

Children's Living Arrangements and Secondary Schooling in Latin America and the Caribbean

Abstract: Fifty years ago, educational attainment in Latin America was far better than in other developing countries. That advantage has been lost. We investigate the extent to which secondary school enrollments and progress are compromised by family instability. We find that biological parents in the household promote good educational outcomes for children in Latin America and the Caribbean, and that the advantage to living with two biological parents is greater in richer countries within the region. Family instability thus presents an obstacle to successful secondary schooling that remains after economic development.

Promoting education is universally recognized as good for individuals and for nations given that it contributes to productivity through increased cognitive skills and better individual and public health practices. "Learning begets learning, skills (both cognitive and non-cognitive) acquired early on facilitate later learning" (Coyle, Alexander, and Ashcroft 2005: 138). Latin America led other developing countries in schooling in the 1960s, but expansion of education has been relatively poor. Now students in Eastern Asian and Pacific countries are more likely to complete secondary school, and the Latin American advantage over poorer developing countries has also dwindled (Barro and Lee 2010). Overcoming barriers to education in the region is additionally desirable due to increases in the rates of return to education in Latin America during the 1990s (Pritchett 2004).

Primary school enrollments are nearly universal in Latin America, but secondary enrollment is much more variable both between and within countries. Educational systems in Latin America do a poorer job of equipping students relative to other regions (Mizala and Romaguera 2002) with important consequences: Hanushek and Woessmann (2012) have demonstrated that slow economic growth in the region can in fact be explained by lower cognitive skills (as measured by standardized tests). School quality is undoubtedly an important factor in why many Latin American students reach their late teens functionally illiterate (Hanushek and Woessmann 2012), and has received considerable attention (Fuller and Clark 1994; Woessmann 2010 and references cited therein). Nonetheless, given that only children attending and progressing through school can derive whatever benefits their schooling systems have to offer, we analyze basic background factors compromising secondary enrollments and progress in Latin America and the Caribbean.

Context

Universal education is typically conceptualized as a government responsibility and there are certainly high-level policy prescriptions that can facilitate it. Nonetheless, we argue that with Latin America's history of an early advantage over other developing countries in pursuing education and continued governmental commitment to this goal (e.g., Escobal, Saavedra, and Vakis 2012) including increased per capita expenditures (Ramirez and Téllez 2006), it is appropriate to assess remaining household-level obstacles to promoting secondary education.

We maintain that considering education in the Latin American context mandates a focus on family structure. Literature from Northern countries documents an educational advantage for

children living with their married biological parents, but this traditional family structure is less common in Latin America and the Caribbean than anywhere else in the world. Even Mexico that has low rates of non-marital childbearing by regional standards is on par with notorious liberal Sweden at 55% of birth occurring outside of marriage (Author 2011). While children born outside marriage could be reared by their subsequently married biological parents, this is less common than for children born to married parents, and more unlikely given the high rates of cohabitation in Latin America and the Caribbean. Further, the high rates of both non-marital childbearing and cohabitation are increasing across the region (Author 2011; Esteve et al. 2012). Therefore, it is important to explore whether there are educational consequences for Latin American children reared apart from married biological parents.

It is surprising that the effects of family structure on education have received little empirical investigation in Latin America and the Caribbean. What little literature exists is hardly conclusive. One cross-country study that included Colombia, Peru, and Uruguay found that children living with neither biological parent had lower secondary enrollments than those living with both, and that those living with only one biological parent were disadvantaged in Colombia and Uruguay, but not Peru (Wilcox et al. 2009). In both Bolivia and Venezuela, father-absence increased the probability of children working, but the subsequent effect on schooling was significant only in Bolivia where child labor occurred at higher rates (Psacharopoulos 2007). Bolivian children living with two parents also had higher language test scores (Mizala et al. 2000). Father-absence was associated with significantly lower cognitive performance among preschool children in northeastern Brazil (Santos et al. 2008). In urban Peru, children living with both biological parents had better grades in school than all other groups, including single and remarried parents (Soto 2011). The most comprehensive study to date (Lippman et al. 2012) covered 10 Latin American/Caribbean countries. Lippman and her colleagues drew data from the Organization for Economic Cooperation and Development's (OECD) Program in International Student Assessment (PISA) 2009 dataset that included middle- or higher-income countries (8 in Latin America and the Caribbean) as well as from the Demographic and Health Surveys (5 in Latin America and the Caribbean, 3 of which also had PISA data). In the PISA data, they found negative educational outcomes (either significantly lower reading literacy scores or significantly higher incidence of grade repetition) in all the countries among 15-year-olds who did not live with two parents (whether biological or step): Argentina, Brazil, Chile, Colombia, Costa Rica¹, Mexico, Peru, and Uruguay. In all these countries, both children living with one parent and those living with none had worse educational outcomes (Lippman et al. 2012). Their analysis of DHS data also found a disadvantage for children living apart from both parents in four out of five countries, but children living with one parent did not generally have compromised educational outcomes.²

In sum, there is some indication that the effects of family structure on education might be similar in Latin America and the Caribbean to the heavily-studied Northern countries where children of married biological parents do the best, but more evidence is necessary before drawing such a conclusion. A particular deficit in the existing literature is that wealthier countries within the

¹ In Costa Rica alone, the advantage to living with two parents became insignificant when household wealth was controlled.

² Colombian children living with only one parent were less likely to be enrolled in school, but not less likely to be behind grade for age. In Brazil, Peru, Bolivia, and Nicaragua there were not significant differences among children living with one versus two parents on either educational measure.

region are over-represented in the empirical studies. More representative evidence is necessary to understand how children's living arrangements affect their educational prospects in Latin America and the Caribbean.

Data and Methods

Data. Our data come from the Demographic and Health Surveys (DHS) and include the same five DHS countries as in Lippman et al. 2012 as well as five additional Latin American/Caribbean countries. Our added countries are all poorer than the OECD countries that participated in PISA. DHS data are best known for analysis based on detailed interviews of reproductive-aged women, but the sample for individual interviews is drawn from a household questionnaire that provides other important information. In its initial round, the DHS did not include schooling outcomes for children, but since round II (circa 1992) the household questionnaire has also collected the educational attainment and enrollment status of all household members. We use the most recent round that 1) identified the parents of children in the household files, 2) included children's education, and 3) allowed for including a household wealth control: Bolivia (2008), Brazil (1996), Colombia (2009-2010), Dominican Republic (2007), Guatemala (1998-1999), Guyana (2009), Haiti (2005-2006), Honduras (2005-2006), Nicaragua (2001), Peru (2004-2008).

Dependent variable. We construct a measure of whether children aged 11-14 are at an educational disadvantage by combining data on whether they are attending school and how many years of schooling they have completed. At these ages, not attending school is a poor outcome. Moreover, children that are behind the expected grade for their age are also at a disadvantage, either because of grade repetition or late enrollment.³ Having either negative outcome is our dependent variable. With this coding, positive coefficients mean that poor outcomes are more likely and negative ones mean that poor outcomes are less likely. We recognize that there are many children at an educational disadvantage (e.g., having low test scores or lacking functional literacy) who will not be identified as disadvantaged by our rough measure, but children out of school or falling behind in school are among the worst off. We therefore have confidence that we are measuring important educational outcomes, but also note that relevant differences among relatively advantaged students go uncaptured by our analysis.

Independent variables.

Number of parents in the household. The DHS household questionnaire identifies whether the child's biological parents reside in the household. Children can therefore easily be classified as living with two, one, or no biological parents.

Other adults. The presence of adults other than biological parents in the household may represent additional resources (particularly in the case of step-parents if the biological parent is not employed). In addition, extended family may support schooling by helping with household labor so that children may attend and study.

Other children. The presence of other children in the household could compromise the schooling of secondary-aged children if their labor were needed for income or child care, or more simply because of competition between children for resources like school uniforms and books. Having more siblings has been associated with lower academic achievement (Downey 2001, 1995; Kuo

³ We use country-specific school start ages which range from 5 to 7 when calculating whether a child of a given age and completed years of schooling is behind grade for age.

and Hauser 1997; Parcel and Menaghan 1994; Blake 1989), but the sibling effect is smaller in poorer contexts than in richer ones (Sibanda 2004, Chernichovsky 1985; Gomes 1984). We include the number of children continuously, with all values greater than 6 considered as equal to 6.

Child's gender and age. Gender is a dummy variable (0=female, 1=male), and age is continuous (11, 12, 13, or 14).

Parental education. We define parent's education as the higher of either the mother's or the father's education using six categories: no education, incomplete primary, complete primary, incomplete secondary, complete secondary, and higher. For children living with neither parent (and also in the few cases where parent's education is missing), we use education of the household head. Education of the household head has been shown to be a strong determinant of children's schooling (Case and Deaton 1999).

Wealth. We construct a wealth index based on housing quality and ownership of consumer durables. It is an 8-point scale measuring absolute wealth developed by Sarah Giroux (personal communication).⁴ The only Latin American country that did not have the information to construct this index was Paraguay.

Teenaged mother. Children born to teenaged mothers face a number of obstacles that could easily compromise their own schooling. Controlling for parental education and household wealth captures some of these effects, but in principle our key independent variable—parental presence in the household—may be an artifact of teen motherhood. That is, women who bear children in their teens are less likely to be living with their child's biological father 11-14 years later when we observe educational outcomes. In order to avoid other negative effects of teen motherhood from being captured by our children's living arrangement variables, we include a variable indicating whether the mother was still in her teens when the focus child was born (0=mother aged \geq 20 at the child's birth, 1=mother aged $<$ 20 at the child's birth).

Residence. Residence is a dummy variable (0=rural, 1=urban). Other studies of Latin American education have shown residence to be a persistent factor impacting educational opportunity (Benavides and Mena 2010).

Region. In our final model (see methods section below), we use regions divided into rural and urban areas instead of simply controlling for residence. Because the geographic distribution of educational opportunities is so uneven in developing countries and capital cities in Latin America and the Caribbean have a distinct advantage over other areas, particularly in the poorer countries of the region (Escobal, Saavedra, and Vakis 2012; Molinas et al. 2010), these regional controls are necessary to account for differences in access to secondary school. The models then

⁴ 1=poor floor, poor drinking water, and poor toilet

2=2 of the following (poor floor, poor drinking water, and poor toilet)

3=1 of the following (poor floor, poor drinking water, and poor toilet)

4=0 or 1 of the following (poor floor, poor drinking water, and poor toilet) and a radio

5=0 or 1 of the following (poor floor, poor drinking water, and poor toilet) and electricity

6=0 or 1 of the following (poor floor, poor drinking water, and poor toilet) and a television

7=0 or 1 of the following (poor floor, poor drinking water, and poor toilet) and a refrigerator

8=0 or 1 of the following (poor floor, poor drinking water, and poor toilet) and a car

Some countries also have a DHS-provided wealth index that divides households into wealth quintiles within the country (relative wealth). In no case where the two wealth measures could be compared was the statistical significance of family structure variables affected by the choice of wealth control. Thus the absolute wealth index was used to retain the maximum number of countries and comparability.

estimate the effects of family structure and other variables *within regions*. See Huisman and Smits (2009) who also describe the importance of district controls.

Methods. We start with a sample pooled across all of the Latin American and Caribbean countries. First, we simply assess the effect of biological parents being present without any controls. We then correct for clustering in the sample⁵ and add all of the control variables listed above besides region and teenaged mother. In the third model, we include a set of dummy variables to control for fixed effects of regions. We then estimate these same three models for individual countries in addition to the pooled sample. The fixed effects models provide the most reliable indication of how important the other independent variables are for educational outcomes. Not only do they control out some of the differences in educational opportunity, but they also provide correction for some correlation between variables within regions. For example, traditional families may be more common in more remote regions where children are also less educated. The dummy variables for region do not purge our estimates of such bias because there can still be variation within regions (e.g., more traditional ethnic groups also being less likely to educate their children than others in the same region), but they nonetheless provide a better indication of how much our household-level variables matter for educational outcomes.

Finally, we add the variable indicating whether the child of secondary school age was born to a mother still in her teens at the time. The mother's age at the child's birth is known only for children living with their mothers at the time of the interview: out of 81,012 children aged 11-14, 13,406 (16.6%) were living apart from their mothers—3,166 with only their father (3.9%), and the rest (12.7%) with neither biological parent. Children whose mother's age is known thus represent a select sample, and we re-estimate model 3 with this subsample before adding the teenaged mother variable. We can then properly compare how living arrangements affect children's secondary schooling with and without controlling for teen motherhood.

Results

In our preliminary analysis, we first measured children's living arrangements using the number of adults rather than the number of biological parents. These results were insignificant, i.e., educational outcomes did not vary between children living with no, one, and two or more adults. This was in strong contrast to the results that distinguished biological parents from other adults that are presented below. Thus consistent with the literature on investment in children being conditioned by biological relatedness, parents matter (see Hamilton 1964; Hoffereth and Anderson 2003).

In Table 1, first model without controls shows that children living apart from either biological parent are more likely to have poor educational outcomes. The disadvantage for children living apart from both biological parents is still greater: those living with one parent are 25% more likely to be out of school or behind grade-for-age ($e^{0.221}=1.25$) and those with no parents are about two-thirds more likely to be experiencing one of these negative outcomes ($e^{0.513}=1.67$).

⁵ Educational outcomes are clustered geographically within countries; there is an urban advantage that is consistently statistically significant when the models are estimated without robust standard errors and is diminished (but sometimes still significant as discussed in our results section) with robust standard errors.

The difference between these estimates is statistically significant (not shown), meaning that children with neither parent are also at a disadvantage compared to those living with one parent.

(Table 1 about here)

When the control variables are introduced (model 2), children living with both biological parents are still at a significant advantage over all others, but there is no longer a difference between having one parent and having none. In the final model controlling for regional fixed effects (model 3), the children living with both biological parents still have a significant educational advantage over those living with one parent as well as those living with neither parent, but the estimated magnitude of the advantage is smaller. Those living with one biological parent are about 15% more likely to be out of school or behind the expected grade for their age, and those living with neither parent are 23% more likely to be disadvantaged in one of these ways. The difference between living with one parent and no parents is not statistically significant, but children in either group fare significantly worse than those living with both biological parents.

Thus, when considering educational outcomes across all of the Latin American/Caribbean countries in our sample, having both biological parents in the household confers a significant advantage to secondary-aged students. The presence of other adults in the household did not matter for children's education, but additional children in the household were associated with poorer educational outcomes.⁶

The effects of age, parental education, wealth, and urban residence were all in the expected direction: older children were more likely to be behind or out of school, but children of educated parents, those in wealthier households, and those living in urban areas were less likely to have these disadvantages. Boys were also 34-46% *more* likely than girls to have poor educational outcomes. This female advantage in secondary education in Latin America and the Caribbean has been documented before (e.g., Knodel and Jones 1996; Creighton and Park 2010); finding it here indicates that although the DHS does not specialize in collecting education data, the data are nonetheless of high quality.

Table 2 shows results for individual Latin American/Caribbean countries. For parsimony, we present only the final model (model 3 above).

(Table 2 about here)

Living apart from both biological parents was associated with an educational disadvantage in seven of the ten countries that was significant in five of them. Living with only one biological parent rather than two was disadvantageous in eight countries, but it only conferred a significant disadvantage only in Brazil, Colombia⁷, and Peru.

⁶ Fertility and human capital investments are associated at both the societal and household levels for both causal and non-causal reasons: our analysis does not help explain the association; it merely documents it.

⁷ Colombia contributes disproportionately in the pooled sample because its DHS included a large number of observations.

In every country, boys are at a disadvantage—more likely to be doing poorly than girls—and that disadvantage is statistically significant in six out of ten countries. The estimated magnitude of the significant disadvantages varies from being 2.06 times more likely to have a poor educational outcome (Dominican Republic) to 0.26 times more likely (Honduras).

Table 2 presents only the final models where the differences between rural and urban areas cannot be estimated because the set of dummy variables for region identifies rural and urban regions of provinces (or their equivalent) separately. Nonetheless, we note that when we estimated model 2 for individual countries (not shown) a significant rural disadvantage existed in four of the countries: Guatemala, Haiti, Nicaragua, and Peru. These countries have more spatial variation in educational outcomes, while the other countries are doing a better job of providing education in more remote areas.

Finally, we investigate how much of the two-parent advantage can be explained by the fact that children born to teenaged mothers are less likely to be living with both biological parents by the time they reach secondary school age. The first column of Table 3 is the same as the third column of Table 1: it is replicated solely to facilitate comparison between the full sample used in the initial analysis and the subsample of children living with their biological mothers (those for whom the mother's age at the time of the child's birth is known). Children living with only one biological parent (their mother) are still at a significant disadvantage compared to those living with both biological parents, but the estimated magnitude is smaller: they are about 7% more likely to be doing poorly educationally as compared to 15% for children living with either biological parent in the full sample. This suggests that while the absence of either biological parent is problematic for secondary education, father's absence matters less than mother's absence. This was confirmed by an additional analysis where children living with only their father were 55% more likely to have a poor educational outcome (not shown). The estimated effect of living with only the biological mother is virtually the same with and without controlling for mother's age at the child's birth (compare columns 2 and 3 of Table 3). Thus the significant effect of children's living arrangements at secondary school age on their education cannot be explained away by teen mothers being less likely to stay with their children's fathers: living arrangements matter irrespective of teen motherhood.

(Table 3 about here)

Discussion

Our results demonstrate, first and foremost, that biological parents matter for secondary schooling in Latin America and the Caribbean, a region where expansion of education has lagged behind other developing regions. Children with more educated parents have better schooling outcomes, but parents simply being in the household also matters. Other adults do not help with children's educational outcomes. Our work focused on biological parents, and we found stronger effects than other analysis using the same data that instead compared all two-parent families (whether two biological parents or one married biological parent) to sole parent families and no parent families (Lippman et al. 2012). In other words, biological parents seem to promote secondary schooling more than stepparents, and certainly more than other adults. The benefit conferred by living with both natural parents is modest, less than half of that conferred by having a parent or household head with one higher level of education. Nonetheless, family instability

appears to be a significant obstacle to better educational outcomes. In our sample spanning 10 countries in the region, only 56% of children aged 11-14 years lived with both biological parents.

The importance of family structure for secondary enrollments and progress seems to be greater in the wealthier countries of Latin America and the Caribbean. We found an advantage for children with two biological parents in Brazil, Colombia, and Peru, but not in Bolivia, the Dominican Republic, Guatemala, Guyana, Haiti, Honduras, nor Nicaragua. Not only were the three highest income countries in our sample the ones where family structure mattered the most, but also previous analysis of PISA 2009 data that showed an educational advantage for children in two-parent homes did not include any of the poorer Latin American and Caribbean countries. Thus it seems that at lower levels of socioeconomic development that educational progress may depend more on macro-level factors, but that at higher levels, children's family structure emerges as an important determinant of whether they are able to take advantage of the educational opportunities that are present (see Baker 2012). If this is the case, then family patterns in Latin America and the Caribbean that are already an obstacle for secondary schooling in wealthier Latin American countries will become an even greater obstacle overall as poorer countries come closer to universal secondary education.

It is also noteworthy that girls in Latin America and the Caribbean are not at an educational disadvantage. Overall, they seem advantaged, at least at ages 11-14 before pregnancy starts to become a factor affecting schooling. Efforts to promote gender equity in secondary education need to be focused on defining the obstacles for boys.

Conclusion

We have studied obstacles to having more Latin American/Caribbean children complete secondary school and contribute to the health and development of their communities. Our analysis demonstrates that family structure, not just government, plays an important role in maintaining secondary enrollments. Governments obviously play an active role in extending educational opportunities to remote areas, but less obviously they also need to be concerned with supporting intact families in order to overcome the region's emerging disadvantage in human capital. This is particularly the case in wealthier Latin American countries where "easier" obstacles to education have been overcome and remaining educational differentials have more to do with family structure than they do in the poorer countries of the region.

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