant, the returns to migration, and the child’s access to care (including stimulation and nutrition) during the period of migration.

This paper uses data from a detailed household survey with data for more than 4000 households in 6 municipalities close to the border with Honduras to shed light on these issues. The region was selected for its high levels of rural poverty and it’s susceptibility to weather shocks. The households in this region, that otherwise mainly rely on subsistence agriculture, use seasonal migration as an important risk coping and income diversification strategy. Table 1 illustrates this: 50% of all households have at least one member that seasonally migrated in the last 12 months and income of seasonal migration accounts, on average, for 19% of all household income. Migrants, and in particular mothers, bring back a substantial share of all income earned. While migration of fathers is most common, 8% of the mothers also migrated. More than half of all migrants go to other Central American countries (Honduras, El Salvador and Costa Rica), while others migrate to other regions in Nicaragua. Average stay of both fathers and mothers is almost 3 months, while other

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4 In absolute numbers, the average amount of money brought home by mothers amounts to about $ 250 (4174 Cordobas).
5 Because we cannot control for selection into domestic or international migration, this paper considers both types of migration together, thereby assuming they result in similar impacts on the children that stay behind.
members migrate on average 4-5 months. In part because the neighboring countries restrict the duration of legal stay, these might be spread over multiple trips.

To investigate the impact of this type of seasonal migration on early childhood development, we consider TVIP standardized test scores. TVIP (Test de Vocabulario de Imagenes Peabody) scores aim at capturing cognitive development of pre-school children. This standardized test of receptive vocabulary is the Spanish language equivalent of the PPVT (Peabody Picture Vocabulary Test). The TVIP contains 125 translated items to assess vocabulary of Spanish-speaking and bilingual students, using standard, universal Spanish. Children are shown a series of slides/plates with four pictures. For each plate, they are told a corresponding stimulus word that describes one of the four pictures and are asked to point to the relevant picture. The items become gradually more difficult and the test score reflects how many items the child can identify before making an excessive number of errors (6 out of the last 8). The test has been normalized for Spanish speaking children from Mexico and Puerto Rico with a mean score of 100 and a standard deviation of 15. In this paper, we use this standardized measure. We also test the robustness of the result by using an internally standardized score.

Both the TVIP and PPVT have been used in many other studies of early childhood development (e.g., Gertler and Fernald, 2005; Paxson and Schady, 2006; Currie and Tomas, 1999). The PPVT has been shown to be a good predictor of later adult achievement and as such can be seen as an indicator variable of human capital accumulation. The TVIP was administered to 2086 children between 3 and 7 years old. Table 2 shows that TVIP scores in the region studied are very low. In order to also analyze the non-cognitive aspects of development, and in particular potential problems of malnutrition, the analysis of TVIP scores is complemented with anthropometric measures, which are available for children up to 5 years old (weight for age, height for age and weight for height). In most of the analysis, we exclude observations of children whose parents are not the household head, in order to analyze a group of households that are likely to have more homogeneous decision-making processes.6

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6 Indeed, additional analysis below suggests that the migration decisions and outcomes in extended households are behaviorally different than those in nuclear households.
Figures 1-3 present graphically the correlations between migration and these ECD outcomes. The figures suggest that in particular older children of migrants might have a disadvantage in terms of cognitive development, while children between 20 and 50-60 months are also more likely to be stunted and underweight. There is no clear difference in the level of wasting between migrant and non-migrant children, possibly because overall levels of wasting are low (less than 5%, Table 2).

Overall, we find a negative correlation between seasonal migration and ECD outcomes for children of pre-school age (specification 1, table 3). Clearly this negative correlation might reflect certain unobservable characteristics of households with temporary migrants (see further). While this relationship hence does not necessarily imply that seasonal migration causes delays in ECD outcomes, it does imply that children of seasonal migrants tend to have a human capital disadvantage even before entering primary school.

3. Income, seasonal migration and ECD

These initial correlations raise a number of questions regarding the role of income versus stimulation for early childhood development, and in particular about the potential trade-off migration might imply. To shed further light on this, we decompose household seasonal migration between mothers, fathers and other household members. We find that the negative relationship between migration and TVIP scores does not hold when the migrant is the child’s mother (specification 2, table 3). In fact, we find a positive and significant relationship between mother’s migration and TVIP. Figure 3 shows that this relationship is stronger for younger children, but overall it largely holds across the entire age range. Specification 3 in Table 3 shows a similar finding when considering the duration, rather than the likelihood of migration. The data furthermore show a positive relationship between mother’s migration and the various anthropometric measures.

To further investigate these somewhat surprising results, we account specifically for some of the exogenous factors that might be driving migration. In particular, we instrument migration duration with the occurrence of various exogenous shocks in the household.
Specification 1 in Table 4 shows that the positive relationship between mother’s migration duration and TVIP scores persists after instrumentation. In terms of magnitudes, a 30-day absence for a migrant mother implies an increase of about 10% in the child’s TVIP score. We also use an internally standardized TVIP score and get similar results (not reported), implying that the results are not driven by the left censoring of the scores, which is relatively large in our sample. While the magnitude of the coefficient might seem large, this result should be interpreted in light of the low levels of cognitive development in the region that arguably leave much room for large improvements (also see Table 2).

In order to evaluate the validity of the instruments, we first note that the underlying assumption is that the shocks used as instruments do not affect TVIP scores through other mechanisms. It is worth emphasizing that any potential effects of shocks on ECD (e.g. directly through nutrition) are expected to be negative. Given that there is a positive relationship between most shocks and migration, this would likely lead to an underestimation of the effects of migration on ECD, which would strengthen our results on mother’s migration. It might however imply that the estimations underestimate a possible positive impact of migration of fathers and others. In this light, it is important to note that the IV passes the over-identification test.

A second concern relates to the potential weakness of the instruments. The first specification in Table 4 includes 4 instruments, with the F-value of joint significance of the instruments relatively low (between 4.01 and 5.69), suggesting a possible problem with weak instruments (we use various shock variables to instrument for the 3 migration variables: plague shock, health shock, wage shock and price shock). We therefore turn to a model that is not over-identified. These IV results, reported in specification 2 of table 5 are robust with the F-value of the instruments between 4.37 and 6.86. In addition, the Anderson (1984) canonical correlations test, which is a likelihood-ratio test of whether the equation is

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7 The first stage regressions shed light on the relationship between the shock variables and migration duration (Table 5). We find in particular that health shocks affected migration by all type of members. Fathers were also more likely to migrate during years of wage shocks, while mothers’ migration is related to plagues and price shocks. These results suggest that different shocks affect migration behavior of different members of the household differently, which allows us to identify the effects separately. Note however that the effect of plagues works in the opposite direction of the other shocks. The occurrence of plagues reduces migration duration by mothers. One explanation of this finding could be related to the need for a caretaker of the crops when plagues hit.
identified (i.e. that the excluded instruments are "relevant", meaning correlated with the endogenous regressors), rejects the null hypothesis of the test that the equation is under-identified.

The first stage regression of the IV for the anthropometric measures indicates however that the shocks do not provide good instruments for migration of household members of these younger kids (shocks are not jointly significant). We are therefore unable to identify the effect of migration on the anthropometric outcomes. Given that the instruments are not very strong, the sample can also not be split up further to investigate the potential differential impact of migration by age group or other type of characteristics. We do however return to the difference between seasonal and permanent migration that we indicated above. A relatively small subset of the sampled households receives remittances from permanent migrants. Because the effect of these returns to permanent migration of a former household member might either offset or complement the effects of seasonal migration, and because seasonal and permanent migration might be correlated with each other, we estimate a specification that excludes all the households with permanent migrants. Column 3 in table 4 shows that our results are robust, confirming the key role of seasonal migration in this context.

To summarize, the results suggest that mother’s seasonal migration has a significant positive effect on early childhood development, suggesting that the positive income effect might be larger than potential lack of parenting effect. At the same time, we do not find significant effects of father’s or other’s migration on ECD. Furthermore, the OLS findings on the anthropometrics are at least suggestive in that the impact if mother’s migration may be channeled through improved nutrition.8

4. Further interpretation of the results

4.1. Empowerment

8 In addition to nutrition, migration income might help households to invest better in the human capital of their children (e.g. through spending on health). Moreover, migration can lead to exposure of new ideas (e.g. on preventive health care) that can translate on higher cognitive development outcomes.
One potential explanation of these findings may be related to the allocation of migration income. Indeed, an important difference between permanent and seasonal migration is that they have different effects on who controls earnings. Permanent male migrants send remittances home, and spouses (or others) who stayed home can decide on the allocation of that income. In contrast, with seasonal migration, the migrant comes home with the money and decides what to do with the money. The descriptive statistics suggest that migrant women bring home a higher share of migration income. As women contribute more to household income, intra-household bargaining might be shifted towards women, which could improve the spending on children’s human capital (e.g. through better nutrition and health, see e.g., Djebbari, 2005; Bobonis, 2006).

The data show some striking patterns that are consistent with such a hypothesis. First, while TVIP scores are positively correlated with household consumption, the relationship is stronger for households with seasonal migrant mothers (figure 4). This pattern is consistent with increased women’s empowerment and consequent higher investment in children as a result of seasonal migration. Furthermore, figure 5 compares TVIP scores between the two highest and lowest household consumption per capita quintiles, and shows that TVIP scores of children from seasonal migrant mothers are particularly large. In addition, if the impact of mother’s seasonal migration works through increased household bargaining power, we do not necessarily expect to see a similar result when considering mother’s who are not spouses of the household head. We therefore also estimate a specification where we include all children in our sample, irrespective of whether they are children of the household head. As it can be seen by the results in Table 4 (specification 5), the coefficient on mother’s seasonal migration increases but is not significant. The instruments are also much weaker for this specification, indicating that seasonal migration decisions in nuclear households might be driven by different factors than in extended (often multigenerational) households.9

4.2. Alternative caregivers

In order to better understand our results, it is also important to account for the family members that do not migrate, and might become responsible for care-giving during the...
migration episodes. The regressions in table 5 all control for household demographics. One could however hypothesize that the effect of migration itself might depend on whether, in the mother’s absence, care of the children is taken over by other adult household members who might provide similar levels of parenting and/or stimulus. To shed some partial light on this hypothesis, specification 4 (Table 4) shows an estimation that excludes all children from households where there is an adult female household member, in addition to the mother. The results are very similar to the earlier findings, suggesting that having an alternative caregiver in the household might not be key for ECD. This does not necessarily imply however that such care is not important, but could rather indicate that the care of children of women migrants is temporary taken over by women in other households.

Field observations indeed suggested the importance of such a temporary caregiver mechanism, and this could further help explain the different findings for migration of mother versus father. Migration by fathers potentially results more often in temporary negative consumption shock than migration by mothers. When fathers migrate seasonally (and unlike permanent migrants that may send remittances), households temporary lose the cash income that fathers otherwise bring home, and this temporary shock could negatively affect ECD. Mother’s care might also decrease during this period if she is forced to look for a cash income during the father’s absence. A similar effect on ECD is less likely to occur when mothers migrate, as mothers typically leave the children in care of a grandmother or other family member. The children then become temporary members of the other household. Since the cash income of the other household is not affected by the migration, access to nutrition and care might be more constant. Such a hypothesis relates to recent findings of positive effects of fostering on children’s human capital outcomes (Akresh, 2006). Unfortunately, our data do not allow analyzing this hypothesis.

4.3. Stimulus as a complementary input

10 This last result might be driven, however, by the fact that we have excluded children whose parents are not the household head (e.g. because the household head is the grandfather).
11 This last result might be driven, however, by the fact that we have excluded children whose parents are not the household head (e.g. because the household head is the grandfather).
12 While in principle, this same option might exist for children of households were only the father migrates, social norms might prevent mothers to place those children in another household during the father’s absence. Field observations confirm that such temporary child fostering is much less likely to occur when mothers are still present in the community.
An important caveat to the results on stimulation, is the potential cumulative effects of yearly seasonal migration that we are unable to capture. Indeed, our IV approach only allows isolating the seasonal migration due to a shock in the year preceding the survey. Hence, to the extent that negative effects of lack of stimulus only occur after repeated absences, our results might underestimate the potential trade-off.

Yet a possible alternative explanation of our findings is that stimulus might be important for early childhood development, but only if the child has reached a minimum nutritional threshold. Given high levels of malnutrition in the region studied, lack of stimulus might not have strong effects as long as nutrition is severely constrained. Migration income of mothers might then be a pre-condition for early childhood development through stimulus. We can shed light on this hypothesis by exploring information we have from the survey from an early childhood development program whose specific goal is to provide stimulus to young children, in order to separate income from stimulation effects.

Since 2003, the government of Nicaragua has been implementing a program for early childhood development and stimulation, called PAININ (Programa de Atención Integral a la Níñez Nicaraguense). 39% of the pre-school children in our sample have participated in PAININ. The program focuses on stimulation of children between the ages of 0 and 7 through interaction with trained facilitators in child-care facilities or small community-organized groups. The program aims at developing different cognitive skills of the children by consistently stimulating and practicing a set of vocabulary, motoric and social tasks, with the aim of reaching a set of age-specific benchmarks in these areas.

Figure 6 illustrates the striking complementarity between this stimulus program and household consumption. TVIP scores of children from households in the two highest consumption quintile who participate in Painin are clearly larger than children who do not participate, but such differences are much smaller for children in the lowest consumption quintiles, for which the nutrition constraint is more likely to be binding. These patterns are particularly interesting as the difference in the average per capita consumption levels of the highest quintiles is itself not very large ($358, compared to $220 for the lowest quintiles). An even more striking contrast results if we look at the relationship between Painin and TVIP
scores for children of migrant and non-migrant mothers (figure 7). These figures hence shed further light on the role of mother’s migration income to address key constraints in early childhood development, which in turn might facilitate the further impact of stimulus programs.

5. Conclusion

This paper has shown that seasonal migration can play an important role in protecting early cognitive development of preschool children in poor shock-prone areas with severe problems of malnutrition. The paper also points to the potential trade-off that might exists as seasonal migration can result in lack of direct parenting and stimulation, and as such can cause lags in early childhood development. After accounting for exogenous shocks that might be driving seasonal migration, we find that mother's migration has a positive effect on ECD, while father's and other's migration does not. Indeed, seasonal migrant mothers in our data tend to bring more migration income home, possibly allowing them to spend more on children’s welfare, through a direct income and possibly an indirect empowerment effect. The importance of income (consumption) for ECD is also suggested by the differences in TVIP across consumption quintile.

The somewhat surprising result regarding mother’s migration needs further investigation. Nevertheless, it suggests that cash income of mother’s might be a crucial factor in early childhood development. This indicates a potential important advantage of conditional cash transfer programs that are targeted to mothers. Ongoing research evaluating an experimental conditional cash transfer pilot program in the region of study will help to shed more light on this issue.

This paper has analyzed the relationship between human capital accumulation and seasonal South-South migration, an aspect of globalization that is not yet well understood. It has focused in particular on early childhood development as both theory and evidence indicates

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13 While these figures do not allow drawing causal inferences, in Macours and Vakis (2007) we use various matching estimators to address program placement and self-selection and reach very similar conclusions.
high economic returns to this type of human capital investments at early ages.\textsuperscript{14} Cunha et al. (2005) provide a theoretical framework to show that investment at an early age produces a high return through self-productivity and direct complementarity. Early investment in cognitive and non-cognitive skills lowers the cost of later investment by making learning at later ages more efficient. Longitudinal studies in developed countries have provided empirical evidence in terms of the long-term pay-offs in income, wages, educational achievement, and social behavior (see review by Schady, 2006). While such longitudinal evidence is more limited for developing countries, recent evidence from Guatemala (Maluccio et al. 2006) finds large long-term gains in terms of cognitive skills and educational attainment and of adults 25 years after a nutritional intervention.

The fact that household’s decisions regarding human capital investments are arguably more severely constrained in many developing countries suggests that early childhood development might be an even more important factor in breaking the intergenerational transmission of poverty. The evidence in this paper illustrates how one aspect of globalization, i.e. increased opportunities in seasonal migration because of higher South-South mobility, might positively affect early childhood development, and as such long-term poverty reduction.

\textsuperscript{14} Or as Amartya Sen (1999) has put it “The capabilities that adults enjoy are deeply conditional on their experiences as children.”
References


Currie, Janet and Duncan Thomas, 1999, “Early Test Scores, socioeconomic Status and Future Outcomes”, NBER WP 6943, Cambridge, MA.


Tables and Figures

Table 1: Seasonal migration patterns

<table>
<thead>
<tr>
<th></th>
<th>Mother</th>
<th>Father</th>
<th>Other member</th>
<th>Any household member</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households with migrants (%)</td>
<td>8*</td>
<td>41</td>
<td>13</td>
<td>50</td>
</tr>
<tr>
<td>% of seasonal migrants who go abroad</td>
<td>45*</td>
<td>59</td>
<td>39</td>
<td>56</td>
</tr>
<tr>
<td>Migration duration (days)</td>
<td>85</td>
<td>86</td>
<td>140(^1)</td>
<td>122(^1)</td>
</tr>
<tr>
<td>Migration income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total earned (Cordobas)</td>
<td>6976</td>
<td>6028</td>
<td>5435</td>
<td>5652</td>
</tr>
<tr>
<td>Brought back (Cordobas)</td>
<td>4174*</td>
<td>3356</td>
<td>2694</td>
<td>3115</td>
</tr>
<tr>
<td>% of migration income brought back</td>
<td>73*</td>
<td>65</td>
<td>57</td>
<td>64</td>
</tr>
<tr>
<td>% brought back as share of total hh income</td>
<td>23</td>
<td>21</td>
<td>15</td>
<td>19</td>
</tr>
</tbody>
</table>

\(^1\) Refers to the total of all days absent for all members

* Significant difference between Father and Mother migrant at 10% or better

Table 2: Dependent variables means

<table>
<thead>
<tr>
<th></th>
<th>Mother</th>
<th>Father</th>
<th>Other member</th>
<th>Any household member</th>
<th>Non Migrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVIP standardized score (36-84 months)</td>
<td>70</td>
<td>67</td>
<td>65</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>% Wasted (0-60 months)</td>
<td>3.8</td>
<td>4.3</td>
<td>1.3</td>
<td>4.0</td>
<td>2.2</td>
</tr>
<tr>
<td>% Stunted (0-60 months)</td>
<td>22.6</td>
<td>28.6</td>
<td>26.7</td>
<td>29.5</td>
<td>27.8</td>
</tr>
<tr>
<td>% Underweight (0-60 months)</td>
<td>13.2</td>
<td>18.3</td>
<td>16.0</td>
<td>18.8</td>
<td>15.4</td>
</tr>
<tr>
<td></td>
<td>TVIP standardized score</td>
<td>Weight for age z-score</td>
<td>Height for age z-score</td>
<td>Weight for height z-score</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------</td>
<td>-------------------------</td>
<td>------------------------</td>
<td>----------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>Any household member migrated temporary</td>
<td>-1.281***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.73)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother migrated temporary</td>
<td></td>
<td>2.310**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.58)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father migrated temporary</td>
<td></td>
<td>-0.975*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.94)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other household member migrated temporary</td>
<td></td>
<td>-0.984</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.27)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total # of days - Mother migrated temporary</td>
<td></td>
<td>0.020**</td>
<td>0.004**</td>
<td>0.004**</td>
<td>0.002*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.15)</td>
<td>(2.46)</td>
<td>(2.38)</td>
<td>(1.69)</td>
</tr>
<tr>
<td>Total # of days - Father migrated temporary</td>
<td></td>
<td>0.001</td>
<td>-0.000</td>
<td>-0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.25)</td>
<td>(0.08)</td>
<td>(0.62)</td>
<td>(0.30)</td>
</tr>
<tr>
<td>Total # of days - Other household member migrated temporary</td>
<td></td>
<td>-0.010**</td>
<td>-0.000</td>
<td>0.000</td>
<td>-0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.42)</td>
<td>(0.11)</td>
<td>(0.21)</td>
<td>(0.61)</td>
</tr>
<tr>
<td>Controls for individual, household and community characteristics yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Observations</td>
<td>1535</td>
<td>1535</td>
<td>1536</td>
<td>1787</td>
<td>1788</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.55</td>
<td>0.55</td>
<td>0.55</td>
<td>0.12</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Only nuclear households included. TVIP scores are for 36-84 months old; anthropometrics are for 0-60 months old.
Table 4: Seasonal Migration and ECD: IV estimates

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVIP standardized score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total # of days - Mother migrated</td>
<td>0.276**</td>
<td>0.238*</td>
<td>0.282**</td>
<td>0.252*</td>
<td>0.884</td>
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<tr>
<td></td>
<td>(1.97)</td>
<td>(1.69)</td>
<td>(2.05)</td>
<td>(1.71)</td>
<td>(0.53)</td>
</tr>
<tr>
<td>Total # of days - Father migrated</td>
<td>-0.015</td>
<td>-0.006</td>
<td>0.008</td>
<td>0.010</td>
<td>0.052</td>
</tr>
<tr>
<td></td>
<td>(0.22)</td>
<td>(0.09)</td>
<td>(0.06)</td>
<td>(0.14)</td>
<td>(0.22)</td>
</tr>
<tr>
<td>Total # of days - Other household member migrated</td>
<td>-0.071</td>
<td>-0.073</td>
<td>-0.116</td>
<td>-0.063</td>
<td>-0.200</td>
</tr>
<tr>
<td></td>
<td>(1.07)</td>
<td>(1.16)</td>
<td>(1.54)</td>
<td>(1.08)</td>
<td>(0.44)</td>
</tr>
<tr>
<td>Controls for individual, household and community characteristics</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Just identified</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Excludes household with permanent migrants</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Excludes households with other female adults</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Includes any child in household</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Observations</td>
<td>1534</td>
<td>1534</td>
<td>1367</td>
<td>1221</td>
<td>2080</td>
</tr>
<tr>
<td>Joint F-test of exclusion restriction - Mothers</td>
<td>4.13</td>
<td>4.37</td>
<td>7.15</td>
<td>6.37</td>
<td>1.56</td>
</tr>
<tr>
<td>Joint F-test of exclusion restriction - Fathers</td>
<td>4.01</td>
<td>5.33</td>
<td>3.44</td>
<td>3.74</td>
<td>5.72</td>
</tr>
<tr>
<td>Joint F-test of exclusion restriction - Other</td>
<td>5.69</td>
<td>6.86</td>
<td>9.05</td>
<td>12.24</td>
<td>2.39</td>
</tr>
<tr>
<td>Anderson instruments validity (chi²)</td>
<td>5.997</td>
<td>5.997</td>
<td>2.611</td>
<td>5.719</td>
<td>0.262</td>
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<tr>
<td>P-value</td>
<td>0.0499</td>
<td>0.0143</td>
<td>0.1061</td>
<td>0.0168</td>
<td>0.6085</td>
</tr>
<tr>
<td>Sargan over-identification (chi²)</td>
<td>0.612</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>P-value</td>
<td>0.4342</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Instruments for column (1) include households in last 12 months: plagues, wages, adult illness and price shock. Column (2) to (5) exclude price shocks.

Absolute value of z statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: First stage regression for IV estimates (Table 4, specification 1)

<table>
<thead>
<tr>
<th></th>
<th>Total # of days mother migrated temporary</th>
<th>Total # of days father migrated temporary</th>
<th>Total # of days other household member migrated temporary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.59)</td>
<td>(2.77)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>Adult illness shock</td>
<td>12.647***</td>
<td>19.896***</td>
<td>41.093***</td>
</tr>
<tr>
<td></td>
<td>(3.10)</td>
<td>(2.76)</td>
<td>(4.53)</td>
</tr>
<tr>
<td>Price shock</td>
<td>7.560*</td>
<td>1.693</td>
<td>13.488</td>
</tr>
<tr>
<td></td>
<td>(1.84)</td>
<td>(0.23)</td>
<td>(1.48)</td>
</tr>
<tr>
<td>Agricultural plague shock</td>
<td>-3.305*</td>
<td>0.289</td>
<td>2.651</td>
</tr>
<tr>
<td></td>
<td>(1.88)</td>
<td>(0.09)</td>
<td>(0.68)</td>
</tr>
<tr>
<td>Controls for individual, household and village characteristics</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>1534</td>
<td>1534</td>
<td>1534</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.10</td>
<td>0.09</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%
Figure 1 – TVIP scores by age and seasonal migration status

Figure 2 - % of children that are stunted: by seasonal migration status
Figure 3 - % of children that are underweight: by seasonal migration status

Figure 4 – TVIP, Migration, Mothers and Wealth
Figure 5 - TVIP and wealth

![Graph showing TVIP standardized score against age in months for non-migrant and migrant mothers across different consumption quintiles.]

- Non-migrant mothers
- Migrant mothers

TVIP standardized score vs. Age in months

- 2 lowest consumption quintiles
- 2 highest consumption quintiles

Bandwidth = .8

Figure 6 - TVIP standardized scores: low versus high consumption quintile

![Graph showing TVIP standardized score against age in months for Painin and Non-Painin groups across different consumption quintiles.]

- 2 lowest consumption quintiles
- 2 highest consumption quintiles

TVIP standardized score vs. Age in months

- Non-Painin
- Painin

Bandwidth = .8
Figure 7: TVIP: Painin with Migration

The figure shows a comparison of TVIP standardized scores between non-migrant and migrant mothers. The x-axis represents age in months, ranging from 40 to 80, and the y-axis represents the TVIP standardized score, ranging from 40 to 120. The data is differentiated by a bandwidth of .8, indicating the smoothing applied to the data points to show the trend more clearly.

- **Non-migrant mothers**
  - The solid line represents non-Painin mothers.
  - The dashed line represents Painin mothers.

- **Migrant mothers**
  - The solid line represents non-Painin mothers.
  - The dashed line represents Painin mothers.

Bandwidth = .8