

Child Labor and Household Composition: Determinants of Child Labor in Mexico

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ABSTRACT

Despite the positive effects of some social programs based on conditional cash transfers, child labor in Mexico has not decreased as expected. This could be explained in part as a result of the high poverty levels in which most of the population lives. However, children do not necessarily work in all of the affected families. Using the database of Child Labor Modules 2009, 2011 and 2013 (hereafter MTL), this study provides an estimation of the determinants of child labor for children between 5 and 17 years old in Mexico. We find that small differences in the perceived opportunity cost of schooling have a significant impact on child labor. Other factors such as family structure and parents' educational level exert influence as well. The results also show that by using different definitions of child labor, the probability that a minor will work varies significantly by gender.

Key Words: child labor, labour in Mexico

INTRODUCTION

"Jose is already working with his dad. He no longer wanted to continue attending High School. He is doing the right thing! Why waste time in school when business is going well for them?"
(Referring to Jose's dad's auto repair shop)

Is going to school worth it or not? What does a child get by attending school? What are the long-term benefits that can, at any given time,

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justify an investment in education? In Mexico, around six out of 10 individuals who start High School graduate; and of these, less than 19% (INEGI 2009; 2011; 2013) initiate a bachelor's degree program. When family income is high, investing in education does not require any great assessment. However, when the family income is low, the decision between investing in education or not becomes much more difficult. As family income decreases, the need to decide between investing in education or not is replaced by the need to choose to send their children to work or not. This translates either in the possibility that children provide an income or: (1) work to pay for school, (2) decrease the family spending budget or (3) help with the household chores so that another family member can work. In either case, by lowering the family income flow, the cost of attending school increases. Hence, many authors claim that child labor is deeply rooted in poverty (Beneria 1992; Chant 1994; Roberts 1995) and inversely linked to the opportunity cost of schooling (Edmonds 2008; Levinson, Moe and Knaul 2001; López Villavicencio 2005; Udry 2006).

This correlation is well established in the literature; however, theoretical analyses appear to differ increasingly from empirical analysis. The theory has emphasized the negative relationship between income and child labor; while the empirical evidence suggests a smaller effect of poverty on the work done by children especially in sectors where the family has a small business (Gatica and Ruiz 2015), suggesting a nonlinear relationship between income and child labor. These differences between theory and empirical analysis are more evident when analyzing the effects of conditional cash transfers on child labor and schooling. Regardless of the positive impact of programs like PROGRESA on school attendance (Parker and Skoufias 2001; Rubalcava, Teruel and Thomas 2004), other social programs based on conditional transfers have not achieved the same effects. An example of this is the *Rescue Program for Families Working on the Streets of Guadalajara*, which failed to increase school attendance and to reduce child labor (Murrieta, et al. 2009). Despite the economic transfer and possible child income replacement from such transfer, the impact on child labor was not as expected. In large part, this may be because the relationship between poverty reduction and reduction of child labor is not a linear relationship. The range in which you can have a real impact on school attendance is small given that there are many factors involved in deciding whether or not to send children to school (Rogers and Swinnerton 2004; Ravallion and Wodon 2000), factors that are independent of income.

Another factor that significantly influenced the failure of this program was the lack of impact on parents' perception of the cost of schooling,

due in part to (1) parents' valuation of education, (2) the flexibility of the informal labor market and (3) the lack of alternative opportunities of work. That is, in some cases financial support decreased the need for income from the children; however, parents did not necessarily change their perception about the importance of education and their belief that it is good to work and study at the same time. Nor did they change their perception of the possibility of engaging in a different job to street work. Very few considered working elsewhere in order to keep their children off the streets and to guarantee economic stability to avoid the need for child labor. This resulted, among other things, from the lack of employment opportunities as well as from not knowing of alternative options and the means to achieve them – which in most cases are associated with parents' education.

The inefficiency of the program, and the lack of clarity on the relationship between child labor and poverty, make it essential to analyze other factors –beyond simply poverty itself– that influence the decision to send children to school or to work. Hence, the aim of this paper is to analyze economic and social factors that explain child labor in Mexico; while understanding why, when faced with similar living conditions, some families living in poverty send their children to work and others do not? My hypothesis is that, despite income, there are other factors such as family structure and parents' education that influence child labor.

To achieve our objective, I analyze the relationship between child labor and the opportunity cost of schooling taking into account other factors that influence parents' decisions about child labor and schooling. Once the literature on child labor is reviewed, I discuss within the theoretical framework, the different positions in relation to the decision-making process of children's allocation of time: who determines whether or not a child should go to school or work? I argue that personal characteristics of the person who makes the decision, influence the probability of working. The relationship between child labor and opportunity cost of schooling forms the second part of the theoretical framework. After analyzing this relationship more deeply, we continue with a descriptive analysis of child labor in Mexico. Subsequently, we describe the estimation methods, data and variables, and results. We conclude with the public policy implications arising out of this analysis.

LITERATURE REVIEW

Some authors believe that child labor exists because individuals cannot find other means to deal with an extreme situation in which the work done by children becomes a necessary survival strategy (Edmonds 2008; Beneria 1992). But child labor is not an activity performed by all the children who are poor. Although poverty is strongly related to child labor, multiple factors influence its existence and the conditions under which such work takes place. There is no clear causal explanation on why children work; however, the literature highlights three main arguments. The most common and simplified argument is poverty. If the household income increases, the need for a financial contribution by the children decreases and families are able to invest in their children's education. This argument has been taken up by human capital theorists who have focused their work on the study of parental decisions over the distribution of their children's time as it relates to work and school (Knaul 2001). The second argument states that child labor is determined by economic and social factors such as technology implementation or legislation. From this perspective, establishing a minimum age for employment and mandatory education can reduce child labor. Finally, a third line of argument has focused on the transformations that the concept of childhood has had, where child labor is analyzed as a result of not implementing the rights of children (Cunningham 1995).

Most of the literature on child labor has been developed by economists and has focused on the determinants of the allocation of children's time. The most prominent arguments pertain to the effects of poverty (Basu and Van 1998) and market imperfections (Ranjan 2001; Baland and Robinson 2000). Cigno, Rosati and Guarcello (2002) have argued that commercial trade and reforms on investment policies have had a positive impact on reducing child labor. Labor markets, the family, the net return on education and poverty are some of the factors that have been identified as determinants in decisions regarding the allocation of children's time (Basu and Van 1998; Baland and Robinson 2000; Buchmann 2000; French 2010). Besides economists' and sociologists' interest in the different aspects of child labor, those in the field of education have focused on the effects of child labor on schooling (Binder and Scrogin 1999; Gunnarsson, Orazem and Sánchez 2006). Finally, in recent years there has been an increased interest in child labor in terms of social policy. There has been an evaluation and monitoring of programs focused on reducing child labor and increasing schooling (Murrieta, et al. 2009; Parker and Skoufias 2001; Ravallion and

Wodon 2000).

Likewise, research on child labor in Mexico has increased in recent decades. Christenson and Juárez (1987), and Brizzio de la Hoz (1996) have stressed the importance of parental education, income, family size, and the presence of female heads of household as determinants of child labor. Binder and Scrogin (1999) found a correlation between the time young people devote to work and the presence of a female as head of household. When analyzing school attendance and achievement, Levinson, Moe and Knaul (2001) found a negative relationship between child labor and schooling in children between 12 and 17 years old. One of the few attempts to explain the differences between men and women is the work of Knaul (2001) who analyzes the long term impacts of school drop out and working during childhood as a function of market labor returns. Barreiro García (1997) identifies the differences between boys and girls work in Mexico City's Central Wholesale Market (Central de Abastos).

In general, existing research has emphasized the need to incorporate a definition of child labor that includes nonmarket-oriented activities such as housework, family or community service and begging in disguise (see for example Parker and Skoufias 2001). It has also revealed significant differences between rural and urban areas. In this paper I analyze child labor from a human capital perspective and focus on parents' decisions about child labor and schooling. Given the lack of information about Mexico and children under eleven years of age, I use data to include child labor among children who are not allowed to work and, therefore, are not able to participate in the formal labor market.

To Work or To Study: Who Decides?

Beyond income, what determines whether a child will work or study? While it is true that poverty is a determinant of child labor, it is also true that not in all low-income families' children work or drop out of school. In Mexico, more than 90% of school-age children attend school; of these, at least 35% live in poverty. This means that we can roughly say that over 70% of families living in poverty send their children to school. What does this difference depend on? One way to explain this stems from the perception of the cost of schooling; that is, how much parents believe that a child could earn if she works instead of going to school (Levinson, Moe and Knaul 2001). The cost of schooling is higher when there is an informal labor market that facilitates child work,

as it is the case in Mexico. Notwithstanding, the decision to work does not only depend on the opportunity they have to do so: income, parents' education and family structure, also influence who and what decisions are made.

Cigno, Rosati and Guarcello (2002), argue that children work for three main reasons: poverty, the "rate of return" of schooling time (i.e. the expected benefits from having gone to school) and parents' preferences. The rate of return of schooling time depends largely on: the return on education, the value of play, the time spent in household production, the labor income in the formal market and the direct costs of attending school. Edmonds (2008) stresses the importance of: the assessment made by parents on the long term welfare of their children, the meaning they give to education and play as part of the child's well-being, child productivity in family activities, the cost of attending school, and the income opportunities available to children. In either case, it is assumed that parents make the final decision. If parents make the decision, their preferences necessarily influence the outcome, and these preferences are determined by a personal story in which the parent's education and family characteristics are interwoven.

Nonetheless, parents' involvement in the decision on their children's allocation of time does not necessarily imply a complete subordination by the children of the preferences that are imposed on them. Some authors have claimed that many children work because they want to, especially older children or adolescents (Edmonds 2008). Also, spite of family constraints, a significant number of working children are able to decide how to use their money (Brewis and Lee 2010); this makes it possible to have the children decide upon their own activities, as is the case with many street children. However, in terms of household income distribution, the literature has shown that it is significantly influenced by the parents and that working hours spent by children at work vary depending on the decision-making power that the mother has at home (Cigno, Rosati and Guarcello 2002); this is especially true for girls (Reggio 2011; Levinson, Moe and Knaul 2001; Basu 2006).

This has led to research whose main direction is decision-making by parents, where parents are assumed to be altruistic (Reggio 2011; Schluter and Wahba 2010) and in which their education has a significant influence in decreasing the probability of child labor (Christenson and Juárez 1987; Buchmann 2000; Parish and Willis 1993; Basu, Das and Dutta 2010).

Therefore, based on these assumptions, the literature has tried to explain the variables that influence parents' decisions about child labor and

schooling. In general, they can be summarized as follows: (1) the influence of both parents' education (Levinson, Moe and Knaul 2001; Christenson and Juárez 1987), (2) the decision-making power by women (Reggio 2011), (3) the instances of women as heads of households (López Villavicencio 2005), (4) the value parents place on education (Buchmann 2000), (5) parents' perceptions that their sons or daughters will have more opportunities in the labor market with an education and (6) the expectation parents have of receiving financial support from their children at an old age (Rogers and Swinnerton 2004; Buchmann 2000). For the case of Mexico, only the first three variables can be measured with existing data.

Child Labor and the Cost of Schooling: Between Egotism and Altruism

There is sufficient evidence to affirm that most of the decisions made by parents about child labor and education are based on their assessment between the cost of sending their children to school and the long-term benefits their children can obtain by going to school (Ravallion and Wodon 2000; Buchmann 2000). Furthermore, the data suggest that in Mexico parents positively value the education of their children. According to the survey of the Ministry for Social Development, in Mexico the majority of poor people prioritize education over health and clothing; and 17 out of 100 consider that before meeting the need for electricity, water and gas, it is important to invest in education (Széckely Pardo 2003). This data may explain, in part, the high rate of school attendance in Mexico. However, although there is a preference for education, in Mexico income (Levinson, Moe and Knaul 2001) and, to a lesser extent, household wealth remains a major cause of child labor (López Villavicencio 2005).

But even in that case –and despite the challenges faced when measuring parents' attitudes regarding their children's work– much of the literature on child labor and education has been based on the assumption that parents are altruistic towards their children (Becker 1965). Under this assumption, children will work only if the family is unable to meet their basic needs (Basu and Van 1998), and if income increases or the need for an income provided by the child decreases, parents can send their children to school.

There is little empirical evidence on this altruistic behavior by parents. In the case of Mexico, Schluter and Wahba (2010) show altruism in poor families in rural areas. Using data from PROGRESA, they reject the hypothesis of a selfish parent in poor families of non-urban areas.

Furthermore, they find that parents who are beneficiaries of PROGRESA spend more money on goods for their children than those who do not receive such benefits, while spending on goods for adults is held constant. If we take this evidence into account and consider both the school attendance rate in Mexico (which is greater than 90%), and the proportion of households without a per capita income above the welfare line as established by CONEVAL (see table 1), we can argue that in fact, in the case of Mexico, an altruistic behavior is likely to occur. We then hope that parents will send their children to work only when truly necessary.

Table 1. Boys and girls between 5 and 17 years old by level of well-being in rural and urban areas

	Rural Population	Below the minimum well-being line*	Above minimum well-being, but below the well-being line**	Above the well-being line***
Girls	10456	6678	2410	1368
Boys	10952	7010	2499	1443
Total	21408	13688	4909	2811
	Urban Population	Below the minimum well-being line*	Above minimum well-being, but below the well-being line**	Above the well-being line***
Girls	38970	18791	12854	7325
Boys	40643	19634	13328	7681
Total	79613	38425	26182	15006

Source: Calculations based on data from MTI 2009-2013 and estimates from the Well-being line of CONEVAL.

* All who live in the countryside and have an income less than \$691.76 Mexican pesos (52 US dollars) or living in urban areas and have an income less than \$974.75 Mexican pesos (73 US dollars). ** Those living in the countryside and have an income less than \$1,315.02 Mexican pesos (99 US dollars), but equal to or greater than \$691.76 Mexican pesos, and those living in urban areas and have an income less than \$2,075.21 Mexican pesos (156 US dollars), but equal to or greater than \$974.75 Mexican pesos (73 US dollars). *** All who live in the countryside and have an income greater than or equal to \$1,315.02 Mexican pesos (99 US dollars) or living in urban areas with an income greater than or equal to \$2,075.21 Mexican pesos (156 US dollars).

According to the MTI during the period 2009-2013, in average, 19 out of every 100 children between 5 and 17 years live in households where there is no income. 64 out of 100 have a monthly income below

the minimum rural welfare line and less than half (48%) are able to ensure their well-being in an urban area. Moreover, 87 of every 100 children in rural areas have an income below the welfare line (table 1).

There are great differences between the countryside and the city. In terms of income, overall, boys and girls living in urban areas have proportionately a better quality of life than those living in rural areas. The proportion of children living in households with a per capita income above the poverty line is higher in the first case. Similarly, the proportion of households with an income below the poverty line is even greater for those children who live in the country; hence we can assume that in most cases the result of child labor is a real need; and parents send their children to work because they really need their child's work. So the question becomes: given the need, what determines that not all children will work?

CHILD LABOR IN MEXICO

In the period 2009-2013, INEGI estimated that in Mexico seven in 10 children ages 5 to 17 years old perform some form of work, including domestic work for their homes. Girls had a slightly higher participation than boys. Most of the boys work in activities related to agriculture; while for girls it is more common to carry out domestic work, engage in service and trade or become self-employed. Although some children over 12 years old work in the formal sector, most children work in the informal sector and/or in their homes.

In Mexico, as in many other countries, child labor has become a livelihood. When family income is not enough to sustain the entire family, children have to work and, in many cases, they have to drop out of school. But the literature has been inconclusive about the relationship between child labor and schooling. It is unclear whether work decreases school attendance or if dropping out increases child labor. In Mexico, almost 90% of school-age children, i.e. children between 5 and 17 years old, go to school. In contrast, only 6 out of 10 children who work go to school.

General descriptions of child labor in Mexico suggest important differences between boys and girls in terms of the quality and quantity of work. There are more boys than girls carrying out economic activities. 14 of every 100 boys ages 5 to 17 years old work; this is double that of girls. At the same time, it is more common for a man than for a woman to do a triple shift. The main difference between men and women

is related to domestic work and schooling. More men than women are dedicated solely to school; likewise, there are more women than men doing only housework. In both cases, the majority of children are involved in domestic work and attending school. This suggests that if we do not consider domestic work as child labor, we are omitting an important part of the work performed by minors. However, according to definitions by the International Labor Organization, when these activities do not interfere with school attendance, rest and the children's play, it is not necessarily considered child labor. Most children work less than 15 hours a week, giving them reasonable time to do other things besides going to school, which only requires 4 hours a day in most public schools. Based simply on whether or not they are able to study, domestic work should not be considered child labor; however, the conditions under which it is given and other restrictions that result from work, might make us think it is. Typically, the time spent going to work goes against time that should be used to rest or play.

It is important to emphasize that a high proportion of children do not obtain an income for their work (47% and 48%, respectively) and only a very small percentage are self-employed; this is less than 4% nationally. The rest are subordinate workers mainly engaged in the service area. The lack of remuneration for boys is higher in the agricultural sector and for girls in the area of trade; but in both cases, the activities carried out in agriculture, trade or services are for the most part not paid. It is also interesting to note that most boys working on their own do so in services area (48 of 100) and, to a lesser extent, in trade (20 of 100); while most women are self-employed selling things (52%) or working in manufacturing.

Children working in agriculture, trade and services lack a regular work schedule; this can be an advantage for children in order to study or to carry out other activities such as domestic work or play. Given that work schedules in the field of construction are more structured, it is harder for a child to work and go to school at the same time. This may be one reason why children in this sector work between 25 and 34 hours a week. Still, it is in agriculture where the longest workday occurs. Besides the large number of hours a child spends working, agriculture has the disadvantage of being the worst form of paid work. Most children who work in the fields (73%) are not paid; and if they are paid, it is less than two minimum wages (less than 5 dollars per day). In contrast, the top income for girls pertains to formal jobs within the construction sector; informal work is not paid. In general, little girls have lower wages

than younger boys; both averaging less than minimum wage.

Although, most of the arguments underline the correlation between family income and child labor in both rural and urban areas, only 34 out of 100 children share their income with the family. Of the 34 who share, half of both boys and girls share their entire income, while the remaining children share half or a bit more. In fact, only a small proportion of children working (15%) do so because their family needs their economic contribution. Also, it seems contradictory that while more girls reported working because the family needs her income, a lower proportion of women than men use it for household expenses (29%).

One of the main arguments against child labor has to do with the risk of having an accident and lack of medical care. Overall, it may seem that selling food and providing services appear to be non-hazardous activities; however, according to MTI most accidents occur in agriculture (33%), in manufacturing (22%), in the service sector (21%), and in the area of trade (16%). Although it is more common for boys to have accidents (out of 10 children who have accidents, eight are men and two women), there are only a few accidents in the construction area; and when this happens, they almost always receive medical care. In general, men are significantly more at risk than women, but the data suggest that women are less likely to receive medical care than men, especially when working in the fields of trade and services where they suffer more accidents. Although most children work in places unsuitable for them (mines, high places, places with no light or ventilation, streets, bars, etc.), there are relatively few accidents. At least 9 out of 10 children work in unsuitable spaces. The main problem arises from the lack of some form of protection while working.

The national data suggest that most children work because it is necessary, especially in the case of girls. There is a clear difference between boys and girls on the need to learn an occupation; this is the second most important reason why young men work. Women, especially as they grow, work to pay for their school costs. Even when both girls and boys leave school because they feel they do not have the ability to study, only 5% work because they do not want to go to school.

The differences between the countryside and the city are also significant. In the countryside the number of children working doubles (9% of men and 5.2% of women in urban areas, 18.2% of men and 8.8% of women in rural areas). Working in agricultural fields significantly decreases the probability for girls of going to school. In general, children working in urban areas come to work longer hours (although, as already mentioned,

in rural areas the average working hours is greater) and they earn higher wages than those working in less urbanized areas. Almost 96% of women working in rural areas receive less than two minimum wages (less than 7 dollars per day) or have no income (51%). For boys, the situation is worst given that that 56 out of 100 are not paid. In rural areas, a larger number of children work because their families need their income or labor. We can assume that in less urbanized areas child labor reflects more of a survival strategy than in urban areas where there are more factors involved.

In summary, data suggests that children do not necessarily leave school because they have to work. Given the case, it is more likely for the families to need children's work than their income; this is especially true for girls. Very few children work in order not to go to school; school attendance among working children is high. It is also true that as children grow up, their interest in learning a trade or occupation decreases, and the need to work for money increases. Many children sell food and drinks, or work in the production of goods; however, by carrying out these activities, they earn the lowest wages and they face the highest risk given the working conditions; and, among other things, exposure to hazardous substances, tools and high risk equipment.

In less urbanized areas the relationship between child labor and poverty is more evident. The occupancy rate is higher, the income of children is lower and economic need is greater. Similarly, the proportion of women working and not going school is higher. However, in rural areas working conditions are apparently better than in large cities. In urban areas it is more common to find children working in unsuitable places, they face more risks at work and withstand the longest workday. Still, there are more accidents in the agricultural fields. Finally, rural domestic work has a greater negative effect on children; and in the agricultural fields more minors have the longest working hours, and more are not attending school.

HYPOTHESIS AND ESTIMATION

From the descriptive data we cannot deny the relationship between child labor and income, but we can also not deny the effect of other factors in the parent's decision regarding child labor. Our hypothesis is that child labor is determined as much by income or welfare, as by the child's characteristics, household composition and family structure; as children get older the likelihood of working increases, especially in

the case of men. We also expect that the presence of women as heads of household and the education level of the head of household will decrease the probability of child labor. The presence of older siblings can help so that the child does not have to work, while we expect the opposite when there are younger siblings.

The main objective of this research is to analyze: to what extent the association between income and child labor is affected by the fact that household heads with more education tend to prevent young children from working, especially from economic activities. It is then necessary to understand the way in which child labor varies, given the household characteristics, the child and the size of the town where they live.

In order to test our hypothesis, we consider work as a dependent variable; and we construct a dichotomous variable whose values are:

$y_i =$ with the probability of π_i and $1-\pi_i$, respectively

To estimate the probability of working, we use a *logit* model where the child's age, gender, per capita income, education and gender of the head of household, the presence of older siblings and the size of the population are used as predictors of child labor. We assume that the *logit* function of the probability of π_i is a linear function of such factors and may be expressed in abbreviated form as:

$$\text{Logit}(\pi_i) = \alpha + \sum_i \beta_i x_i + \varepsilon$$

It is important to emphasize that as in any model of this type, the coefficient β_j represents a marginal change in the *logit* of the probability associated with the change in factor j , holding all other factors constant. In table 2, we list the variables used to estimate the relationship between child labor and income.

In order to do our estimations we use the data from Child Labor Module of the National Survey of Occupation and Employment (ENOE) 2009-2013. The main objective of the module is to obtain the latest information on the socio-demographic characteristics of children between 5 and 17 years of age engaged in economic, domestic and school activities nationally. The sample is nationally representative and was obtained from the sample of households in the ENOE with presence of children in the age range selected. The survey was carried out during the fourth quarter of the corresponding years. It is nationally representative, and

the estimate was based on 101,022 observations.

The MII divides the children into two main categories: “occupied” and “unoccupied”. The first category relates to those children engaged in economic activities, “activities for the production of goods and services for the market production or for subsistence” (INEGI 47), and the second category includes those engaged in marginal domestic chores, or in school. The MII makes it possible to identify marginal activities and street work; with which it is possible to include a more complete definition of child work.

Therefore, to explain the relationship between child labor and income we start from two different definitions of child labor. The first is the simplest definition of work, equivalent to the INEGI definition of “occupied” and includes only persons engaged in economic activities. The second definition includes both economic, non-economic activities and domestic work, ie “actions taken to meet basic personal needs of the home or the community, as well as activities to earn income but does not involve the production of goods or services. It also includes marginal activities and disguised begging” (INEGI 47); this is what we refer as child labor in table 2.

Table 2. Description of variables, averages and standard deviation

Name	Description	Average	Standard Deviation
Dependent Variables:	Dummy variables, coded as 1 if the child works currently		
Occupied	Children that carryout economic activities exclusively	0.105	0.306
Child labor	Includes children that carryout both economic and non-economic activities	0.709	0.454
Working out of necessity	Children that work because their work or their income is necessary for the home	0.075	0.264
Independent variables: Per capita income	The family income excluding the child's income divided by the total family members	1220	1407
Minimum well-being	Those that achieve minimum well-being. Dichotomous variable coded as 1 if the income per capita is below the welfare line (1313.02 in rural areas and 2075.21 in urban areas), but it is the same or greater to the minimum well-being line in rural areas (691.76) and urban areas (974.75) ¹	0.308	0.461

Below the minimum well-being line	Dichotomous variable coded as 1 if the income per capita is below the minimum well-being line, meaning that it is below 691.76 in rural areas and 974.75 in urban areas	0.516	0.500
Characteristics of the children			
Age	The age of child in years	11.16	3.731
Gender	Dichotomous variable coded as 1 if he is a boy	0.511	0.500
Family structure			
Older siblings	Number of older siblings	0.675	0.921
Extended family	Dichotomous variable coded as 1 if they live with a relative who is not part of the immediate family	0.290	0.453
Head of household gender	Dichotomous variable coded as 1 if he is a man	0.779	0.415
Head of household schooling	Highest educational level earned by the head of household	4.040	1.669
Occupation of Head of household	Dichotomous variable coded as 1 if head of household is employed	0.835	0.371
Characteristics of place of residence			
Rural area	Dichotomous variable coded as 1 if the place of residence is rural	0.212	0.409

Given the difficulties in defining appropriate ways to include child labor, domestic work activities and marginal activities (which in reality represent work) and without over-estimating the activities of children, we compare the models for child labor and employment status with the model to *Work Out of Necessity*. The results in the first model led us to analyze the impact of income by levels of well-being. Thus, we construct categories of well-being from the CONEVAL definition described above, leaving two categories: (1) below the poverty line but above the minimum line of poverty; and (2) below the minimum poverty line, i.e. the poorest. Therefore, six different models were estimated.

1 Welfare line as defined by CONEVAL and explained previously.

RESULTS

As mentioned above, six different models were employed. We used three different dependent variables and test two ways to measure the effect of income (per capita income and welfare level). Models are described in tables 3, 4 and 5; they include reports on the coefficient estimates, the marginal effects and in parenthesis the standard errors for each of the models.

The first set of models was estimated in order to analyze the relationship between economic activities and income or well-being (Table 3); in other words, the relationship between income and the narrower definition of child labor. According to the expected outcome, both per capita income and the lack of a minimum level of well-being have a significant impact on the probability of working. By increasing the income, the likelihood of economic activities decreases; also, having an income below the minimum welfare line has a marginal effect of 0.005 over the probability of performing these activities. Hence, we can say that the market-driven activities arise largely as a function of income. However, using income we are not able to observe impact as clearly as with level of well-being. The marginal effects of income are lower than the effects of level of well-being. Using a continuous variable decreases the possibility of observing the real effects of income over child labor, when differences among groups are significant.

Table 3. Estimates of *logit* models for Economic Activities (Occupied)

	I		II	
	Coefficient (standard error)	Marginal effects dy/dx	Coefficient (standard error)	Marginal effects dy/dx
Per capita income	-0.000*** (0.000)	-0.000	—	—
Minimum well-being	—	—	0.076*** (0.035)	0.004
Below the minimum well-being	—	—	0.111*** (0.033)	0.006
Age	0.352*** (0.005)	0.017	0.352*** (0.005)	0.017
Gender	0.868*** (0.024)	0.043	0.868*** (0.024)	0.043

Older siblings	-0.041*** (0.018)	-0.002	-0.041*** (0.018)	-0.002
Extended family	-0.029*** (0.026)	-0.001	-0.029*** (0.026)	-0.001
Head of household schooling	-0.233*** (0.008)	-0.011	-0.233*** (0.008)	-0.011
Head of household gender	-0.187*** (0.028)	-0.010	-0.187*** (0.028)	-0.010
Head of household occupation	0.764*** (0.036)	0.030	0.759*** (0.036)	0.030
Rural zone	0.534*** (0.027)	0.030	0.549*** (0.027)	0.031
Constant	-6.859*** (0.086)		-6.982*** (0.093)	

Source: Authors' estimations based on data from MITI 2009-2013.

* 90% Significance; ** 95% Significance; *** 99% Significance.

Table 4. Estimates of *logit* models for Child Labor

	I		II	
	Coefficient (standard error)	Marginal effects dy/dx	Coefficient (standard error)	Marginal effects dy/dx
Per Capita Income	-0.000*** (0.000)	-0.000	—	—
Well-being	—	—	0.113*** (0.023)	0.021
Below the minimum well-being line	—	—	0.122*** (0.022)	0.023
Age	0.273*** (0.002)	0.051	0.273*** (0.002)	0.051
Gender	-0.438*** (0.015)	-0.081	-0.438*** (0.015)	-0.081
Older siblings	-0.092*** (0.008)	-0.017	-0.091*** (0.008)	-0.017
Extended family	-0.141*** (0.018)	-0.027	-0.141*** (0.018)	-0.027
Head of household schooling	-0.038*** (0.005)	-0.007	-0.038*** (0.005)	-0.007
Head of household gender	-0.100*** (0.020)	-0.018	-0.100*** (0.020)	-0.018

Head of household occupation	0.257*** (0.022)	0.050	0.247*** (0.023)	0.048
Rural zone	0.134*** (0.020)	0.024	0.151*** (0.020)	0.028
Constant	-1.570*** (0.043)		-1.709*** (0.049)	

Source: Authors' estimations based on data from MITI 2009-2013.

* 90% Significance; ** 95% Significance; *** 99% Significance.

Table 5. Estimates of *logit* models for Work Out of Necessity

	I		II	
	Coefficient (standard error)	Marginal effects dy/dx	Coefficient (standard error)	Marginal effects dy/dx
Per capita income	-0.000*** (0.000)	-0.000	—	—
Minimum well-being	—	—	0.134*** (0.041)	0.004
Below the minimum well-being line	—	—	0.129*** (0.039)	0.004
Age	0.425*** (0.006)	0.012	0.426*** (0.006)	0.012
Gender	0.791*** (0.027)	0.022	0.7907*** (0.027)	0.022
Older siblings	0.067*** (0.022)	0.002	0.068*** (0.022)	0.002
Extended family	0.006*** (0.029)	0.000	0.005*** (0.029)	0.000
Head of household schooling	-0.253*** (0.009)	-0.007	-0.255*** (0.009)	-0.007
Head of household gender	-0.289*** (0.031)	-0.009	-0.288*** (0.032)	-0.009
Head of household occupation	0.653*** (0.040)	0.015	0.638*** (0.040)	0.015
Rural zone	0.465*** (0.031)	0.015	0.489*** (0.031)	0.015
Constant	-8.074*** (0.109)		-8.299*** (0.117)	

Source: Authors' estimations based on data from MITI 2009-2013.

* 90% Significance; ** 95% Significance; *** 99% Significance.

By expanding the definition of child labor, that is, by including both marginal activities such as domestic work, the marginal effects of income per capita and well-being increase with respect to the estimate for economic activities. In both cases, the effect of the level of well-being is higher when estimating economic and non-economic activities together, which may reflect a greater need for children to work regardless of their income.

The characteristics of the children, the family and the town of residence have a significant impact on the likelihood of participating in economic activities. Being a boy in the countryside significantly increases the probability of working. However, by incorporating marginal and domestic activities the relationship between gender and work is inverted; for a boy, this leads to a significant decrease in the likelihood of engaging in child labor. An important difference between the two models is the effect of gender on labor. Models show a higher probability of boys engaging in economic activities while girls are more likely to do domestic work.

Results show important differences on the effect of gender based on the definition of work used. These differences would be explained by the definition of gender roles in Mexico and the role of girls as caregivers within the household. In Mexico, many girls work at home while mothers work outside the home or carry out other activities for the family; this is especially true when the family is large. This cultural pattern is also reflected in the relationship between extended family and child labor. The marginal effect of the presence of other family members such as grandparents, aunts or uncles, is greater when accounting for domestic work (Table 4); the presence of extended family has a marginal effect of -0.0266. This is because in many cases the presence of extended family allows the minors to stop participating in housework. Also in this case, the fact that the head of household is male has a slightly greater impact than in the first model. This may be because in most cases where the father is the head of the family, the mother (or dad's partner) lives in the same household and she is primarily responsible for housework. In any case, the results are consistent with previous studies (Christenson and Juárez 1987; López Villavicencio 2005).

It is not surprising that living in rural areas significantly increases the likelihood that a child will work. This is because many children living in the countryside work harvesting or in production of goods for the market or for self-consumption. Still, living in a rural area has less of an impact on child labor than the fact that a father works, especially if they are involved in economic activities; many children engage into the same economic activities than their parents.

Children Who Work Out of Necessity

Even when it uses a more complete definition of child labor, the second model has the disadvantage of over-estimating the work done by children because it includes a very broad category for child labor. Given this definition, any child who has carried out a domestic activity for at least one hour during the week preceding the survey, is considered to have performed some kind of work, even when it does not affect schooling and play time. Contrary, the first definition leaves out an important part of the work that children carry out and includes children that leave school by choice and devote themselves to working, which depending on age, may not be considered child labor. Therefore, none of them are ideal definitions of child labor.

Given the difficulty to get a better definition and to better understand the relationship between child labor and poverty, we conducted a third model in which we consider only those children who work out of necessity. To this end, we take as a starting point the reasons why they work. Work was taken as any needed work resulting from the need to contribute financially to the home, to pay for school or for other expenses.

At first, a fourth model was developed taking into account only those children who earn money; but since the vast majority perform unpaid activities, we discarded this model. Furthermore, that model ruled in advance the possibility that children replace their parents work at home. Only 10.4% of children under 17 engaged in economic activities. However, if we compare the proportion of children who are occupied with the proportion of those working out of necessity (7.5%), we found that the proportion of those working out of necessity is less, and only a very small percentage (0.5%) earn money, despite the fact that 54.65% of children working out of necessity have an income below the minimum welfare line. Therefore, to say that children work because their income is a necessity is incorrect; in many cases they do so because their work is needed to replace their parents' work at home.

When analyzing only those cases in which children work out of necessity, we find again that income and well-being levels are significant; with a higher marginal effect on the probability of working when the income is good enough to guarantee food, but not enough for other things. One would expect a greater positive effect when income is below the minimum well-being line, but this was not the case; the greater positive effect took place among the intermediate level of well-being (having it a marginal effect of 0.0039 versus 0.0035 for the poorest). The results

could be explained by the impact that small businesses have on child labor. The working definition of *necessity* is given both by the need for income and the need to work. In many cases this means that, when the minor does not work and the family has a small business, it is necessary to hire someone else to do their work. When the income from the family business is not high enough, they cannot afford paying someone else to do work, so children work in the family business. Thus the family income increases by not having to pay a salary to someone else for doing the activities that the child performs. This may also explain why the average per capita income of households with children who work needs to be higher than average per capita income of households with children engaged in child labor (as defined previously).

It is not surprising that when the work arises out of need, the marginal effect of other variables on the probability of working decreases with respect to the effect they have on the other models (see Table 5). For instance, the marginal effect of being a boy is lower when working out of necessity (0.022) than when we consider economic activities (0.043). This decrease in the marginal effects occurs also in age, gender, characteristics of the head of household and characteristics of the community. The school level of the household head has the same marginal effect when using work out of necessity and child labor. In both cases a high level of education decreases the likelihood of working. However, this effect is higher when using economic activities, suggesting some appreciation of domestic worked; esteem that was observed in previous research.

Another important difference in the estimates occurs with respect to the variable effect of older siblings. Having older siblings decreases the likelihood of economic activities or child labor, but increases the probability of working by necessity. It is very likely that this is due to the interaction between household size and presence of older siblings.

CONCLUSIONS AND IMPLICATIONS FOR PUBLIC POLICY

So, we can conclude that child labor is significantly correlated with well-being and income; but it is also influenced by the perceived cost of schooling, which is correlated with parents' education and place of residence. We were also able to observe differences based on gender and the definition of work. Finally, we analyzed the specific case of work out of necessity, in which many of the variables have a lesser impact

suggesting that when there is a real need gender, age and parents' education are not as important as when there is no need to work.

In any case, Child labor is important for its implications on the well-being of children. It is also important because it has a negative impact on economic development; it creates poverty traps (Basu 2000) that facilitate intergenerational reproduction of poverty; when there is a need to work, it is less likely that the child will study; thus, the child's ability to have a better income in adulthood decreases. It is also a development issue because it reduces school attendance and threatens the health and nutrition of children. We know that education is a key factor in economic and social development (Gereffi and Fonda 1992).

However, trying to eliminate child labor when the need for additional income is so significant is not certainly the best solution for the welfare of children. Most policies to eliminate child labor have focused on establishing a minimum age for employment. Currently in Mexico it is illegal for children under 14 to work, yet the average age of working children is eleven years old. The establishment of a minimum age only leads to the failure to protect children from working and increases the number of children that work triple shifts (where the child works, goes to school and performs household chores). At the same time, the effect on the reduction of child labor has been marginal. As mentioned previously, in formal jobs such as construction, children receive greater care and better wages; but most work in the informal sector imply higher risks and lower compensation. While there is easy access to informal or illegal work and no way to ensure the safety and proper care for children, families continue to use these alternatives to survive, despite a preference for keeping their children out of work and within schools.

Based on the above data, we can say that policies to increase school attendance can have a positive effect on reducing child labor, but not if implemented in isolation. It is important to take into account the specific needs of children living in the countryside, and the risks of working children in the city. Policies aimed at reducing child labor should not be implemented uniformly. It is necessary to analyze different scenarios, and base on them, implement alternatives. Child labor fulfills a need, and it will exist so long as families continue to seek alternatives to meet their basic needs and to survive.

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