

Child Labor in Colombia¹

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First draft: October 14th 2005

This draft: June 8th 2007

This paper studies the magnitude and nature of child labor in Colombia. In particular, we evaluate the factors that determine joint child labor and school attendance decisions within the household. In addition, we study the characteristics of children, parents and households that are associated with certain types of child labor, e.g., work with relatives vs. work with non-relatives and work in certain economic sectors. We use various sources of data including the Child Labor Survey (2001), Child Labor Module Follow-up included in the National Household Survey (2003) and the *Familias en Accion* database (2002-2003). Total child labor participation, which includes all working children from 5 to 17 years of age, was approximately 14.5% in 2001. Approximately two thirds of this group also attended school. Child labor participation rates in rural areas were twice as big as those in urban areas. Around two thirds of working children worked for their parents or other relatives. The majority of children work in the agriculture sector (approximately 38%) followed by retail, manufacturing and services.

We estimate a model in which child labor and school attendance are simultaneous decisions. The results of this estimation indicate that in fact these two choices are highly correlated. Higher educational attainment of the head of the household, older head of household and higher adult employment rates within the household are positively and significantly associated with higher probabilities of child labor. In addition, the probability that a child works increases for those in the lowest income quintile, for children living in larger households and living with extended family. The most vulnerable children (e.g., ethnic minorities, with low-educated parents, living in very poor households, etc.) are more likely to work in agriculture, whereas less disadvantaged children (e.g., highly educated parents, higher adult employment rates within the household, male head of household, etc.) are more likely to work in retail and in particular, in family-owned businesses. In sum, we find evidence of two different types of child laborers: child employment with relatives in family-owned businesses predominant among less disadvantaged children, which *complements* adult labor and is usually accompanied with school attendance; and child employment with non-relatives which is not usually accompanied with school attendance, is associated with poorer households and tends to *substitute* adult labor. Finally, we find robust evidence that a conditional cash transfer program, *Familias en Accion*, has had significant effects on child labor, especially in the case of boys.

¹ Lucas Higuera provided excellent research assistance. Funding from TSG and U.S. AID is gratefully acknowledged. Corresponding author: rbernal@uniandes.edu.co.

1. Introduction

The issue of child labor has attracted increasing attention in the past decade from researchers, policy makers and advocates although it is really not a new phenomenon. In fact, child labor is a persistent problem in most developing countries, and to a lesser extent in developed regions of the world. Child labor is particularly dangerous because it involves the sacrifice of child's future welfare in exchange for immediate benefits. It is difficult to address mainly because (i) there is a significant time separation between the immediate benefits of child labor and the long-delayed costs of sending children to work, and (ii) the costs and benefits of child labor are born by different people (see Udry, 2004)². Numerous studies have tried to document the extent of child labor in developing countries. However, we still have very little understanding of why children work or what can be done to alleviate the problem of child labor.

There are several problems that emerge when trying to study and solve the issue of child labor. First, there are conflicting definitions and accounts of child labor that vary over time and across countries, partly due to the diverse nature of this phenomenon. Second, it is hard to come across detailed and reliable data that would allow the researcher to identify the type of work that has the consequence of interfering with schooling and thus with future earnings (as opposed to work that can be defined as benign because it can be an important component of rearing a child, e.g., limited household work). Third, it is hard to measure whether working children are really sacrificing education because child labor and education are jointly determined. For example, a child might be working in order to be able to attend school, might not be in school because she is working or she could be working because of the lack of good schooling opportunities.³ The policy implications of these various circumstances might be significantly different.

The International Labor Organization (2002) estimates that about 210 million children between the ages of 5 and 14 worked in 2001, and about half of them worked full-time. That implies that approximately 1 in 10 children in the world were working full-time. In the first panel of Table 1, we show the total number of children (between the ages of 5 and 14) economically active and the corresponding employment ratios by region. The Asian-Pacific region harbors the largest number of child workers in the 5-14 age category, 127.3 million in total. It is followed by Sub-Saharan Africa and Latin America and the Caribbean with 48 million and 17.4 million respectively. Developed economics and transition economies have the lowest absolute numbers of child workers.

In terms of incidence, Sub-Saharan Africa exhibits the highest child employment ratio. The estimates indicate that almost one child in three below the age of 15 is economically active (29%) in the region. The child employment ratio in other major regions of the world is below 20 percent. In Asia-Pacific and Latin America & the Caribbean the incidence is 19 percent and 16 percent, respectively. In the Middle East and North Africa, it is 15 percent. Not surprisingly, the incidence of

² The child bears the main costs of child labor while other household members benefit.

³ The evidence, however, suggests a negative correlation. Psacharapoulos (1997) shows much lower educational attainment for children that work in Bolivia and Venezuela. Bozi and Suri (2001) find similar results in Ghana.

child labor is lowest in developed economies. The estimates indicate that about two per cent of all children below 15 years of age are economically active. In panel (b) of Table 1 we show participation rates of children by age and region. Clearly Sub-Saharan Africa and Asia and the Pacific have the highest rates across ages. Latin America & the Caribbean exhibit rates very similar to the Middle East and North Africa and significantly higher than those in developed countries.

In addition to involving a sacrifice of child's human capital accumulation, child labor is particularly problematic due to the fact that working children can be the objects of extreme exploitation, e.g., toiling for long hours for minimal pay. Their work conditions might be especially severe, often not providing the stimulation for proper physical and mental development. Some forms of child labor amount to direct abuse. In the first panel of Table 2 we present the estimated number of children by region in unconditional worst forms of child labor. In Latin America & the Caribbean a significant number of children work in prostitution or pornography (750 thousand out of a total of 1,800 thousand) and illicit activities (260 thousand out of 600 thousand).

Finally, in the last panel of Table 2 we compare the extent of child labor in Colombia with other Latin American countries. By 2001, approximately 1.3% of children between the ages of 10 and 14 were economically active (only) and 12.2% were economically active and also attended school. While these numbers are not as high as in other countries of the region (for example, in Argentina 20.8% of children between 10 and 14 are economically active or are economically active and attend school, in Bolivia 25.9% and in Ecuador 39.1%) they are clearly higher than in some other countries like Costa Rica, Honduras, Panama and Venezuela.

This paper studies the magnitude and nature of child labor in Colombia. In particular, we evaluate the factors that determine joint child labor and school attendance decisions within the household. In addition, we study the characteristics of children, parents and households that are associated with certain types of child labor, e.g., work with relative vs. work with non-relatives and work in certain economic sectors; and use these results to provide some policy recommendations. We use various sources of data including the Child Labor Survey (2001), Child Labor Follow-up Chapter included in the National Household Survey (2003), the Living Standards Survey (2003) and the *Familias en Accion* database (2002-2003).

Our estimation results indicate that higher educational attainment of the head of the household, older head of household and higher adult employment rates within the household are positively and significantly associated with higher probabilities of child labor. In addition, the probability that a child works increases for those in the lowest income quintile, for children living in larger households and living with extended family. The most vulnerable children (e.g., ethnic minorities, with low-educated parents, living in very poor households, etc.) are more likely to work in agriculture, whereas less disadvantaged children (e.g., highly educated parents, higher adult employment rates within the household, male head of household, etc.) are more likely to work in retail and in particular, in family-owned businesses.

In sum, we find evidence of two different types of child laborers: child employment with relatives in family-owned businesses predominant among less disadvantaged children, which *complements* adult labor and is usually accompanied with school attendance; and child employment with non-relatives which is not usually accompanied with school attendance, is associated with poorer households and tends to *substitute* adult labor. Finally, we find robust evidence that a conditional cash transfer program, *Familias en Accion*, has had significant effects on child labor, especially in the case of boys.

This paper is organized as follows. In section 2 we define child labor. In Section 3 we present a comprehensive description of the phenomenon of child labor in Colombia based on two sources of data: the 2001 Child Labor Survey (CLS 2001) and the 2003 child labor follow-up chapter included in the National Continued Household Survey (CHS 2003). Section 4 presents a model of joint child labor and school attendance decisions and results of the estimation. In Section 5 we present a similar model of economic sector choice and the estimation results. In Section 6 we analyze the issue of child labor with relatives and in family businesses. Section 7 presents results of the effects of a conditional cash transfer program called *Familias en Accion* on child labor and Section 8 concludes.

2. What is Child Labor?

An individual between the ages of 5 and 17 is considered a child. There are several definitions of child labor which vary depending on the age of the child, the type of work and/or the extent to which work interferes with school attendance. According to the International Labor Organization (ILO), a child is considered to be economically active if she is between the ages of 5 and 17 and she works for wages (cash or in-kind), works in the family farm in the production and processing of primary products, works in family enterprises that produce primary products for the market or own consumption, or is unemployed and looking for a job. A child that works as a domestic worker in a household that is not her own is considered economically active. However, a child that devotes time to household work in her own household is not considered economically active.

According to standards of the ILO, an economically active child is a child worker if she is under 13 and economically active for 1 or more hours per week, 13-15 and working more than 14 hours per week or 1 hour or more per week in activities that are “hazardous by nature or circumstance”, and if she is 15-17 and works in “unconditional work forms of child labor” (trafficked children, children in bondage or forced labor, armed conflict, prostitution, pornography, and illicit activities).

In developing countries where educational systems are not well developed, the thresholds to define these categories are shifted to 12 years of age in the case of children who are economically active for 1 or more hours per week and 12-14 years of age for children who work more than 14 hours per week or 1 hour or more in “risky” activities.

Child labor has often been defined by policy-makers as participation in economic activities that are deleterious to the child’s well-being. There are some instances where it is hard to imagine how an activity could not be harmful to the child (e.g. forced prostitution). However, most working children actually participate in activities that can be harmful or beneficial for the child, depending on the

circumstances of the activity. Ultimately, the impact of child labor on the well-being of the child depends on the counterfactual of what the child would be doing in the absence of work. For example, child labor can be harmful to the extent that it involves a sacrifice of child's human capital accumulation which, in turn, would be associated with lower wages and worse labor market outcomes.

Hence, it is important to understand that we are not assuming that all child labor is by definition harmful to children. Rather, in defining child labor we evaluate several aspects of work done by children and try to understand the effects of that work on the child's other time uses and the child's well-being.

3. The Nature and Magnitude of Child Labor in Colombia

In Appendix 1 we show a table that summarizes our sources of data. First, we use the 2001 Child Labor Survey (CLS 2001) which is a nationwide survey that contains data about child labor, economic activity, wages, characteristics of the workplace, hours worked, educational attainment, health variables as well as a host of household/child demographic characteristics. Second, the 2003 child labor follow-up chapter included in the National Continued Household Survey (CHS 2003) which is nationwide and contains the same set of variables available in the 2001 CLS although the definition of "employed" was changed from one survey instrument to the other which creates some issues of comparability.⁴

Lastly, we use the evaluation of the *Familias en Accion (FA)* program which is a conditional transfers program implemented mostly in rural areas in 2002. In particular, we can use the baseline and follow-up surveys designed to assess the impact of the *FA* program, both of which contain information about child labor, educational attainment, health, consumption, anthropometric measures and a wide range of household and individual characteristics. We will discuss the program and the dataset in more detail in Section 7 where we use it to assess the effect of such a cash transfer on child labor.⁵

In this section, we present a description of the nature of child labor in Colombia, based on both, the CLS 2001 and the CHS 2003. In the first panel of Table 3 we show employment rates by age and region⁶. In 2001, 14.5% of children between the ages of 5 and 17 worked. In particular, 11% of children in urban areas, and 22.5% in rural areas participated in the labor market. The age patterns indicate that around 5% of the youngest children (between 5 and 9 years), 12% of children 10 to 11

⁴ In particular, the CLS (2001) included "other unpaid workers" which were not included in the definition of employed in the CHS (2003) follow-up chapter.

⁵ The National Household Survey, the Continued Household Survey and the Living Standard Survey (2003) also contain data about child labor. Some of the analyses presented in this paper are also available with these datasets upon request. The results remain largely unchanged regardless of the source of data.

⁶ The definition of employment includes individuals who worked with or without payment in some productive activity for at least one hour per week. In particular, it includes children who worked as domestic workers for a household different than their own and excludes children who devoted time to household work in their own household.

years of age, 19% of those between 12 and 14, and 29.9% of young adults between the ages of 15 to 17 worked this year.

In panel (b) of the same table, the data indicate significant differences by gender. Although 20% of male children from 5 to 17 years worked during 2001, only 9% of girls did. This gap varies with age. For example, the participation rate of girls between 5 and 9 years of age was 50% lower than that for boys in the same age range, and the gender difference in participation rates for young adults between 15 to 17 years of age was approximately 54%.

In addition to participating in the labor market, many of these children also report having done domestic work at home. In Table 4 we show the percentage of working children (by age and gender) that also reported some domestic work. From the total number of working children between 5 and 17 years of age, approximately 75% also did some household work. The age pattern exhibits an inverted U-shape, that is to say, working children on the intermediate age ranges did more household work than the youngest and oldest children. For example, 82% of working children from 10 to 11 years of age also did some domestic work at home while 75% of children between 5 and 9 years and 68% of children 15 to 17 did. As expected, girls tend to do more household work than boys. In particular, while 70% of working boys also did some domestic work, about 85% of girls did.

In Table 5 we show child employment rates by economic sector by age (panel a) and by gender (panel b). According to these results, in 2001 the agriculture sector employed more children (approximately 36.4% of working children in the country) than any other sector. Retail (32%), manufacturing (12.5%) and services (11.7%) followed. The data indicate significant differences by age. In particular, the youngest children (from 5 to 9 years) were more likely to work in agriculture (40%) than any other sector. Children between 10 and 11 years of age were more likely to work in manufacturing than in agriculture (42% vs. 30%). In the case of older children, employment rates in agriculture and retail were practically the same. Boys were more likely to work in the agriculture sector than girls. In contrast, 40% of working girls worked in the retail sector and 25% in services, while only 11% of working boys worked in services.

In Table 6 we show employment rates by geographic region and age (panel a) and gender (panel b). Child labor is basically distributed proportionally throughout the regions, with a slightly higher participation in the Central region (26% compared with approximately 22% in the other regions). There is also a significant fraction of working children in Bogotá, around 5.6%. Interestingly, there are a few important regional differences by gender. In panel (b) we show that the highest fraction of working boys (approximately 28%) lived in the Central region. Meanwhile, the greatest fraction of working girls was concentrated in the Atlantic and Pacific regions (25% and 25.5% respectively).

In Table 7 we illustrate the distribution of working children by occupation by gender (panel a) and by economic sector (panel b). The data in panel (a) indicate that the majority of working children in 2001 reported to be an “unpaid family worker” (around 40% of total working children) or paid worker (around 35%). Over 12% of working children reported to be an “unpaid assistant”, 10% self-employed, and, finally, 4.1% a domestic worker. A slightly higher fraction of girls than boys

reported to be an “unpaid familiar worker” (43% vs. 37%), while the opposite happened in the case of paid workers (40% of boys compared to 21% of girls). A significantly higher number of girls reported to be domestic workers than boys (12% vs. 0.5%). Children who reported to be paid workers work mainly in agriculture and retail, with 35% participation in each case (see panel (b) of the same Table). Only 15% of paid workers worked in manufacturing. From the ones who reported to be household workers, 98% were employed in the services sector. The majority of the unpaid family workers and the unpaid assistants worked in the agriculture sector (43% and 48% respectively). Around 35% of unpaid family workers and unpaid assistants worked in retail. Finally, most part of children who reported to be self-employed worked in retail or services (40% and 24% respectively).

In Table 8 we show data about hours worked by age (panel a) and by gender (panel b). These data indicate that children younger than 11 worked for a lower number of hours per week than older children. For example, 55% of working children between the ages of 5 and 9 worked on average nine hours or less per week. Similarly, 67% of working children from 10 to 11 years of age worked 14 hours or less on average per week. However, 53% of working children between the ages of 12 and 14 worked more than 15 hours per week, and around 13% worked more than 56 hours per week. Similarly, 70% of working children from 15 to 17 years of age worked more than 15 hours per week, and 17% for more than 56 hours. The data reported in panel (b) reveal that girls worked on average fewer hours than boys. In particular, 54% of working girls worked on average less than 15 hours per week while only 43% of boys did.

In Table 9 we show data about average monthly wages of working children by occupation (panel a). Around 52% of working children in 2001 were not remunerated in exchange for their work. Approximately 26% received monthly wages lower than \$71,500 colombian pesos⁷ (a quarter of the minimum wage in 2001). Eight percent of working children earned wages between \$71,500 and \$143,000 pesos (a quarter to a half minimum wage). Additionally, 8% reported monthly earnings between half and one minimum wage on average. Finally, only around 1.3% of working children reported wages higher than a minimum wage.

Half of working children who reported to be paid workers received a monthly wage equivalent to less than a quarter of the minimum wage, while only 3% earned more than a minimum wage in exchange for their work. A great majority of children who reported to be self-employed reported monthly earnings below a quarter of the minimum wage (67%).

In panel (b) of the same table we report data about child labor by type of employer and geographic area. As can be observed, almost 50% of working children reported to work for their parents. This fraction was significantly higher in rural areas than urban areas (59% vs. 42%). An additional 16.3% reported to be employed by other relatives. Finally, around 10% of working children reported to be self-employed.

⁷ Approximately US\$32.

Next, we analyze the relationship between child labor and schooling. We have discussed that child labor could be particularly harmful for the child in the sense that it implies a reduction in human capital accumulation which translates into lower wages, and, in general, worse labor market outcomes during adulthood. In Colombia, nearly two thirds of total working children also attended school during 2001. Since this group of children also accumulates human capital while they work, the main goal of public policies designed to alleviate the issue of child labor should focus on the group of children who works but does not attend school.

To analyze these issues in more detail, we show the distribution of children between 5 and 17 years of age by combination of activities in Table 10. In particular, we classify children in the sample into four groups: (1) children who only attend school, (2) children who only work, (3) children who work and attend school, and, finally, (4) children who neither work nor attend school. It is important to note that we are, in a sense, abstracting from household work in this table. In other words, the “study only” group includes both, children that attend school and do not work, and children that attend school, do not work and do household work (regardless of the number of hours). Similarly, in the group of children that “work only” we are including both children that work and do not attend school, and children that work, do not attend school and do household work.

Approximately 77% of children between the ages of 5 and 17 attended school and did not work during 2001 (see panel a). Around 5.2% worked but did not attend school, and 9.3% both worked and attended school. This is interesting in the sense that while an employment rate of 14.5% of children ages 5 to 17 does not seem small, the really critical group is the group of children who work but do not attend school (only a third of total working children) since these are the ones that are incurring a higher cost in terms of human capital accumulation. Finally, a non-negligible fraction of children (approximately 8.7%) neither attended school nor worked⁸.

The age patterns indicate that the likelihood that a young child attended school was higher than for an older child. For example, 8% of children between 5 and 9 years old only attended school (and did not work), and 1% worked but did not attend school. On the other hand, 76% of children from 12 to 14 years old only attended school, and around 6% worked and did not attend school. The probability that young boys attended school while working was higher than for girls (see panel b). In particular, while 6.3% of girls attended school and worked at the same time, this fraction was around 12% in the case of boys. In addition, it was more likely that girls attended school and did not work than boys (82% vs. 72%) but also more likely that they neither worked nor attended school (9.3% vs. 8%).

In Table 11 we present data about child labor conditional on household characteristics⁹. In panel (a) we show that the highest fraction of working children (in 2001) corresponds to children who lived in medium to large sized households. In particular, 36% and 39% of working children lived in families

⁸ This group includes, for example, children that do household work only, disabled children, children that are home-schooled, etc.

⁹ Household is defined as all individuals that are relatives of the head of the household and live in the same residence. In other words, domestic employees and their children, and any other individual who is not a relative of the head of the household are excluded.

of 3-4 and 5-6 members respectively. Only 2.7% of working children belonged to families of less than three members, and 14% to families with seven or eight members. According to the data reported in panel (b), most of young workers lived in households whose head was male (75% vs. 24%). On the other hand, 70% of working children whose household was headed by a female also attended to school while this fraction is only 60% in the case of male headed households.

In Table 12 we show some of the self-reported reasons for child labor. The usual caveat applies: self-reported measures are often prone to measurement error and endogeneity due to the fact that some individuals are more likely to report better outcomes than others and the reasons why this is the case are strongly correlated with other characteristics of individuals such as education, income, etc.. The leading reasons for child labor in 2001 are: the child wants to save her own money (26% in rural areas and 39% in urban areas), need to help in the family business (23%) and at a distant third, the child needs to contribute to household income (only about 18%).

Child labor can be considered as part of the childrearing process in the sense that it might help build the child's character. Nevertheless, only 8% of working children reported working for this reason. This fraction increases to 12% when household work in the child's own home was included as child labor (see panel b). A small proportion of individuals, approximately 5%, reported to work in order to be able to pay for school.

4. A Model of Child Labor and Schooling

We now turn to the estimation of a model of joint child labor and schooling choices. This framework is set up in order to understand the factors that influence the probability of child's school attendance and working behavior in a reduced form model, focusing on a mixture of demand and supply side variables. The particular choice of the estimation method has been influenced by the decision making process, and the available data. In particular, we do not want to assume that schooling and work decisions of children are independent, which could be treated in a multinomial logit model¹⁰. We also do not want to assume any sequential process of decision making as we believe this is not necessarily a sequential choice¹¹. Hence we treat schooling and working alternatives as two interdependent choices.

In particular, we estimate child labor and school attendance reduced form decision rules jointly. We do this by estimating a bivariate probit model to test the likelihood of children working and

¹⁰ The logit assumes independence of irrelevant alternatives (IIA) which is often an implausible assumption. The IIA implies that the ratio between two choice probabilities is independent of the remaining alternatives included in the choice set. For example, IIA would imply that the ratio between the probability of choosing to work and the probability of choosing not to work is independent of whether the alternative of going to school is available. Clearly, this does not seem like a reasonable assumption.

¹¹ For example, Patrinos and Grootaert (2002) estimate a sequential probit model in which parents first decide whether to send the child to school or not, then conditional on not having chosen school parents decide whether the child should work in the labor market or not, finally and conditional on not having chosen labor market, parents decide whether to have the child work in a family business or not work at all. The results from the sequential analysis are quite sensitive to the ordering of the alternatives, which seems problematic.

attending school, conditional on a variety of individual and household characteristics. Bivariate probit models (and more generally, multivariate probit models which we will use in this and the next section) allow for the existence of possibly correlated disturbances between two probit equations. In other words, the error structure of the multivariate probit model allows for the possibility that some alternatives are more similar to the others and this matters for the way in which individuals make joint decisions about the various alternatives they face. In addition, it also allows us to test whether this joint estimation is significantly different from estimating univariate probit equations for each decision¹².

One of the contributions of this work is precisely to understand the joint nature of schooling and child labor choices. As a consequence of this methodological approach, we have to limit our attention to labor participation and abstract from labor supply. In other words, although the analysis of hours worked seems to be relevant in terms of policy, the approach that we adopt here requires that we focus on participation because a joint model of hours worked and hours attending school could be computationally intractable.¹³ In addition, the data imposes some constraints in the sense that although we observe hours worked, we do not observe the number of hours that children spend at school.

4.1. The Econometric Model

In the bivariate model, V_s is a latent variable that measures the utility derived from choosing school attendance (s) and V_w is a latent variable that measures the utility derived from choosing work (w). Each latent variable is given by the following expression:

$$V_k = \beta_k' X + \varepsilon_k, \quad k = s, w \quad (1)$$

where X is a vector of child and household characteristics that we will discuss below. An individual would choose to attend school if $V_s > 0$ ¹⁴ and would decide to work if $V_w > 0$.

Due to the simultaneous nature of these choices (school attendance and work) and the fact that there are unobserved child and household characteristics that determine both choices jointly, the bivariate model assumes a certain correlation structure for $\{\varepsilon_s, \varepsilon_w\}$. In particular,

$$Var(\varepsilon_s) = Var(\varepsilon_w) = 1; \quad Cov(\varepsilon_s, \varepsilon_w) = \rho \quad (2)$$

¹² For example, Jensen and Nielsen (1997), Patrinos and Psacharopoulos (1995, 1997) and Mason and Khandker (1997), estimate two independent probits: one for the probability that the child works and the other for the probability that the child attends school.

¹³ As the number of choices increases, the estimation of the discrete choice model becomes significantly more computationally cumbersome. The solution and estimation of the model would be even more complicated if we allowed for continuous choices. For details, see the methodological discussion in Section 4.1.

¹⁴ Note that this condition results from normalizing the utility derived from non-attendance to 0 given that only utility differences matter when individuals make choices between two alternatives.

Individuals face a total of $2 \cdot 2 = 4$ feasible alternatives. Let j be an alternative $\in J = \{(\text{school only}), (\text{school and work}), (\text{work only}), (\text{neither attend school nor work})\}$. Let $d_j = 1$ if alternative j is chosen, 0 otherwise.

The probability of choosing, for example, alternative $j=1$ (school only) is thus given by:

$$\begin{aligned} Pr(d_j = 1) &= Pr(V_s > 0, V_w < 0) \\ &= Pr(\varepsilon_s > -\beta'_s X, \varepsilon_w < -\beta'_w X) \end{aligned} \quad (3)$$

We can obtain an analogous probability expression for each of the remaining three alternatives in the individual's choice set J . Given that $\{\varepsilon_s, \varepsilon_w\}$ are jointly distributed, the probability expression in equation (3) cannot be expressed as the product of the probability of two individual events, namely, the probability of attending school and the probability of not working. Rather, that probability will be given by the region of $\{\varepsilon_s, \varepsilon_w\}$ for which both events coincide:

$$Pr(d_j = 1) = \int_{-\beta'_s X}^{\infty} \int_{-\infty}^{-\beta'_w X} f(\varepsilon_s, \varepsilon_w) d\varepsilon_w d\varepsilon_s \quad (4)$$

where $f(\varepsilon_s, \varepsilon_w)$ is the bivariate normal density function with parameters given by equation (2). In other words, each probability expression (that makes part of the likelihood function to be maximized) is a double-order integral. Given that equation (4) does not have an analytical solution, this model has to be estimated by using simulated maximum likelihood. In particular, we use the well-known GHK simulator to estimate the probability expressions¹⁵.

In terms of the relevant elements of the vector X , there is extensive literature that guides the choice of these variables. For example:

- a) Characteristics of the child: Age, gender and ethnic group (whenever possible).
- b) Characteristics of parents: Education, age, gender, employment and nature of parents' employment.
- c) Household characteristics: Size, composition (age and gender of siblings present in the household), age of the head of household (to capture a life-cycle effect), whether the head of the household is male or female. In addition, we include the participation rate of the adults in the household and the nature of adults' employment (for example, whether it is self-employment or not). Note that income should not be included given the fact that it is clearly endogenous. For example, low ability parents will most likely have low income and unstable labor market histories. They are also more likely to have low ability children with unsteady performance in school, even if there is not a direct causal relationship between income and the child's schooling

¹⁵ Note that if we have more than two alternatives then the probability expression in equation (4) would be given by a J-order integral, where J is the number of choices.

choice. Instead we include a dummy for whether the household is in the lowest income quintile to capture the additional constraints (such as, credit constraints) for the poorest households.¹⁶

- d) Data about the cost of schooling or variables that measures cross-region differences in the availability and quality of schools. Due to data limitations, in practice we include region dummies to capture these differences.

4.2 Estimation Results

In order to estimate the model shown in section 4.1, we use the following possible definitions of the dependent variables: (1) “Work”=1 if the child 5 to 11 years of age works in the market or reports doing household work and if the child 12 to 17 years of age worked according to the standard definition, 0 otherwise; (2) “Work1”= 1 if the child works, 0 otherwise (in other words, household work is excluded); and (3) “Study”=1 if the child attends school, 0 otherwise.

The model of school attendance and child labor was estimated using CLS 2001 and CHS 2003 data. The most important results do not vary significantly across surveys. Therefore, we only report results obtained with the CHS 2003¹⁷. In Table 13 we show means and standard deviations for control variables included in the model. The average age of the head of the household is between 44 and 45 years, from 71% to 74% of the households are headed by a male and average schooling for the head of the household ranges from 6.7 and 9 years depending on the survey. In addition, we can calculate average schooling of the child’s parents (as opposed to the head of the household who might or might be the child’s parent) using the Living Standards Survey (LSS) 2003. However, these data are only available for 8,058 children of the total of 22,269 between 5 and 17 years old. The number indicates that the average schooling for parents is approximately 6.8 years¹⁸.

The occupation rate of adults in the household ranges from 66% to 68% and the fraction of working adults in the household who report to be self-employed varies from 34% to 38%. Around 72% of households with children in the LSS 2003 live in urban areas while urban areas were over-sampled in both, CLS 2001 and CHS 2003 (approximately 90%). Approximately 28% of households with children are one-parent households. In addition, the percentage of households who live with extended family ranges from 36% (LSS) to 55% (CLS). Finally, these households have on average 2.8 children.

In Table 14 we show the results of the model of school attendance and child labor presented in Section 4.1 estimated using 2003 CHS data. In this estimation we used the definition of child labor “work1” defined above. These results are robust to the use of regional dummy variables or the estimation of standard errors using regional clusters. It is important to note that we report a marginal

¹⁶ The definition of household used in the construction of these variables corresponds to all individuals that are related and live in the same household. In particular, it does not include household workers who are not family members, the relatives of household workers, or other non-related individuals who live in the same household

¹⁷ Results using the Living Standard Survey 2003 and CLS 2001 are available upon request.

¹⁸ Average years of schooling for father and mother, if both are available.

effect associated with each control variable for **each** combination of events (event s = school attendance, event w = work, i.e., a total of 4 possible combinations of events). This is the result of the assumption according to which the decisions of school attendance and child labor are interdependent. For example, the first number in the first row corresponding to the control variable “headeduc” is interpreted as the marginal effect of a one-year change in the educational attainment of the head of the household on the probability that a child neither works nor attends school (the title of the first column in Table 14), the second number of the same row is the marginal effect on the probability that a child works and does not attend school (the title of the second column of Table 14), etc.

The child’s age is significant in all the cases. Since we included both, age and age squared, as explanatory variables, it turns out to be useful to graph the total marginal effect as a function of the child’s age. In Figure 1 we show this result. The probability that a child works and attends school at the same time, $P(w=1, s=1)$, always increases with her age in the range of 5 to 17 years. The effect of the child’s age on the probability that the child works and does not attend school, $P(w=1, s=0)$, is negative and decreasing up until the age of 14 and turns positive from this point on¹⁹. In other words, the probability that a child works and does not attend school is always increasing with age starting at 14, and the probability that younger children work and do not attend school is lower than the probability that they work and attend school at the same time.

The results also indicate that the child’s gender is significantly associated with the probability of school attendance and the probability of child labor. In particular, boys are more likely to work than girls (whether they attend school or not) and girls are significantly more likely to attend school and not work²⁰. This implies that there is no evidence in favor of gender discrimination in schooling against girls, which has been found to be the case in other developing countries²¹.

Schooling attainment of the head of the household is statistically significant and exhibits the expected signs: a higher schooling attainment of the head of the household implies a lower probability that a child works (regardless of whether she attends school or not), a higher probability that the child attends school and does not work, and a lower probability that a child neither works nor attends school²². The gender of the head of the household does not turn out to be significant²³. In

¹⁹ It is interesting to note that this inflexion point precisely coincides with the 13 to 14 years of age threshold identified as the critical point when the drop out rate significantly increases as children transition from elementary to secondary school.

²⁰ For example, the probability that a child works and attends school is one percent higher for boys than for girls and the probability of attending school and not working is 4.4 percentage points lower for boys than for girls.

²¹ See, for example, Canagarajah and Coulombe (1997).

²² In Appendix 2 we present a similar exercise using LSS 2003 data but we replace the schooling level of the head of the household with the average schooling attainment of the child’s parents (this information is only available for this survey). Results are robust to this change, although the magnitudes of the marginal effects of education on child labor and school attendance are slightly larger in this case. For example, while the probability that a child works and does not attend school falls 0.23 percentage points if the educational attainment of the head of the household increases one year, this effect is equivalent to 0.3 percentage points in the case of the education of the child’s parent.

addition, the probability that a child does not attend school, regardless of whether she works or not, falls with the age of the head of the household while the probability that a child attends school and does not work increases with the age of the head of the household.

The probability that a child works (regardless of whether she attends school or not) increases with the occupation rate of adults in the household. This result is somewhat surprising, since it has been argued that child labor and adult labor are substitutes. This evidence, on the contrary, suggests that child labor is complementary, and not substitute, of employment of adults in the household²⁴. This result can be related to the fact that child labor in Colombia is highly correlated with the presence of a family business in the household²⁵. If parents and/or other adults in the household work in a family business, it is more likely that children also participate in the family enterprise²⁶.

To investigate this hypothesis further, we included the percentage of working adults in the household who report to be self-employed as an additional explanatory variable. The results indicate that the positive effect of the employment rate of adults in the household on the probability of child labor increases with the fraction of working adults who are self-employed. For example, the probability that a child works and does not attend school increases by 2.1% if the employment rate of adults in the household increases by 1% and all of them are self-employed (0.015 + 0.006 in rows seven and eight in Table 14).

Note that the positive effect of the ratio of adults who are self-employed on the probability that a child works and attends school is three times bigger than the effect on the probability of work and school non-attendance (0.006 vs. 0.0018). In fact, according to the results obtained with 2001 CLS (not reported), the fraction of self-employed adults in the household significantly increases the probability that a child works and attends school but is not significantly associated with the probability that the child works but does not attend school. Recall that this variable is meant to capture the presence of a family business in the household. In fact, from the total number of working children who reported to be family workers²⁷, 63% belong to households with at least one self-employed adult. Therefore, this result provides evidence that the presence of a family business in the

²³ The results obtained with the LSS 2003 indicate that the probability that a child attends school and does not work significantly increases if the head of the household is female. If the head of the household is male, the probability that a child does not attend school (regardless of whether she works or not) significantly increases.

²⁴ Replacing the occupation rate of adults in the household by the unemployment rate of adults in the household obtains similar results. In other words, the larger the unemployment rate of adults in the household, the lower the probability that the child works.

²⁵ Grootaert (1998) reports a similar result for Ivory Coast. In particular, the probability of child labor increases if the father and the mother are employed. The author attributes this result to the correlation between the presence of family businesses and child labor.

²⁶ In Appendix 3 we explore the possibility that the effect of the employment rate of the adults in the household on child labor may be different for the poorest households. In particular, we included the interaction between `Occupr_hh` and `Quint1`. The sign of the interaction is negative, which indicates that the effect of the employment rate of adults in the household on the probability of child labor is smaller (nearly half) in the case of poorest households.

²⁷ In other words, those who reported to work for their parents or other relatives and/or being “unpaid family workers.”

household is significantly associated with a higher probability that a child works and attends school and less so with the probability that she only works²⁸.

In sum, the evidence implies that despite the fact that the presence of a family business in the household (or the proportion of self-employed adults in the household) increases the likelihood of child labor, this increase is associated almost exclusively with changes in the probability of child work and school attendance. In other words, child labor with the family is associated with lower non-attendance than child labor outside of the household in non-family businesses.

In Table 15 we provide additional evidence in favor of the hypothesis that it is more likely that children working with the family also attend school than children working outside of the household. In particular, 75% of children who work with relatives also attend school and only 25% work but do not attend school. In the case of working children who work for non-relatives, only 46% also attend school while the remaining 54% do not. This result is important, since it implies that even though child labor with the family is quantitatively very significant (around 66% of total working children), these children are at less risk in the sense that is more likely that they also attend school while working than children who work for non-relatives.

In the literature, there seems to be consensus about poverty being the main determinant of child labor²⁹. To investigate this hypothesis, we included a dummy variable equal to one if the household belongs to the lowest income quintile, and zero otherwise. The results indicate that this variable has a significant positive impact on the probability that a child works even after controlling for other household characteristics, such as the age and education of the head of the household and the occupation rate of adults, which are important determinants of household income. This suggests that there are *additional* constraints that affect the poorest households, besides those associated with lower levels of human capital, which increase the likelihood that a child works.

For instance, poorest families have less access to credit markets, are less likely to be able to insure against short-run income fluctuations, and in general, can be more dependent upon child labor for survival. In Table 16 we present evidence in support of this hypothesis. In particular, the Table shows the contribution of working children to total household income. As can be observed, the contribution of working children who belong to households in the lowest income quintile is significantly higher than the average contribution. For example, while children 10 to 14 years of age contribute on average 9.7% of total income, this ratio is around 25% in the case of working children

²⁸ In Appendix 4 we report the results of a similar exercise in which we replaced the fraction of self-employed adults in the household with a variable labeled “head_buss”, which is equal to 1 if the head of the household reported an income different from zero to a question inquiring about net monthly earnings in an activity or business different than a remunerated job, 0 otherwise. This variable is meant to capture the presence of a family business in the household. The results seem consistent, i.e., the probability that a child works (regardless of whether she attends school or not) increases with the presence of a family business in the household. However, this effect is significantly higher on the probability that a child works and attends school than on the probability that she works only.

²⁹ See, for example, Grootaert and Kanbur (1995).

in the same age range in the poorest households. In other words, in the poorest households, children's wages constitute an important fraction of total family income³⁰.

Results reported in Table 14 also indicate that it is more likely that children who reside in urban areas attend school and do not work, less likely that they work (regardless of whether they attend school or not), and less likely that they neither work nor attend school. In addition, the number of parents residing in the household is not significantly associated with the probability of child labor or the probability of school attendance³¹. Children living with extended family are more likely to work and less likely to attend school.

The probability that a child works and does not attend school significantly increases with the number of children at home. In addition, the probability that a child attends school and does not work falls with the total number of children in the household. The literature provides evidence that in large households, parents cannot in general afford to send all children to school and thus, some children attend school at the expense of the others (see, for example, Lloyd 1994). In addition, in larger households, income per capita decreases and the dependency ratio increases; both these factors increase the likelihood that the child might need to generate additional income.

Finally, it has been argued that the gender composition of children in the household has a significant effect on school attendance and work patterns of children in the household (Chernichovsky, 1985). However, we did not find a statistically significant effect of the number of boys in the household on the probability of child labor or the probability of school attendance.³²

We have already mentioned that our econometric strategy allows us to evaluate whether there is in fact interdependence between labor participation choices and school attendance choices of children. In particular, a negative and significant estimator of ρ (the correlation between the two error terms) would indicate that both options (child labor and school attendance) are "rivals" and compete for the child's time. In fact, the estimated ρ (see Table 14) is negative and statistically significant.

In Tables 17a and 17b we present estimations of the baseline model (shown in Table 14) separately for urban and rural areas. Despite the fact that the main results still hold, some interesting

³⁰ In Appendix 5 we present a similar exercise in which we control for all income quintiles, except one. Results indicate that even after controlling for some important determinants of household income (such as age and education of the head of the household and the occupation rate of adults in the household), it is more likely that children from the lowest income quintile work and less likely that children from the highest income quintile do. In other words, there are additional factors besides income, that are different between poor and wealthy households which are significantly associated with the probability of child labor. For example, differences in access to credit markets or cultural differences.

³¹ The results based on LSS 2003 indicate that the probability that a child does not attend school (regardless of whether she works or not) decreases if she lives in a two-parent household. In addition, the probability that a child attends school (regardless of whether she works or not) increases with the number of parents residing in the household.

³² The 2002 LSS data allows us to distinguish those individuals who belong to an ethnic minority (afro-Colombian, indigenous or "raizal"). The results indicate that in urban areas it is significantly less likely that children who belong to an ethnic minority work and do not attend school, and more likely that they work and attend school than non-minority children, while in rural areas it is significantly more likely that children from ethnic minorities attend school and do not work and less likely that they work and do not attend school than non-minorities.

differences emerge: (1) the probability of child labor and non-attendance significantly increases if the head of the household is male in rural areas, while the gender of the head of the household does not significantly predict the probability of child labor in urban areas; (2) the age of the head of the household only significantly predicts the probability of child labor in urban areas, but not in rural areas; (3) the presence of extended family significantly explains the probability of child labor in urban areas only; (4) the number of boys as a fraction of the total number of children in the household significantly predicts the probability of child labor and school attendance in rural areas; and (5) school attendance and child labor are “rival” activities and compete in a stronger way for the time of the child in rural areas than in urban areas (since the estimated value of ρ is -0.38 in urban areas and -0.43 in rural areas).

5. A Model of Sector Choice

In order to investigate further the main features of child labor, we now turn to the estimation of a choice model of economic sector for children who report being employed³³. In particular, we are interested in studying the characteristics of children and their households that are associated with the probability that working children choose particular sectors of the economy.

5.2 The Econometric Model

Just as in the model presented in the previous section, here we define V_κ as the latent variable that measures the utility derived from choosing sector κ . In particular, κ =agriculture, manufacturing, retail, services and other. We define $d_\kappa = 1$ if the individual chooses to work in sector κ , 0 otherwise.

The utility derived from working in each sector will be given by:

$$V_\kappa = \beta'_\kappa X + \xi_\kappa, \quad \kappa = \text{sector}$$

The probability of choosing to work in sector j , will thus be given by:

$$\Pr(d_j = 1) = \Pr(V_j > V_k, \forall k \neq j) \tag{5}$$

In other words, the probability of choosing to work in sector j is given by the probability that the utility derived from working in sector j is higher than the utility derived from participating in any other sector $k \neq j$.

The specific form of the probability expression in equation (5) will depend on the distributional assumptions we make about $\{\xi_1, \xi_2, \dots, \xi_\kappa\}$. For example, if we assume a normal distribution in

³³ The usual self-selection problem is evident in this estimation. In other words, participating children are expected to be systematically different than non-participating children in observed and unobserved ways. Hence, several, if not all, coefficients might be biased. However, we will focus on the sign and statistical significance rather than the magnitude of the specific coefficients and this should provide a reasonable guideline for policy recommendations.

which we allow for a correlation structure across error terms in each utility expression then we end up with a multinomial probit model. Recall that due to the fact that the integral of the normal density function does not have a closed form solution, this results in probability expressions that are κ -order integrals. Hence the computational burden implied by such a model is quite significant.

Alternatively, we can assume that the error terms are distributed type-I extreme value which yields the multinomial logit model. There is a clear computation advantage of estimating the multinomial logit model with respect to the multivariate probit because the type-I extreme value assumption yields closed form solutions of the probability expressions in equation (5). However, the logit assumes independence of irrelevant alternatives (IIA) which might be an implausible assumption in this case. The IIA implies that the ratio between two choice probabilities is independent of the remaining alternatives included in the choice set.

5.2 Estimation results for the sector choice model.

The dependent variable of this model is defined as follows: the variable “sector” equals to 1 if the child works in agriculture and mining, 2 if she works in manufacturing, 3 if she works in the services sector, 4 if she works in retail, and 5 if she works in any other sector.

In Tables 18a and 18b we present the results of the multinomial logit model for urban and rural areas respectively.³⁴ The excluded category is number 5, i.e., the other sectors. The results indicate that it is more likely that boys work in agriculture and mining, and less likely that they work in services than girls, both in urban and rural areas. The higher the education level of the head of the household, the lower the probability that a working child works in agriculture and mining (both in rural and urban areas) and the higher the probability that she works in services in urban and rural areas and in retail in rural areas only.

In addition, the probability that a working child works in services in urban areas decreases if the head of the household is male as does the probability of working in agriculture in rural areas. The likelihood that a working child works in retail in rural areas increases if the head of the household is male.

The probability that a working child works in the services sector decreases and the probability that she works in manufacturing in urban areas increases with the employment rate of adults in the household. In addition, the higher the fraction of self-employed adults in the household, the higher the likelihood that a child works in retail and the lower the likelihood that she does in manufacturing in urban areas.

It is more likely that working children who belong to households in the lowest income quintile work in agriculture than in any other sector and less likely that they work in services in rural areas. The

³⁴ The choice of economic sector for working children is presumably fundamentally different in urban areas and rural areas given the significant differences in labor markets in each. Thus, we report results separately by geographic region.

probability that a working child works in services in rural areas decreases with the number of parents that reside in the household. Finally, it is more likely that working children who reside in large households work in agriculture than in any of other sector in rural areas, while in urban areas working children who belong to large households tend to work more in services and less in retail.

In sum, we can say that the most vulnerable children (e.g., ethnic minorities³⁵, children of low educated parents, the ones who reside in large households or households in the lowest income quintile) tend to work in agriculture more than in any other sector. In a way, employment in agriculture could be associated with worse working conditions in general (with respect to the other sectors), higher probability of exploitation given the characteristics of these jobs³⁶, and probably lower levels of human capital accumulation in the form of “on-the-job-training”. This implies that not only is it more likely that the population of more vulnerable children work, but also that they do in economic sectors with potentially more adverse effects on their human capital.

6. Child Labor in Family Businesses

As we discussed in Section 3, approximately 50% of children who report being employed, work for their parents. Some other stylized facts presented in that section highlighted the importance of child labor in family businesses. To better understand the nature of child labor, we now turn to analyze what characteristics of children and households are associated with child labor in family businesses compared to child labor with non-relatives out of the household.

In Table 19 we show the distribution of employment with family and employment with non-relatives by characteristics of children and households. For example, 50% of working children in urban areas work with their families and 50% are employed by non-relatives. Similarly, 68% of working children in rural areas work for parents and other relatives and 32% for non-relatives. These numbers indicate that work with family is more frequent in rural areas than in urban areas.

It can be observed that a greater proportion of working girls work for their families than boys (56% vs. 52%). Similarly, it is more likely that a child younger than 12 works for her family than if she is older than 12 (72% vs. 47%). A slightly lower fraction of working children from the poorest households work for their family than in the case of working children from richer households. Similarly, a larger share of working children from households whose head has at least secondary education are family workers, compared to the share in households with less educated heads (56% vs. 52%).

The proportion of family workers is greater in the case of children whose head of household is male than in the case of female-headed households (57% vs. 43%). This is also true for working children in households with both parents present compared to one-parent households (58% vs.

³⁵ According to the LSS 2003, working children who belong to ethnic minorities are more likely to work in agriculture and less likely to work in services and retail in rural areas.

³⁶ For example, working in the countryside under ruthless weather conditions, long walking distances, harvesting could hurt the child's hands, etc.

42%). The prevalence of work with family is higher among working children who reside in small households (less than 4 siblings) than among children in larger households (57% vs. 45%). The proportion of working children who work with family is smaller in the case of children who live with extended family than among those who do not, and finally, work with family is more likely among working children whose head of household is employed than among children whose head of household reports to be unemployed (57% vs. 28%).

These results indicate that work with family is more likely among children who belong to less disadvantaged households: highly educated head of household, employed head of household, male head of household, both parents living at home, and smaller households. To formally assess this hypothesis, we estimate a probit model using the sample of working children, where the dependent variable is given by “family work”=1 if the working child works with family, 0 if she is employed by someone who is not a relative³⁷. The results of this exercise are presented in Table 20. The model was estimated in three different versions: the first one uses the entire sample of working children between 5 and 17 years of age (first column), the second and third use the urban and rural samples respectively.

The number reported in each cell corresponds to the marginal effect of the explanatory variable on the probability that a working child is employed by his family relative to the probability of being employed by non-relatives. The results indicate that the probability that a working child works with his family increases with the education of the head of the household, particularly in urban areas, and increases if the head of the household is male and older. In addition, the probability of working with family increases if the head of the household is working both, in urban and rural areas, and increases with the rate of self-employment among adults in the household in urban areas.

The probability that a working child works with family increases with the number of parents at home and decreases with the size of the household, particularly in urban areas. Finally, there is no evidence of a significant association between child labor with family and poverty.

In sum, it is more likely that working children from less disadvantaged families work in family businesses than with unrelated employers. For example, working children who live in households with more educated and older heads, with both parents instead of only one, and smaller households, are more likely to work with family. In addition, we have also established a clear relationship between child labor with family and the probability that the working child also attends school³⁸. In particular, children working for their family are more likely to attend school than children working for unrelated employers.

³⁷ In particular, the child is considered to be a family worker if she reports to be employed by parents or other relatives or if she reports to be an unpaid family worker.

³⁸ In Table 15 we showed that the proportion of working children employed by relatives who also attend school is significantly higher (around 75%) than the fraction of working children employed by non-relatives who also attend school (46%).

7. Evaluation of the Effect of “*Familias en Acción*” on Child Labor

Familias en Acción (FA) is a social welfare program aimed at improving different components of human capital including health, nutrition, and education. The program was initially targeted to the poorest; in particular, households in the lowest income quintile in rural areas in selected areas in the country. The implementation of the program began in 2001. By 2003, it was fully operating. The database used to carry out the evaluation contains information of approximately 11,500 households living in 122 municipalities. All communities are sufficiently poor to be eligible for the *FA* program; however it was implemented only in 57 municipalities out of the 122. The database is longitudinal and consists of two waves. The first wave was collected during 2002, and the second in 2003.

For the purpose of the evaluation of the program, we call the 57 communities where the subsidy was implemented the “treatment” group. Given that the program was not randomly assigned, several municipalities which did not receive the subsidy were selected as a “control” group, and are comparable to the “treatment” areas in a number of pre-program dimensions.³⁹

The component of the program in which we focus in this section is a monthly conditional cash transfer offered in “treatment” communities to mothers who satisfy the eligibility criteria. The cash transfer is conditional on child (children) school attendance during the period⁴⁰. The eligibility criteria included having a welfare indicator lower than a predefined threshold, having at least one child between the ages of 7 and 17, and living in any of the “treatment” areas. The effect of the cash transfer on school attendance and child labor is estimated by comparing school choices and occupation rates between children in “treatment” areas and children in “control” areas.

The conditional cash transfer reduces the price of education facing individuals, and therefore, it is expected to have a positive effect on school attendance of beneficiary children, as long as education is a normal good. In addition, we also expect a positive effect on children occupation rates as it reduces the tension associated with the fact that there is a significant time separation between the immediate benefits of child labor and the long-delayed costs of sending children to work. In other words, parents might prefer the immediate benefits associated with child labor, i.e., immediate increase in household earnings, over the long term benefits associated with sending children to school, i.e., higher earnings capacity during adulthood associated with higher human capital accumulation. If children could compensate their parents, for example, by means of a contract that could guarantee an income transfer by the time the child could repay their

³⁹ In particular, communities were stratified according to the geographic area and an index of health and education infrastructure. For each stratum, communities with the program and communities without the program were selected. This selection was done in such a way that communities would be comparable in terms of their size (population) and a quality of life index.

⁴⁰ In 2002, the cash transfer was COP\$14,000 (US\$5.8) for children in elementary school and COP\$28,000 for children in secondary school. These amounts correspond to approximately 3% and 6% of total household consumption respectively.

parents for their investments, then this issue could be ameliorated. However, these contracts are in general not enforceable. The conditional cash transfer plays the role of such a monetary transfer in the sense that it provides the parent with immediate resources at the same time that the child attends school.

To evaluate the effect of the cash transfer on an outcome Y (in our case, the employment rate of children), we want to compare the average employment rate of children in “treatment” areas with and without the program. Therefore, the parameter of interest, Δ , could be estimated as:

$$\Delta = E(Y_{1,D} - Y_{0,D} | T = 1) \quad (6)$$

where $Y_{j,k}$ is an indicator of child labor if participating in the program ($j=1$) or not ($j=0$), before ($k=A$) or after ($k=B$) the program. $T=0$ denotes control areas and $T=1$ denotes treatment areas. Finally, E is the expectations operator.

Given that we do not observe child labor rates in treatment areas without the program, one could make use of control areas to estimate this counterfactual. We could, for example, compare post-program employment rates across treatment and control areas, after controlling for a set of observed characteristics that might have an effect on child labor:

$$\Delta = E(Y_{1,D} / T = 1, X) - E(Y_{0,D} / T = 0, X) \quad (7)$$

Δ is an unbiased estimator of the effect of the program under the assumption that once one controls for observed characteristics X , there are no unobserved factors (u), which affect child labor decisions of households in treatment areas and control areas differentially. Clearly, this assumption is quite strong. Even if control and treatment areas were chosen in such a way that are perfectly comparable in many observed dimensions, it is always a possibility that there are unobserved differences between the two which are unrelated to the program that may also affect child labor choices. In other words, there is a chance that one might confound the effects of the program itself with the effects of unobserved characteristics on child labor.

Since we observe occupation rates of children in treatment and control areas *before* the implementation of the FA program, we can specify the following Δ estimator under weaker assumptions:

$$\Delta = \underbrace{[E(Y_{1,D} / T = 1, X) - E(Y_{0,D} / T = 0, X)]}_{(1)} - \underbrace{[E(Y_{0,A} / T = 1, X) - E(Y_{0,A} / T = 0, X)]}_{(2)} \quad (8)$$

In other words, the difference between occupation rates in treatment and control areas after the implementation of the program (1) net of the difference between occupation rates in treatment and control areas before implementation (2). In this case, for Δ to be unbiased we only need to assume that all differences in occupation rates between treatment and control areas due to unobserved characteristics are constant over time.

This Δ estimator is known as the differences-in-differences estimator. This estimator is likely to be biased if individuals in treatment areas change occupation rates *in anticipation* of the program. This would imply that $E(Y_{0,A} | T = 1, X)$ would be a biased estimator of the occupation rates in treatment areas in the absence of the program. This could be particularly relevant in the case of *FA* given the specific way in which the program was implemented. In particular, in 2002, when baseline data were collected, approximately half of the treatment group had already received the subsidy. This group of communities has been called TCP (“treatment with payment”). This fact could have accelerated the effects of anticipation in the other half of the treatment group (TSP – “treatment without payment”). In other words, in anticipation of the program, households adjusted their school attendance and child labor choices.

Attanasio et al (2005) showed that the anticipation effects on school enrolment rates in TSP areas were significant⁴¹. These authors used an alternative estimator of Δ which makes use of retrospective enrolment rates collected during baseline in treatment areas (TCP & TSP) and control areas, i.e., enrolment rates prior to baseline (called pre-baseline data) in 2002.

The treatment effects on enrolment rates estimated by Attanasio et al (2005) are reported in Appendix 6a and 6b. Their results indicate that the cash transfer had a significant effect on enrolment rates. The biggest impact was for older children (from 14 to 17 years of age), in particular, the transfer was associated with an increase of approximately 53% in enrolment rates both, in urban and rural areas. The effect for children between the ages of 8 and 13 was approximately 3%⁴². In Appendix 6b, we report their results by gender. The program had a positive effect on enrolment rates at all ages both in urban and rural areas. The effect of the cash transfer on girls’ enrolment rates was only significant for older girls (14 to 17 years old) in urban areas, and girls between the ages of 8 and 13 in rural areas.

Unfortunately, there is no retrospective data about occupation rates of children in the dataset. In other words, we do not have pre-baseline data that could help us attenuate the anticipation effects of the program on child labor. However, given that the cash transfer was conditioned on school attendance and not explicitly on employment status, we would not expect important anticipation effects in this case. In Figure 2 we show a comparison of employment rates of children by area (urban/rural) between TSP areas and control areas. As can be observed, there is basically no difference between the two in rural areas. In urban areas, there seems to be a difference between employment rates of children 15 to 16 years of age. However, this difference goes in the opposite direction of what would worry us. In other words, if anticipation effects existed in TSP areas, employment rates should have been lower than in control areas, but we observe the opposite.

⁴¹ In other words, while the differences between enrolment rates in TSP areas and control areas *before* 2002 were practically null, once the program was implemented in TCP areas in 2002, such differences were substantial around 3 percent.

⁴² This result is not surprising given that enrolment rates of children 8 to 13 were already significantly higher than those of children between the ages of 14 to 17 even before the program was implemented.

Therefore, to estimate the effects of the *FA* cash transfer on children employment rates we can use equation (8) given there is no evidence of anticipation effects. In particular, we estimate the impact of the program on child labor using TSP, TCP and control areas in the baseline ($t=2002$) and in the follow-up ($t=2003$) periods:

$$Y_t = \beta_0 + \beta_1 d[TSP\ 2002][TCP\ 2002,2003] + \beta_2 d[TSP,TCP] + \beta_3 d[2003] + \beta_4 X + \varepsilon_t \quad (9)$$

where:

$$Y_t = \begin{array}{l} 1 \text{ if child works in period } t, 0 \text{ otherwise, with } t= 2002 \text{ and} \\ 2003. \end{array}$$

$$d[TSP\ 2002][TCP\ 2002,2003] = \begin{array}{l} 1 \text{ if area is TSP in } t=2002 \text{ and if area is TCP in } t=2002 \text{ and} \\ 2003, 0 \text{ otherwise.} \end{array}$$

$$d[TSP,TCP] = \begin{array}{l} 1 \text{ if area is TSP in } t=2002, 0 \text{ otherwise.} \end{array}$$

$$d[2003] = \begin{array}{l} 1 \text{ if } t=2003, 0 \text{ otherwise.} \end{array}$$

The estimated treatment effect is thus given by β_2 . In Table 21 we present results of this estimation. In addition, we show our best estimator of the percentage of children who would have worked if the program had not been implemented. The employment rate without the cash transfer is calculated by adding the (absolute value of the) estimated effect of the subsidy to the observed employment rate of children in treatment areas during the follow-up period (2003).

The results indicate that the cash transfer was associated with a significant reduction in employment rates of children between 10 and 17 years of age. In particular, the employment rate fell from 17.6% without the subsidy to 16.1% with the subsidy (almost a 10% reduction). In rural areas this effect was significantly higher. In the case of children ages 10 to 13, the cash transfer was associated with a reduction of 3.2 percentage points in employment rates. In other words, the employment rate in rural areas changed from 10.7% without the subsidy to 7.5% with the subsidy. Finally, in the case of children from 14 to 17 years old the reduction was around 1.5 percentage points, falling from 34.5% without the subsidy to 32.9% with the subsidy.

In Table 22 we explore if the conditional cash transfer had differential effects by gender. As can be observed, the effect of the subsidy on employment rates of children was basically led by an important effect on boys' employment rates, in particular, older boys (from 14 to 17 years of age). The estimated effect in this case is approximately 4.8 percentage points. In particular, the employment rate of this group fell from 44.9% without the subsidy to 40.1% with the subsidy. In urban areas this effect was even stronger, with occupation rates of boys between the ages of 14 and 17 falling from 38.4% without the subsidy to 30.5% with the subsidy. The effect on girls' employment rates is more modest. The only significant effect is for girls between the ages of 10 to 13 who lived on rural areas, and even in this case the estimated effect is quantitatively small.

8. Conclusions

This paper analyzes the issue of child labor in Colombia, with a particular emphasis on the understanding of the determinants of joint school attendance and child labor decisions of households with children. This study uses extensively various sources of data about child labor, school attendance and socioeconomic characteristics of the households.

According to the 2001 CLS, approximately 14.5% of children between 5 and 17 years of age worked in 2001. The problem is particularly relevant in rural areas, where 22.5% of children participated in some kind of work activity during the same year. In general, the incidence of child labor is twice as big for boys than for girls. Similarly, child labor is more prevalent among older children than among younger ones, both, in terms of participation rates and hours worked. Given the magnitude of child work in rural areas, it is no surprising that more than 36% of working children worked in agriculture. Near one third of working children were employed in the retail sector, whereas 12% worked in the manufacturing sector. A similar fraction of children worked in the services sector. Approximately half of working children were unpaid, and, from the group who received payment in exchange for the work, basically all of them earned less than a minimum wage.

The type of employer of working children is one of the most relevant dimensions of our analysis of child labor. Most of child labor takes place in family businesses where children work for their parents or other relatives. Only about a quarter of working children work for non-relatives, while 10% report to be self-employed. In rural areas, working children are primarily employed by their own families.

From the point of view of the design of policies aimed at alleviating the issue of child labor, it is extremely important to distinguish between working children who also attend school (64% of total working children) and working children who do not attend school (36%). Although in both cases human capital accumulation is affected, and therefore, future earnings of the child might be sacrificed, there is no doubt that this problem is particularly severe for the second group of working children. For that reason, in this paper we have emphasized on the characteristics of children and their households that jointly affect the probability of child labor and school nonattendance.

The results of the econometric analysis about the determinants of the joint probability of child labor and school attendance choices provide some important conclusions for policy design. After controlling for a wide range of observed characteristics of children and their households, we can say that child labor decisions are not independent from school attendance choices. Our results also indicate that it is more likely that boys work (regardless of whether they attend school or not), and it is more likely that girls attend school and do not work. On the other hand, the higher the education and age of the head of the household, the lower the probability that a child works and does not attend school.

One of the most interesting results of this paper has to do with the relationship between child labor and the employment status of other household members. The evidence presented indicates that child labor is complementary and not substitute, of employment of adults in the household, contrary to what has been argued in the past. In particular, we find that the probability that a child works (regardless of whether she attends school or not) increases with the occupation rate of adults in the household. If, in addition, employment of adults in the household is associated with the presence of a family business or if the adult members of the household report to be self-employed, then the probability of child labor increases even further.

In addition, the probability that a child works increases with the size of the household, while the opposite happens if the family lives in an urban area. On the other hand, the probability of child labor is higher for children that belong to households in the lowest income quintile, even after controlling for important determinants of household income, such as, education, age, and employment status of adult members of the household. This suggests that other factors not explicitly controlled for in our analysis, e.g. credit constraints, cultural differences, etc., increase the probability of child labor among the poorest. In rural areas, if the head of the household is male, the probability that a child works increases.

In this paper, we also analyze the characteristics of children and their households that are associated with child labor in particular economic sectors. The results indicate that, in the case of urban areas, it is more likely that girls work in the services sector (with domestic work being the most important category). The probability that a child works in the services sector also increases if the head of the household is female and older. On the other hand, child labor in services decreases with the occupation rate of adult members of the household, which suggests that in households with lower levels of unemployment, there are fewer incentives to engage children in domestic work.

Interestingly, child labor in the retail sector is positively and significantly associated with the fraction of adult household members that are employed and the presence of a family business. In other words, if the household owns a family business then the likelihood that children work significantly increases. In rural areas, it is more likely that working children work in agriculture than in any other economic sector. The same thing occurs in the case of the most vulnerable children, i.e., ethnic minorities, children of low educated parents, children who reside in larger households or households that belong to the lowest income quintile.

One of the most interesting empirical findings of this study is that child labor in family businesses is associated with less school nonattendance, compared to employment with unrelated individuals. In particular, we find that 73% of working children employed by their parents or other relatives also attend school, compared to 46% in the case of working children employed by unrelated individuals. Also, the probability that a child works and attends schools at the same time increases with the presence of a family businesses (or the fraction of self-employed adults in the household), which does not happen in the case of the probability of child labor and school nonattendance (except, marginally, in the case of the 2003 CHS data). This suggests that the

presence of a family business makes an enormous difference when it comes to assessing the effects of child labor.

Also interesting is the fact that the probability that a working child works with the family (with respect to working for unrelated individuals) increases with the education and age of the head of the household and also increases if the head of the household is male, particularly in urban areas. This is also true for smaller households and households with both parents. All of this suggests that working children in family businesses do not belong to the poorest households and, therefore, are not necessarily the priority group from the point of view of the design of public policy. The problem is particularly critical among the poorest households in which child labor happens mostly out of the household, and thus it is more likely to happen along with school nonattendance.

This paper also evaluates the effects of a conditional cash transfer program called *Familias en Acción* on child labor. The results indicate that, in addition to positive effects of the program on school attendance and nutritional outcomes of children, *Familias en Acción* has been an effective strategy for the reduction of child labor, particularly in the case of boys. For children between the ages of 10 and 13, employment rates fell from 12% before the subsidy to 10.3% after the subsidy. In the case of children from 14 to 17 years of age, the employment rate decreased from 45% before the subsidy to 40% after the subsidy. The results also indicate that the benefits have been larger in rural areas especially for children between the ages of 10 and 13, and in urban areas for children 14 to 17 years of age.

The results presented in this paper, suggest two possible avenues for the design of public policy aimed at alleviating the issue of child labor in Colombia. First, a set of policies designed to modify the incentives of households to send children to the labor market. These policies should affect both, long term and short-term incentives of households. Second, a set of administrative policies designed to legally enforce child labor laws such as inspection, monitoring and sanctions aimed at certain priority groups. A typical example of the latter is the legal prohibition of the so called “worst types of child labor”.

The results presented in this paper indicate that among the group of policies aimed at modifying long-term incentives of households, special emphasis should be placed in the following issues: improving human capital of the population as child labor is significantly likely to decline with the education of children’s parents; reducing household size and teenage pregnancy, as both have been shown to have significant effects on the likelihood of child labor; and alleviating structural poverty.

In terms of policies aimed at affecting outcomes in the short term, it is crucial to attenuate the agency problem associated with the fact that those who receive the benefits of child labor, i.e. adult members of the household, are not those who incur the costs, i.e. the children themselves. In addition, this issue is accentuated by the fact that benefits are immediate (increase in current household income) while costs are long delayed (future higher earnings during adulthood).

Policies aimed at increasing the opportunity cost of child labor, or what is the same, increasing the private benefit of school attendance should accomplish this goal.

Among policies that can be thought to increase the private return to education we can include, direct subsidies or conditional cash transfers, the reduction of education hidden costs such as uniforms, textbooks and materials, added benefits of education such as nutrition (breakfast, snack, lunch) and vocational education, more flexible schedules, increased availability of public schools and improvement of the quality of education. These should, in turn, contribute to the reduction of child labor.

Finally, it is necessary to note that policies aimed at reducing child labor could have some undesired consequences. Given that working children can contribute up to 20% of household income in some cases, child labor prohibition could seriously affect survival possibilities of the poorest households. For this reason, prohibition policies must be accompanied by compensatory mechanisms that make them more effective, at the same time that they reduce the likelihood of increased poverty in the short-term.

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Table 1**a. Economically active children (between 5 and 15 years of age)
and employment rates in 2000**

	Number of children (millions)	%
Developed Economies	2.5	2.0%
Transition Economies	2.4	4.0%
Asian-Pacific	127.3	19.3%
Latin America and the Caribbean	17.4	16.0%
Sub-Saharan Africa	48	29.0%
Middle East and North Africa	13.4	15.0%
<i>Total</i>	<i>211</i>	<i>18.0%</i>

Source: IPEC Action Against Child Labor 2002-2003, ILO.

**b. Employment rates by age and region
in 2000 (% of total children in each age range)**

	5-9	10-14	15-17
Asian-Pacific	12.3	26.5	48.4
Latin America and the Caribbean	10.6	21.5	35.0
Sub-Saharan Africa	23.6	34.7	44.8
Middle East and North Africa	10.8	19.6	31.8
Developed Economies	1.4	2.8	31.3
<i>Total</i>	<i>12.2</i>	<i>23.0</i>	<i>42.4</i>

Source: "Every Child Counts: New Global Estimates on Child Labor", April 2002, ILO.

Table 2**a. Estimated number of children in unconditional worst forms of child labor, 2000
(‘000s)**

	Traffic*	Forced Labour	Armed Conflict	Sexual Exploitation	Illicit Activities
Asian-Pacific	250	5.500	120	590	220
Latin America and the Caribbean	550	3	30	750	260
Africa	200	210	120	50	na
Transition Economies	200	na	5	na	na
Developed Countries	na	na	1	420	110
Total	1.200	5.700	300	1.800	600

* Region represents the origin place

Source: "Every Child Counts: New Global Estimates on Child Labor", April 2002, ILO.

**b. Employment rates of children by country
(% of children in each age range)**

Country	Only work (%)	Work and attend school (%)	Age range	Year
Panama	1,9	1,1	10-14	1998
Venezuela	1,6	2,8	10-14	2000
Costa Rica	5,4	3,9	12-14	1998
Honduras	8,2	2,2	10-14	1998
El Salvador	4,1	8,7	10-14	2001
Colombia	1,3	12,2	10-14	2001
Brazil	1,7	12,8	10-14	1998
Mexico	6,7	8,6	12-14	1996
Argentina	1,8	19,0	10-14	1997
Peru	1,8	19,6	10-14	1994
Bolivia	3,7	22,2	7-14	1999
Guatemala	11,7	16,6	10-14	2000
Ecuador	9,4	29,7	10-14	1998

Source: Country household surveys and own calculations.

Table 3**a. Employment Rate by Age and Area (%)**

(% of total age x area cell)

Age	Total	Urban	Rural
Total 5-17	14,5	11,0	22,5
5-9	5,1	3,4	8,6
10-11	12,1	9,0	19,0
12-14	19,0	14,8	29,1
15-17	29,9	22,6	49,1

Source: CLS 2001

b. Employment Rate by Age and Gender (%)

(% of total age x gender cell)

Age	Total	Boys	Girls
Total 5-17	14,5	19,7	8,9
5-9	5,1	6,8	3,3
10-11	12,1	16,5	7,4
12-14	19,0	25,9	12,1
15-17	29,9	40,2	18,2

Source: CLS 2001

Table 4**a. Child Labor and domestic labor at child's own household by age (%)**

(% of total working children)

	All	Hours per week devoted to household work			
		< 5	5-15	15-34	>35
Total 5-17	74,8	1,6	18,0	30,2	25,0
5-9	79,3	3,4	27,0	36,0	12,9
10-11	82,8	3,0	33,1	34,2	12,5
12-14	77,9	2,1	19,9	29,0	26,9
15-17	68,7	0,3	9,1	27,7	31,5

Source: CLS 2001

b. Child Labor and domestic labor at child's own household, only boys (%)

(% of total working children)

	All	Hours per week devoted to household work			
		< 5	5-15	15-34	>35
Total 5-17	70,1	1,3	16,4	28,5	23,8
5-9	73,8	1,2	28,8	34,3	9,5
10-11	77,3	1,2	30,2	36,0	10,0
12-14	74,2	2,1	18,4	26,2	27,4
15-17	63,7	0,4	9,3	24,4	29,6

Source: CLS 2001

b. Child Labor and domestic labor at child's own household, only girls (%)

(% of total working children)

	All	Hours per week devoted to household work			
		< 5	5-15	15-34	>35
Total 5-17	85,6	2,4	21,7	34,0	27,6
5-9	88,4	4,6	38,4	29,5	16,0
10-11	95,8	7,2	40,1	30,1	18,4
12-14	85,9	2,1	23,0	35,2	25,7
15-17	81,1	0,2	8,6	36,0	36,3

Source: CLS 2001

Table 5**a. Employment Rate by Age and Sector**

(% of employed by age)

Age	Agriculture	Manufacturing	Retail	Services	Other	Total
Total	36,4	12,5	32,7	11,7	6,7	100
5-9	40,4	18,5	30,7	7,9	2,5	100
10-11	30,6	10,5	42,1	7,5	9,2	100
12-14	35,5	10,7	34,8	14,7	4,3	100
15-17	37,6	12,3	29,0	12,1	9,1	100

Source: CLS 2001

b. Employment Rate by Gender and Sector

(% of employed by gender)

Gender	Agriculture	Manufacturing	Retail	Services	Other	Total
Total	36,4	12,5	32,7	11,7	6,7	100
Boys	45,1	11,3	29,6	6,1	7,9	100
Girls	16,4	15,2	39,8	24,6	4,1	100

Source: CLS 2001

Table 6**a. Employment Rate by Age and Geographic Region**

(% of employed by age)

Age	Atlantic	Oriental	Central	Pacific	Bogota	Total
Total	22,4	22,7	25,9	23,4	5,6	100
5-9	20,5	22,6	30,1	20,4	6,5	100
10-11	20,2	22,7	25,1	26,9	5,1	100
12-14	24,2	22,1	24,7	24,2	4,9	100
15-17	22,5	23,2	25,7	22,7	6,0	100

Source: CLS 2001

b. Employment Rate by Gender and Geographic Region

(% of employed by gender)

Gender	Atlantic	Oriental	Central	Pacific	Bogota	Total
Total	22,4	22,7	25,9	23,4	5,6	100
Boys	21,3	22,3	28,2	22,5	5,7	100
Girls	24,8	23,6	20,6	25,5	5,4	100

Source: CLS 2001

Table 7**a. Employment Rate by Gender and Occupation**

(% of employed by gender)

Gender	Paid worker	Household worker	Unpaid family worker	Unpaid worker	Self-employed	Total
Total	34,8	4,1	39,3	11,8	10,0	100
Boys	40,8	0,5	37,3	11,7	9,8	100
Girls	21,1	12,4	43,8	12,1	10,7	100

Source: CLS 2001

b. Employment Rate by Sector and Occupation

(% of employed by occupation)

Sector	Paid worker	Household worker	Unpaid family worker	Unpaid worker	Self-employed	Total
Agriculture	35,9	-	43,4	47,7	12,7	36,4
Industry	15,3	0,1	11,7	10,2	13,5	12,5
Commerce	34,2	0,4	33,7	29,1	40,6	32,7
Services	7,1	98,2	4,6	8,0	24,4	11,7
Other	7,6	1,4	6,5	5,0	8,8	6,7
Total	100	100	100	100	100	100

Source: CLS 2001

Table 8**a. Employment Rate by Age and Number of Hours Worked**

(% of employed by age)

Hours	Total	5-9	10-11	12-14	15-17
< 5 hrs	12,4	20,7	18,7	13,1	7,1
5-9	19,9	34,4	28,5	18,7	13,3
10-14	13,6	18,5	20,5	15,1	8,9
15-24	15,2	10,0	16,9	15,7	16,1
25-34	7,6	7,8	5,4	8,3	7,7
35-48	15,6	6,6	6,7	11,3	24,4
49-55	4,0	0,1	1,6	4,7	5,5
>56	11,7	1,8	1,8	13,1	17,0
Total	100,0	100,0	100,0	100,0	100,0

Source: CLS 2001

b. Employment Rate by Gender and Number of Hours Worked

(% of employed by gender)

Hours	Total	Boys	Girls
< 5 hrs	12,4	12,2	12,9
5-9	19,9	16,5	27,7
10-14	13,6	13,9	13,0
15-24	15,2	16,6	12,0
25-34	7,6	8,1	6,3
35-48	15,6	17,1	12,3
49-55	4,0	4,4	3,0
>56	11,7	11,2	12,7
Total	100,0	100,0	100,0

Source: CLS 2001

Table 9**a. Employment by Average Earnings and Occupation**

(% of workers by occupational category)

Wage (pesos)	Total	Paid workers	Self-employed	Unpaid workers
Unpaid	51,5	0,0	4,1	100,0
Up to 1/4 MW	26,1	50,9	63,3	
>1/4 MW and <1/2 MW	8,3	17,8	13,4	
>1/2 MW y <1 MW	7,8	18,6	5,8	
>1 MW	1,3	2,9	1,6	
N.A.	5,0	9,8	11,8	
Total	100	100	100	100

Source: CLS 2001

b. Employment by type of Employer and Geographic Area

(% of employed by area)

Employed	Total	Urban	Rural
Parents	49,9	41,8	59,0
Other relatives	16,3	17,1	15,5
Non-relatives	23,7	27,3	19,7
Self-employed	10,0	13,8	5,8
Total	100	100	100

Source: CLS 2001

Table 10**a. School Attainment and Labor Participation by Age in 2001**

(% of total in age group)

Age	Attends and does not work (1)	Works and does not attend (2)	Works and attends (3)	Does not attend nor work (4)	Total
Total	76,9	5,2	9,3	8,7	100,0
5-9	85,2	0,8	4,3	9,8	100,0
10-11	84,0	1,1	11,0	3,8	100,0
12-14	75,8	6,1	13,0	5,1	100,0
15-17	56,2	16,1	13,8	13,9	100,0

Source: CLS 2001

(1): Only attends school + attends school and household work + attends school and looks for work + attends school, household work and looks for work

(2): Only works + works and household work

(3): Attends school and works + Attends school, works and household work

(4): Only household work + Only looks for work + Looks for work and household work + Others

b. School Attainment and Labor Participation by Gender in 2001

(% of total in gender group)

Gender	Attends and does not work (1)	Works and does not attend (2)	Works and attends (3)	Does not attend nor work (4)	Total
Total	76,9	5,2	9,3	8,7	100,0
Niños	72,2	7,7	12,1	8,0	100,0
Niñas	81,8	2,6	6,3	9,3	100,0

Source: CLS 2001

(1): Only attends school + attends school and household work + attends school and looks for work + attends school, household work and looks for work

(2): Only works + works and household work

(3): Attends school and works + Attends school, works and household work

(4): Only household work + Only looks for work + Looks for work and household work + Others

Table 11**a. Employment Rate by Household Size (%)**

(% of total employed)

Number of Childrer	Total
<3	2,7
3 to 4	36,1
5 to 6	39,0
7 to 8	14,2
>9	7,2
N.A.	0,9
Total	100,0

Source: CLS 2001

b. Employment Rate by Gender of the Head of the Household (%)

(% of total employed by column)

Gender of head of household	Total	Urban	Rural
Female	24,5	26,5	13,9
Male	75,5	73,5	86,1
Total	100,0	100,0	100,0

Source: CLS 2001

c. Employment Rate by Household Income (%)

(% of total employed by column)

Household Income	Total	Urban	Rural
No Income	9,6	9,4	10,0
N.A.	0,7	0,8	0,4
<\$71,500	2,9	2,2	4,1
>\$71,501 y	3,1	3,6	2,1
>\$143,001 y	13,5	13,7	13,1
>\$286,000	70,3	70,4	70,3
Total	100	100	100

Source: CLS 2001

Table 12**a. Reported Reasons for Market Work (%)**

(% of total employed by area)

	Total	Urban	Rural
Pay for school	5,2	7,1	2,6
Contribute to household income	18,0	14,3	23,2
Help with the family business	23,4	21,1	26,7
Build character	7,9	6,3	10,2
Keep the child from vices	2,5	2,5	2,4
Save her own money	34,1	39,9	26,0
Other	8,9	8,9	8,9
Total	100	100	100

Source: CLS 2001

b. Reported Reasons for Market Work and Household Work (%)

(% of total employed by area)

	Total	Urban	Rural
Pay for school	3,5	4,6	2,2
Contribute to household income	15,5	14,4	16,6
Help with the family business	30,8	25,6	36,1
Build character	12,6	12,2	13,0
Keep the child from vices	1,6	1,4	1,7
Save her own money	25,3	31,0	19,4
Other	10,8	10,8	10,9
Total	100	100	100

Source: CLS 2001

Table 13

Means of Characteristics in each sample

Variable	Definition	LSS (2003)	CHS (2003)	CLS (2001)
Age	Child's age	10,884 (3,708)	11,0325 3,6788	10,9667 3,7334
Age squared	Child's age squared	132,2 (82,33)	135,3 (82,05)	134,2 (83,00)
Gender	1 if child is male, 0 otherwise	0,5022 (0,500)	0,5091 0,4999	0,5042 0,5000
Race	1 if is afrocolombian, 0 otherwise	0,1160 (0,320)	-	-
Headage	Age of the head of the household	43,85 (12,08)	45,05 (12,52)	44,91 (12,44)
Headgender	1 if head of household is male, 0 otherwise	0,7135 (0,452)	0,7109 (0,453)	0,7483 (0,434)
Headeduc	Educational attainment of the head of the household	6,7049 (4,605)	9,0893 (5,950)	8,9419 (5,922)
Parenteduc	Average educational attainment of parents (N=8058)	6,7892 (4,062)	-	-
Occupr_hh	Employment rate of adults in the household	0,6859 (0,310)	0,6659 (0,301)	0,6683 (0,381)
Selfempl_hh	Fraction of self-employed adults in the household	0,3431 (0,417)	0,3775 (0,416)	0,3836 (0,415)
Quint1	1 if the household belongs to lowest income quintile, 0 otherwise	0,2735 (0,446)	0,2044 (0,403)	0,2140 (0,410)
Urban	1 if urban, 0 otherwise	0,7287 (0,445)	0,9098 (0,287)	0,9177 (0,275)
Parentnumbr	Number of parents living in the household	1,5005 (0,656)	1,7273 (0,476)	1,7418 (0,438)
Extended	1 if living with extended family, 0 otherwise	0,3667 (0,482)	0,4121 (0,492)	0,5511 (0,497)
Childnumbr	Number of siblings	2,8025 (1,554)	2,7572 (1,540)	2,8804 (1,540)
Malenumbr	Number of boys/number of girls in the household	0,5059 (0,348)	0,5116 (0,349)	0,5068 (0,340)
Region1	Atlantic	0,0869 (0,282)	0,2339 (0,423)	0,1732 (0,378)
Region2	East	0,0755 (0,264)	0,2309 (0,421)	0,1313 (0,338)
Region3	Bogota	0,4547 (0,498)	0,0581 (0,234)	0,1581 (0,365)
Region4	Central	0,1574 (0,364)	0,3268 (0,469)	0,0953 (0,294)
Region5	Pacific	0,1838 (0,387)	0,1503 (0,357)	0,0292 (0,168)
Region6	Other	0,0416 (0,200)		
N=		22269	34047	22908

¹For Example: Urban Atlantic, Rural Atlantic, Urban Pacific, Rural Pacific, etc.

LSS: Living Standards Survey

CHS: Child labor follow-up chapter in the Continued Household Survey

CLS: Child Labor Survey

Table 14

**Estimated Bivariate Probit Model of "work1" and School Attendance using 2003 CHS data
5 to 17 years old Children**

(Marginal Effects - Calculated on mean values)

	Pr(w=0,s=0)	Pr(w=1,s=0)	Pr(w=0,s=1)	Pr(w=1,s=1)
Age	-0,09843 (0,0024) **	-0,00898 (0,0008) **	0,08057 (0,0031) **	0,02684 (0,0019) **
Age Squared	0,00475 (0,0001) **	0,00062 (0,0000) **	-0,00473 (0,0001) **	-0,00064 (0,0001) **
Gender	0,00536 (0,0034)	0,00929 (0,0009) **	-0,04425 (0,0045) **	0,02961 (0,0025) **
Headeduc	-0,00583 (0,0003) **	-0,00149 (0,0001) **	0,00911 (0,0003) **	-0,00179 (0,0002) **
Headgender	-0,00153 (0,0043)	-0,00015 (0,0010)	0,00132 (0,0057)	0,00036 (0,0029)
Headage	-0,00137 (0,0001) **	-0,00024 (0,0000) **	0,00165 (0,0002) **	-0,00004 (0,0001)
Occupr_hh	-0,01569 (0,0047) **	0,01563 (0,0012) **	-0,06446 (0,0065) **	0,06452 (0,0037) **
Occupr_hh * Selfempl_hh	0,00378 (0,0045)	0,00590 (0,0010) **	-0,02829 (0,0058) **	0,01860 (0,0029) **
Quint1	0,01883 (0,0035) **	0,00288 (0,0008) **	-0,02080 (0,0044) **	-0,00090 (0,0022)
Urban	-0,03756 (0,0053) **	-0,02417 (0,0023) **	0,10445 (0,0078) **	-0,04273 (0,0047) **
Parentnumbr	-0,00398 (0,0040)	-0,00083 (0,0009)	0,00537 (0,0054)	-0,00056 (0,0027)
Extended	0,01378 (0,0029) **	0,00198 (0,0007) **	-0,01460 (0,0039) **	-0,00116 (0,0020)
Childnumbr	0,01144 (0,0008) **	0,00251 (0,0002) **	-0,01599 (0,0011) **	0,00205 (0,0006) **
Malenumbr	0,00157 (0,0050)	-0,00041 (0,0012)	0,00123 (0,0066)	-0,00239 (0,0034)
Max Likelihood Function	-17814,8			
Number of obs.	33831			
rho	-0,3892 **			

Work1= 1 if the child 5 to 11 years of age works in the market or reports doing household work and if the child 12 to 17 years of age worked according to the standard definition, 0 otherwise

Pr(w=0,s=0): Probability that a child neither works nor attends school, similarly for the other probability expressions.

Includes regional dummies. ** indicates significance at the 5%, and * at 10%.

Table 15**a. Proportion of Children by combination of activities and type of employment**

(% by row)

	Only work	Work and attend school
<u>LSS 2003</u>		
Employment with non-relatives	54,0	46,0
Employment with relatives	28,0	72,0
<u>CHS 2003</u>		
Employment with non-relatives	54,0	46,0
Employment with relatives	25,5	74,5
<u>CLS 2001</u>		
Employment with non-relatives	39,0	61,0
Employment with relatives	22,0	78,0

b. Proportion of children by combination of activities and type of employment and area

(% by row)

	Only work	Work and attend school
<u>Urban</u>		
Employment with non-relatives	51,9	48,1
Employment with relatives	21,1	78,9
<u>Rural</u>		
Employment with non-relatives	69,0	31,0
Employment with relatives	39,5	60,5

Source: CHS 2003

Table 16**Contribution of Working Children
to Total Household Income (%)**

	Total	Quint 1
Total		
5-9 years of age	4,2	5,0
10-14 years	9,7	24,9
15-17 years	20,4	52,1
Urban		
5-9 years of age	2,6	4,7
10-14 years	9,9	25,2
15-17 years	21,0	52,2
Rural		
5-9 years of age	8,4	7,1
10-14 years	7,6	23,0
15-17 years	18,8	54,2

Source: CHS 2003

Table 17a

**Estimated Bivariate Probit Model of "work1" and school attendance using 2003 CHS data
Children 5 to 17 years of age, urban areas only**

(Marginal Effects - Calculated on mean values)

	Pr(w=0,s=0)	Pr(w=1,s=0)	Pr(w=0,s=1)	Pr(w=1,s=1)
Age	-0,08933 (0,0024) **	-0,00771 (0,0007) **	0,07373 (0,0031) **	0,02330 (0,0019) **
Age Squared	0,00433 (0,0001) **	0,00053 (0,0000) **	-0,00434 (0,0001) **	-0,00052 (0,0001) **
Gender	0,00632 (0,0034) *	0,00635 (0,0008) **	-0,03394 (0,0045) **	0,02127 (0,0025) **
Headeduc	-0,00527 (0,0002) **	-0,00124 (0,0001) **	0,00824 (0,0003) **	-0,00174 (0,0002) **
headgender	0,00236 (0,0046)	-0,00012 (0,0010)	-0,00032 (0,0062)	-0,00193 (0,0032)
Headage	-0,00144 (0,0001) **	-0,00024 (0,0000) **	0,00176 (0,0002) **	-0,00008 (0,0001)
Occupr_hh	-0,01790 (0,0047) **	0,01152 (0,0011) **	-0,04994 (0,0064) **	0,05631 (0,0038) **
Occupr_hh*Selfempl_hh	0,00273 (0,0045)	0,00598 (0,0009) **	-0,03068 (0,0057) **	0,02198 (0,0029) **
Quint1	0,02045 (0,0035) **	0,00333 (0,0008) **	-0,02449 (0,0044) **	0,00071 (0,0022)
Parentnumbr	-0,00921 (0,0048) *	-0,00086 (0,0010)	0,00793 (0,0063)	0,00215 (0,0032)
Extended	0,01463 (0,0029) **	0,00191 (0,0006) **	-0,01536 (0,0039) **	-0,00119 (0,0020)
Childnumbr	0,01169 (0,0008) **	0,00245 (0,0002) **	-0,01679 (0,0011) **	0,00265 (0,0006) **
Malenumbr	0,00309 (0,0049)	0,00065 (0,0011)	-0,00445 (0,0065)	0,00071 (0,0034)
Max Likelihood Function	-15237,4			
Number of obs.	30771			
rho	-0,38241 **			

Work1= 1 if the child 5 to 11 years of age works in the market or reports doing household work and if the child 12 to 17 years of age worked according to the standard definition, 0 otherwise

Pr(w=0,s=0): Probability that a child neither works nor attends school, similarly for the other probability expressions.

Includes regional dummies. ** indicates significance at the 5%, and * at 10%.

Table 17b

**Estimated Bivariate Probit Model of "work1" and school attendance using 2003 CHS data
Children 5 to 17 years of age, rural areas only**

(Marginal Effects - Calculated on mean values)

	Pr(w=0,s=0)	Pr(w=1,s=0)	Pr(w=0,s=1)	Pr(w=1,s=1)
Age	-0,20092 (0,0125) **	-0,03217 (0,0067) **	0,16030 (0,0151) **	0,07280 (0,0084) **
Age Squared	0,00925 (0,0006) **	0,00224 (0,0003) **	-0,00912 (0,0007) **	-0,00236 (0,0004) **
Gender	-0,02971 (0,0151) **	0,07200 (0,0083) **	-0,15477 (0,0204) **	0,11249 (0,0109) **
Headeduc	-0,01232 (0,0017) **	-0,00553 (0,0008) **	0,01801 (0,0023) **	-0,00015 (0,0011)
headgender	0,01183 (0,0198)	0,01572 (0,0084) *	-0,04250 (0,0260)	0,01495 (0,0118)
Headage	-0,00040 (0,0005)	0,00002 (0,0003)	0,00012 (0,0007)	0,00025 (0,0004)
Occupr_hh	0,00805 (0,0239)	0,09806 (0,0123) **	-0,22867 (0,0313) **	0,12256 (0,0184) **
Occupr_hh*Selfempl_hh	0,06779 (0,0256) **	-0,01528 (0,0131)	0,00593 (0,0358)	-0,05845 (0,0179) **
Quint1	-0,01300 (0,0161)	0,05068 (0,0207) **	-0,01894 (0,0070) **	-0,01873 (0,0105) **
Parentnumbr	0,00915 (0,0115)	-0,00162 (0,0059)	-0,00021 (0,0161)	-0,00732 (0,0078)
Extended	-0,00848 (0,0132)	-0,00394 (0,0065)	0,01272 (0,0179)	-0,00030 (0,0090)
Childnumbr	0,00936 (0,0030) **	0,00227 (0,0015)	-0,00923 (0,0041) **	-0,00240 (0,0020)
Malenumbr	-0,02462 (0,0251)	-0,02621 (0,0122) **	0,07079 (0,0338) **	-0,01996 (0,0164)
Max Likelihood Function	-2463,76			
Number of obs.	3060			
rho	-0,4359 **			

Work1= 1 if the child 5 to 11 years of age works in the market or reports doing household work and if the child 12 to 17 years of age worked according to the standard definition, 0 otherwise

Pr(w=0,s=0): Probability that a child neither works nor attends school, similarly for the other probability expressions.

Includes regional dummies. ** indicates significance at the 5%, and * at 10%.

Table 18a

Estimated Multinomial Logit Model of Sector Choice using 2003 CHS data

Urban Areas

(Marginal Effects - Calculated on mean values)

	Agriculture	Manufacturing	Services	Retail
Age	-0.00052 (0.0015)	0.02700 (0.0286)	0.00431 (0.0244)	-0.01106 (0.0330)
Age Squared	0.00002 (0.0001)	-0.00118 (0.0011)	0.00021 (0.0009)	0.00013 (0.0013)
Gender	0.00414 (0.0012) **	0.02548 (0.0229)	-0.18564 (0.0232) **	0.03539 (0.0290)
Headeduc	-0.00031 (0.0001) **	-0.00182 (0.0016)	0.00471 (0.0014) **	0.00137 (0.0019)
headgender	-0.00010 (0.0011)	0.00218 (0.0310)	-0.04917 (0.0262) *	0.05495 (0.0356)
Headage	0.00006 (0.0000) *	0.00023 (0.0008)	0.00200 (0.0006) **	-0.00159 (0.0009) *
Occupr_hh	0.00053 (0.0015)	0.21170 (0.0358) **	-0.12871 (0.0267) **	-0.04735 (0.0419)
Occupr_hh*Selfempl_hh	-0.00013 (0.0013)	-0.16018 (0.0289) **	-0.03892 (0.0250)	0.20611 (0.0340) **
Quint1	0.00167 (0.0011)	0.01037 (0.0226)	0.00320 (0.0178)	-0.02534 (0.0258)
Parentnumbr	0.00037 (0.0011)	0.04824 (0.0318)	-0.00364 (0.0247)	-0.03950 (0.0365)
Extended	-0.00027 (0.0009)	0.05162 (0.0191) **	-0.01979 (0.0157)	-0.04159 (0.0223) *
Childnumbr	0.00023 (0.0002)	0.00158 (0.0055)	0.01378 (0.0044) **	-0.01588 (0.0067) **
Malenumbr	0.00237 (0.0016)	-0.02548 (0.0347)	-0.02278 (0.0279)	0.05500 (0.0407)
Max Likelihood Function	-3089.34			
Number of obs.	2597			
Pseudo-R2	0.0905			

Excluded Category: "other" sectors

Includes regional dummies. ** indicates significance at 5% and * at 10%.

Table 18b

Estimated Multinomial Logit Model of Sector Choice using 2003 CHS data

Rural Areas

(Marginal Effects - Calculated on mean values)

	Agriculture	Manufacturing	Services	Retail
Age	0,02402 (0,0368)	-0,00504 (0,0152)	-0,00870 (0,0122)	-0,01031 (0,0309)
Age Squared	-0,00125 (0,0015)	0,00027 (0,0006)	0,00044 (0,0005)	0,00053 (0,0012)
Gender	0,12543 (0,0511) **	-0,00242 (0,0168)	-0,07797 (0,0314) **	-0,04506 (0,0408)
Headeduc	-0,01062 (0,0036) **	0,00145 (0,0010)	0,00324 (0,0012) **	0,00584 (0,0031) *
headgender	-0,05130 (0,0220) *	0,00828 (0,0120)	-0,00225 (0,0125)	0,04423 (0,0267) *
Headage	0,00140 (0,0012)	0,00021 (0,0005)	0,00019 (0,0003)	-0,00177 (0,0009) *
Occupr_hh	-0,03382 (0,0617)	0,04195 (0,0305)	-0,00808 (0,0143)	0,00022 (0,0504)
Occupr_hh*Selfempl_hh	0,12547 (0,0642) *	-0,00181 (0,0193)	0,00181 (0,0153)	-0,12352 (0,0813)
Quint1	0,05603 (0,0334) *	-0,01354 (0,0111)	-0,01497 (0,0089) *	-0,02954 (0,0295)
Parentnumbr	0,03394 (0,0286)	-0,00346 (0,0117)	-0,01095 (0,0061) *	-0,01918 (0,0280)
Extended	0,01139 (0,0264)	-0,00117 (0,0101)	-0,00443 (0,0063)	-0,00560 (0,0232)
Childnumbr	0,02852 (0,0078) **	-0,00553 (0,0025) **	-0,00044 (0,0020)	-0,02202 (0,0070) **
Malenumbr	0,05127 (0,0548)	-0,02259 (0,0215)	0,00167 (0,0138)	-0,03041 (0,0472)
Oriental	-0,86329 (0,0204) **	-0,01789 (0,0069) **	-0,03133 (0,0095) **	-0,08693 (0,0173) **
Central	-0,84228 (0,0382) **	-0,02454 (0,0112) **	-0,04088 (0,0141) **	-0,08298 (0,0200) **
Pacific	-0,86982 (0,0213) **	-0,01988 (0,0081) **	-0,02574 (0,0089) **	-0,08374 (0,0179) **
Max Likelihood Function	-370,85			
Number of obs.	615			
Pseudo-R2	0,1731			

Excluded Category: "other" sectors

Includes regional dummies. ** indicates significance at 5% and * at 10%.

Table 19**Combination of Activities by Characteristics of Child and Household**

(% of working children by category)

Category	Employment with family	Employment with non-relatives	Total
Urban	50	50	100
Rural	68	32	100
Boys	52	48	100
Girls	56	44	100
<=12 years of age	72	28	100
>12 years of age	47	53	100
Lowest Income Quintile	50	50	100
Income Quintile 2 and 3	54	46	100
Education head of household <secondary	52	48	100
Education head of household >=secondary	56	44	100
Male head of household	57	43	100
Female head of household	43	57	100
Two-parent household	58	42	100
One-parent household	43	57	100
Number of children <4	57	43	100
Number of children >=4	45	55	100
Living with extended family	45	55	100
Without extended family	59	42	100
Employed head of household	57	43	100
Unemployed head of household	28	72	100

Source: CHS 2003

Table 20**Probit Model - Employment with relatives vs. non-relatives (CHS 2003)**

(Mg effects - evaluated at means)

Dependent var. ->	Total	Urban	Rural
<hr/>			
Pr(child working with family)			
Age	0,00791 (0,0302)	0,02230 (0,0336)	-0,01312 (0,0755)
Age squared	-0,00230 (0,0012) **	-0,00272 (0,0013) **	-0,00170 (0,0029)
Gender	-0,05056 (0,0269) *	-0,04265 (0,0299)	-0,07754 (0,0545)
Schooling head of household	0,00689 (0,0019) **	0,00879 (0,0020) **	-0,00505 (0,0051)
Gender head of household	0,09250 (0,0316) **	0,03571 (0,0365)	0,15151 (0,0746) **
Age head of household	0,00261 (0,0009) **	0,00295 (0,0010) **	0,00248 (0,0018)
Employment rate adults household	0,47050 (0,0405)	0,48373 (0,0472) **	0,21653 (0,0857) **
Employment rate adults * self-employed	0,02821 (0,0324)	0,11346 (0,0350) **	-0,51689 (0,0829) **
Quint1	0,01089 (0,0246)	0,04307 (0,0268)	-0,15643 (0,0662) **
Urban	-0,20109 (0,0259) **		
Number parents	0,05175 (0,0301) *	0,14762 (0,0374) **	-0,08524 (0,0395) **
Extended	-0,02293 (0,0206)	0,00054 (0,0233)	-0,10383 (0,0444) **
Number children	-0,02961 (0,0060) **	-0,03917 (0,0073) **	-0,00282 (0,0104)
Number boys	0,04922 (0,0386)	0,05420 (0,0424)	0,00386 (0,0865)
Maximum Likelihood Function	-1894,85	-1526,62	-313,05
No. of observations	3206	2597	609
Pseudo-R2	0,1447	0,1519	0,1834

Excluded category: "Child working with non-relatives"

Sample: Working Children

Includes regional dummies. ** indicates 5% significance, and * at 10%

Table 21**Impact of FA program on child labor by area and age**

(Treatment Areas vs. Control Areas)

Area and age	Impact	Employment rate without subsidy (%)	Employment rate with subsidy (%)
<i>10-17 years</i>			
Total	-0,01494 (0,0041) **	17,6	16,1
Urban	-0,01298 (0,0043) **	14,3	13,0
Rural	-0,01630 (0,0065) **	20,2	18,6
<i>Urban</i>			
10-13 years	-0,00469 (0,0024) **	6,3	5,8
14-17 years	-0,01006 (0,0029) **	22,5	21,5
<i>Rural</i>			
10-13 years	-0,03216 (0,0132) **	10,7	7,5
14-17 years	-0,01547 (0,0251)	34,5	32,9

Impact is estimated parametrically using equation (9).

Both, TSP and TCP are included in treatment areas.

Standard errors are clustered at the municipality level.

** indicates statistical significance at 5%, and * at 10%.

Table 22**Impact of FA program on child labor by gender**

(Treatment areas vs. control areas)

Area and age	Girls			Boys		
	Impact	Employment rate without subsidy (%)	Employment rate with subsidy (%)	Impact	Employment rate without subsidy (%)	Employment rate with subsidy (%)
<i>Total</i>						
10-13 years	-0,00289 (0,0012)	3,3	3,0	-0,01684 (0,0051) *	12,0	10,3
14-17 years	-0,00709 (0,0090)	14,2	13,5	-0,04836 (0,0271) *	44,9	40,1
<i>Urban</i>						
10-13 years	-0,00193 (0,0020)	2,6	2,4	-0,00833 (0,0050) *	9,8	9,0
14-17 years	-0,00678 (0,0092)	11,9	11,2	-0,07909 (0,0290) **	38,4	30,5
<i>Rural</i>						
10-13 years	-0,00265 (0,0014) **	3,7	3,5	-0,02326 (0,0083) **	13,6	11,3
14-17 years	-0,01161 (0,0144)	16,5	15,3	-0,01125 (0,0379)	48,7	47,6

Impact is estimated parametrically using equation (9). Both, TSP and TCP are included in treatment areas.

Standard errors are clustered at the municipality level.

** indicates statistical significance at 5%, and * at 10%.

Figure 1

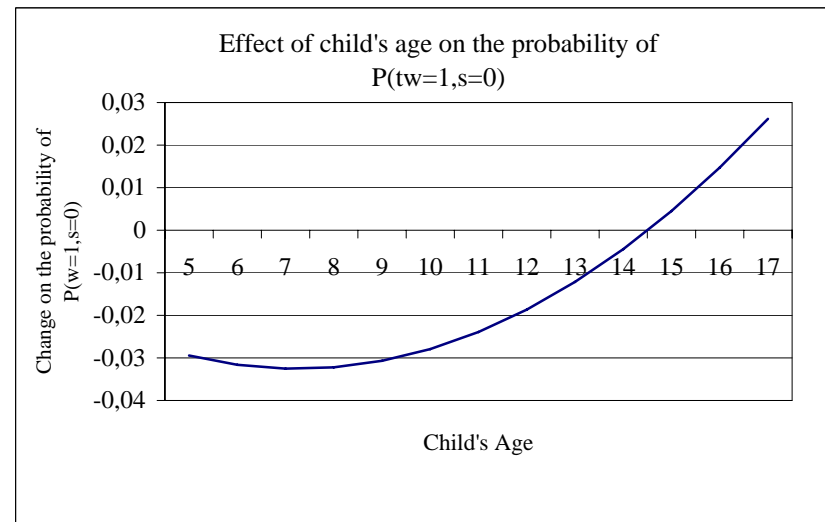
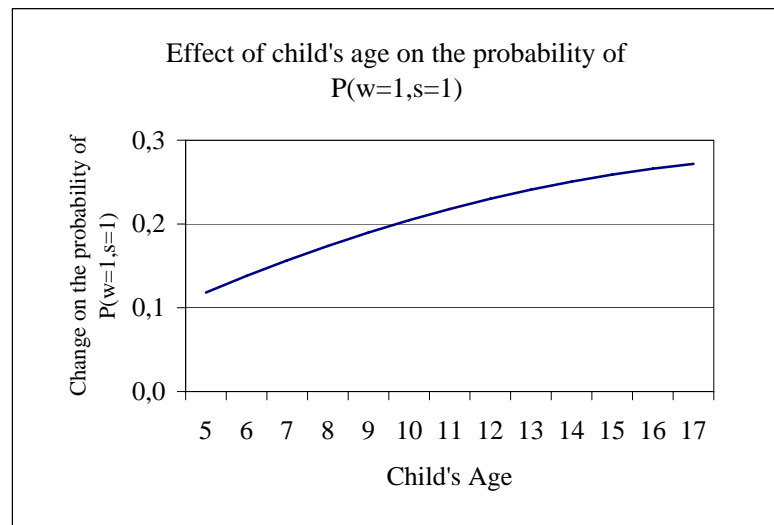
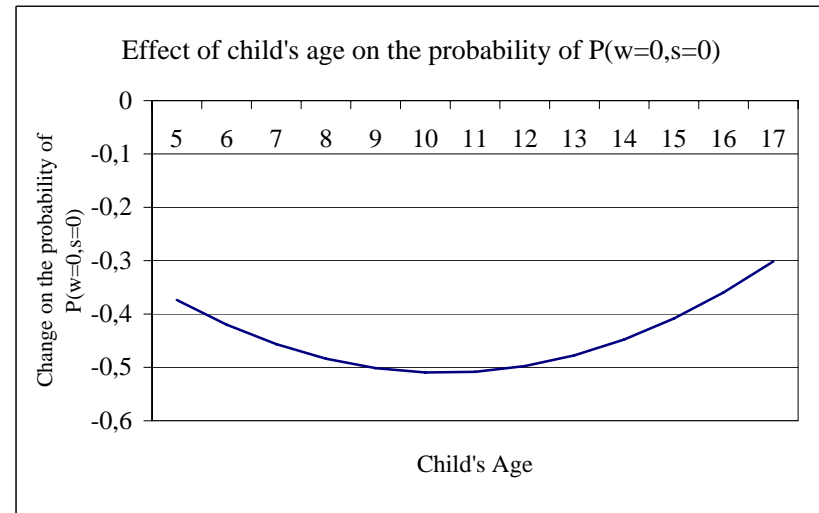
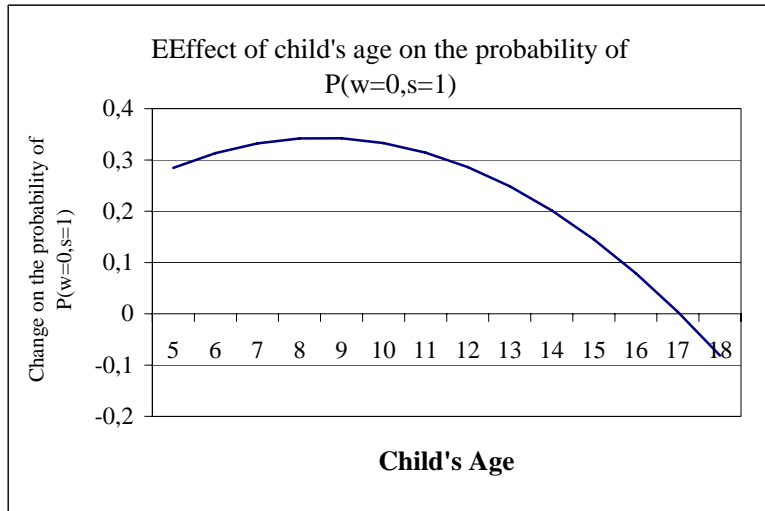
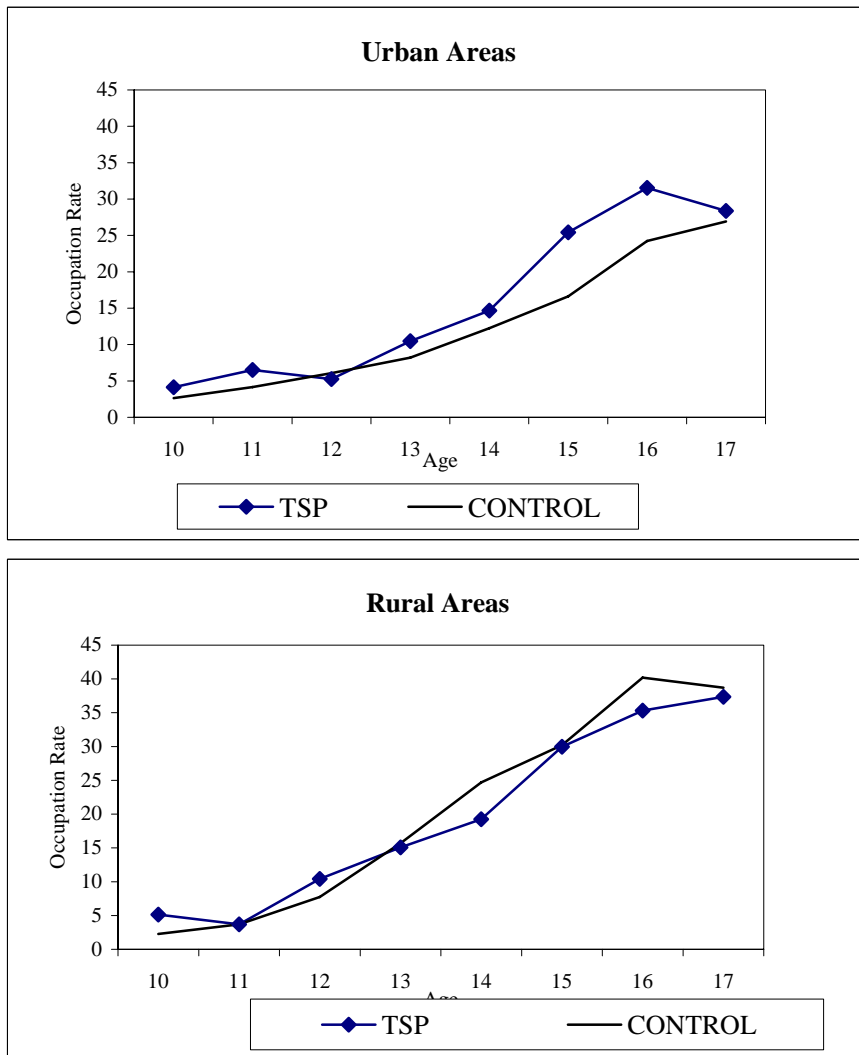


Figure 2

Employment rates of Children by Area - Baseline (2002)
(Comparison between TSP areas and control areas)



Appendix 1

Survey	Abbrev.	Year	Area	Available Information
Child Labor Survey	CLS	2001	National	Child labor, economic activity, wages, workplace, hours worked, education, health, household characteristics, etc.
Follow-up chapter, 2003 CHS (4th quarter)	CHS	2003	National	Child labor, economic activity, wages, workplace, hours worked, education, health, household characteristics, etc.
Familias en Acción	FA	2002-2003	Rural	Child labor, education, health, consumption, income, household characteristics, nutrition, anthropometric measures, etc.

Appendix 2

Estimated Bivariate Probit Model of "trabajol" and School Attendance using 2003 LSS data children 5 to 17 years of age

(Marginal Effects - Calculated on mean values)

	Pr(w=0,s=0)	Pr(w=1,s=0)	Pr(w=0,s=1)	Pr(w=1,s=1)
Age	-0,08673 (0,0054) **	-0,01257 (0,0018) **	0,07569 (0,0073) **	0,02362 (0,0045) **
Age Squared	0,00433 (0,0002) **	0,00085 (0,0001) **	-0,00470 (0,0003) **	-0,00048 (0,0002) **
Gender	-0,00782 (0,0076)	0,01132 (0,0024) **	-0,04518 (0,0109) **	0,04168 (0,0065) **
Race	0,00002 (0,0097)	0,00191 (0,0030)	-0,00790 (0,0137)	0,00597 (0,0077)
Parentduc	-0,00688 (0,0008) **	-0,00291 (0,0003) **	0,01394 (0,0011) **	-0,00414 (0,0007) **
Headgender	0,03284 (0,0065) **	0,00565 (0,0019) **	-0,03291 (0,0087) **	-0,00558 (0,0047)
Headage	-0,00134 (0,0002) **	-0,00034 (0,0001) **	0,00177 (0,0003) **	-0,00009 (0,0002)
Occupr_hh	-0,00112 (0,0089)	0,01983 (0,0029) **	-0,08179 (0,0129) **	0,06309 (0,0078) **
Informr_hh	-0,01251 (0,0083)	0,00161 (0,0024)	-0,00325 (0,0116)	0,01415 (0,0064) **
Quint1	0,03602 (0,0071) **	0,00576 (0,0021) **	-0,03463 (0,0094) **	-0,00715 (0,0050)
Urban	-0,06305 (0,0098) **	-0,01973 (0,0034) **	0,09294 (0,0127) **	-0,01016 (0,0063)
Parentsnumbr	-0,04244 (0,0090) **	-0,01210 (0,0029) **	0,05963 (0,0117) **	-0,00509 (0,0059)
Extended	-0,01991 (0,0072) **	0,00142 (0,0020)	0,00009 (0,0097)	0,01840 (0,0053) **
Childnumbr	0,00836 (0,0018) **	0,00161 (0,0006) **	-0,00896 (0,0026) **	-0,00101 (0,0015)
Malenumbr	-0,00094 (0,0110)	-0,00139 (0,0033)	0,00601 (0,0154)	-0,00368 (0,0088)
Oriental	0,02326 (0,0164)	0,01437 (0,0062) **	-0,05955 (0,0233) **	0,02192 (0,0140)
Bogota	0,04607 (0,0124) **	0,00821 (0,0036) **	-0,04717 (0,0168) **	-0,00711 (0,0088)
Central	0,05627 (0,0151) **	0,02588 (0,0061) **	-0,10695 (0,0210) **	0,02479 (0,0111) **
Pacific	0,04401 (0,0141) **	0,03089 (0,0062) **	-0,12046 (0,0206) **	0,04557 (0,0120) **
Rest exc Atlantic	0,03070 (0,0195)	0,02345 (0,0092) **	-0,09046 (0,0305) **	0,03632 (0,0174) **
Max Likelihood Function	-4837,64			
Number of obs.	8058			
rho	-0,378 **			

Work1= 1 if the child 5 to 11 years of age works in the market or reports doing household work and if the child 12 to 17 years of age worked according to the standard definition, 0 otherwise

Pr(w=0,s=0): Probability that a child neither works nor attends school, similarly for the other probability expressions.

Includes regional dummies. ** indicates significance at the 5%, and * at 10%.

Appendix 3

Estimated Bivariate Probit Model of "Work1" and School Attendance using 2003 CHS data children 5 to 17 years of age

(Marginal Effects - Calculated on mean values)

	Pr(t=0,e=0)	Pr(t=1,e=0)	Pr(t=0,e=1)	Pr(t=1,e=1)
Age	-0,09843 (0,0024) **	-0,00899 (0,0008) **	0,08069 (0,0031) **	0,02673 (0,0019) **
Age Squared	0,00475 (0,0001) **	0,00062 (0,0000) **	-0,00473 (0,0001) **	-0,00064 (0,0001) **
Gender	0,00535 (0,0034)	0,00924 (0,0009) **	-0,04386 (0,0045) **	0,02928 (0,0025) **
Headeduc	-0,00584 (0,0003) **	-0,00152 (0,0001) **	0,00923 (0,0003) **	-0,00187 (0,0002) **
Headgender	-0,00153 (0,0043)	-0,00013 (0,0010)	0,00120 (0,0057)	0,00046 (0,0029)
Headage	-0,00137 (0,0001) **	-0,00024 (0,0000) **	0,00163 (0,0002) **	-0,00002 (0,0001)
Occupr_hh	-0,01652 (0,0050) **	0,02129 (0,0014) **	-0,08934 (0,0069) **	0,08457 (0,0041) **
Occupr_hh*quint 1	0,00823 (0,0095)	-0,01100 (0,0024) **	0,04628 (0,0132) **	-0,04351 (0,0075) **
Quint 1	0,01112 (0,0073)	0,01459 (0,0029) **	-0,06673 (0,0124) **	0,04102 (0,0085) **
Urban	-0,03769 (0,0052) **	-0,02169 (0,0021) **	0,09599 (0,0075) **	-0,03661 (0,0043) **
Parentsnumbr	-0,00381 (0,0040)	-0,00100 (0,0011)	0,00609 (0,0054)	-0,00127 (0,0027)
Extended	0,01374 (0,0029) **	0,00184 (0,0007) **	-0,01398 (0,0039) **	-0,00161 (0,0020)
Childnumbr	0,01146 (0,0008) **	0,00256 (0,0002) **	-0,01622 (0,0011) **	0,00220 (0,0006) **
Malenumbr	0,00163 (0,0050)	-0,00048 (0,0012)	0,00151 (0,0066)	-0,00266 (0,0034)
Max Likelihood Function	-17816,6			
Number of obs.	33831			
rho	-0,3906 **			

Work1= 1 if the child 5 to 11 years of age works in the market or reports doing household work and if the child 12 to 17 years of age worked according to the standard definition, 0 otherwise

Pr(w=0,s=0): Probability that a child neither works nor attends school, similarly for the other probability expressions.

Includes regional dummies. ** indicates significance at the 5%, and * at 10%.

Appendix 4

Estimated Bivariate Probit Model of "Work1" and School Attendance using 2003 CHS data children 5 to 17 years of age

(Marginal Effects - Calculated on mean values)

	Pr(t=0,e=0)	Pr(t=1,e=0)	Pr(t=0,e=1)	Pr(t=1,e=1)
Age	-0,09909 (0,0024) **	-0,00835 (0,0007) **	0,08203 (0,0030) **	0,02541 (0,0018) **
Age Squared	0,00478 (0,0001) **	0,00059 (0,0000) **	-0,00476 (0,0001) **	-0,00061 (0,0001) **
Gender	0,00555 (0,0034) *	0,00909 (0,0009) **	-0,04249 (0,0044) **	0,02785 (0,0023) **
Headeduc	-0,00593 (0,0003) **	-0,00143 (0,0001) **	0,00898 (0,0003) **	-0,00163 (0,0002) **
Headgender	-0,00156 (0,0044)	-0,00014 (0,0010)	0,00135 (0,0057)	0,00035 (0,0027)
Headage	-0,00136 (0,0001) **	-0,00025 (0,0000) **	0,00174 (0,0002) **	-0,00013 (0,0001)
Occupr_hh	-0,01023 (0,0046) **	0,01373 (0,0012) **	-0,05564 (0,0062) *	0,05213 (0,0035) **
Head_buss	-0,00754 (0,0027) **	0,00883 (0,0007) **	-0,03583 (0,0036) **	0,03455 (0,0020) **
Quint1	0,02030 (0,0035) **	0,00285 (0,0008) **	-0,02200 (0,0043) **	-0,00115 (0,0020)
Urban	-0,03639 (0,0052) **	-0,02284 (0,0022) **	0,09930 (0,0076) **	-0,04007 (0,0044) **
Parentsnumbr	-0,00321 (0,0041)	-0,00174 (0,0009) *	0,00911 (0,0054) *	-0,00416 (0,0026)
Extended	0,01442 (0,0030) **	0,00097 (0,0007)	-0,01104 (0,0039) **	-0,00435 (0,0019) **
Childnumbr	0,01168 (0,0008) **	0,00232 (0,0002) **	-0,01553 (0,0010) **	0,00153 (0,0005) **
Malenumbr	0,00177 (0,0050)	-0,00059 (0,0011)	0,00178 (0,0065)	-0,00296 (0,0032)
Max Likelihood Function	-17648,8			
Number of obs.	33831			
rho	-0,3969 **			

Work1= 1 if the child 5 to 11 years of age works in the market or reports doing household work and if the child 12 to 17 years of age worked according to the standard definition, 0 otherwise

Pr(w=0,s=0): Probability that a child neither works nor attends school, similarly for the other probability expressions.

Includes regional dummies. ** indicates significance at the 5%, and * at 10%.

Appendix 5

Estimated Bivariate Probit Model of "Work1" and School Attendance using 2003 CHS data children 5 to 17 years of age

(Marginal Effects - Calculated on mean values)

	Pr(t=0,e=0)	Pr(t=1,e=0)	Pr(t=0,e=1)	Pr(t=1,e=1)
Age	-0,09817 (0,0024) **	-0,00908 (0,0008) **	0,08020 (0,0031) **	0,02705 (0,0019) **
Age Square	0,00473 (0,0001) **	0,00062 (0,0000) **	-0,00471 (0,0001) **	-0,00065 (0,0001) **
Gender	0,00536 (0,0033)	0,00929 (0,0009) **	-0,04417 (0,0045) **	0,02952 (0,0025) **
Headeduc	-0,00554 (0,0003) **	-0,00149 (0,0001) **	0,00895 (0,0003) **	-0,00192 (0,0002) **
Headgender	-0,00173 (0,0043)	-0,00020 (0,0010)	0,00161 (0,0057)	0,00032 (0,0029)
Headage	-0,00124 (0,0001) **	-0,00023 (0,0000) **	0,00155 (0,0002) **	-0,00008 (0,0001)
Occupr_hh	-0,00973 (0,0044) **	0,01835 (0,0012) **	-0,07923 (0,0062) **	0,07060 (0,0037) **
Occupr_hh*Selfempl_hh	-0,00393 (0,0032)	0,00191 (0,0008) **	-0,00710 (0,0042) *	0,00912 (0,0022) **
Quint1	0,02081 (0,0040) **	0,00317 (0,0010) **	-0,02282 (0,0051) **	-0,00116 (0,0025)
Quintil2	0,01365 (0,0042) **	0,00027 (0,0009)	-0,00755 (0,0052)	-0,00637 (0,0025) **
Quintil4	-0,00532 (0,0037)	-0,00094 (0,0009)	0,00636 (0,0050)	-0,00010 (0,0026)
Quintil5	-0,01347 (0,0038) **	-0,00164 (0,0009) **	0,01243 (0,0053) **	0,00268 (0,0029)
Urban	-0,04232 (0,0056) **	-0,02374 (0,0023) **	0,10386 (0,0081) **	-0,03780 (0,0046) **
Parentsnumbr	-0,00227 (0,0040)	-0,00076 (0,0010)	0,00432 (0,0054)	-0,00130 (0,0027)
Extended	0,01533 (0,0029) **	0,00206 (0,0007) **	-0,01553 (0,0039) **	-0,00186 (0,0020)
Childnumbr	0,01155 (0,0008) **	0,00256 (0,0002) **	-0,01618 (0,0011) **	0,00207 (0,0006) **
Malenumbr	0,00150 (0,0049)	-0,00043 (0,0012)	0,00133 (0,0066)	-0,00241 (0,0035)
Max Likelihood Function	-17810,1			
Number of obs.	33831			
rho	-0,3919 **			

Work1= 1 if the child 5 to 11 years of age works in the market or reports doing household work and if the child 12 to 17 years of age worked according to the standard definition, 0 otherwise

Pr(w=0,s=0): Probability that a child neither works nor attends school, similarly for the other probability expressions.

Includes regional dummies. ** indicates significance at the 5%, and * at 10%.

Appendix 6a

Impact of FA program on school enrolment

(Treatment Areas vs. Control Areas)

Area and Age	Impact	Enrolment rate without subsidy (%)	Enrolment rate with subsidy (%)
<i>Urban</i>			
8-13 years	0,01310 (0,0071) *	94,1	95,4
14-17 years	0,05330 (0,0131) **	72,0	77,3
<i>Rural</i>			
8-13 years	0,02950 (0,0117) **	89,2	92,2
14-17 years	0,05920 (0,0221) **	54,4	60,3

Source: Attanasio, Fitzsimons, and Gómez (2005).

TCP and TSP in treatment areas are included. The estimation method takes into account the anticipation effects.

** indicates statistical significance at 5% and * at 10%.

Appendix 6b

Impact of FA program on school enrolment by area, age, and gender

(Treatment Areas vs. Control Areas)

Area and Age	Girls			Boys		
	Impact	Enrolment rate without subsidy (%)	Enrolment rate with subsidy (%)	Impact	Enrolment rate without subsidy (%)	Enrolment rate with subsidy (%)
<i>Urban</i>						
8-13 years	0,00520 (0,0070)	96,1	96,2	0,02100 (0,0106) **	92,7	94,8
14-17 years	0,03420 (0,0148) **	77,4	80,8	0,06920 (0,0163) **	67,3	74,2
<i>Rural</i>						
8-13 years	0,02700 (0,0125) **	91,2	93,9	0,03140 (0,0140) **	87,4	90,5
14-17 years	0,04240 (0,0263)	62,6	66,8	0,07020 (0,0255) **	47,9	54,9

Source: Attanasio, Fitzsimons, and Gómez (2005).

TCP and TSP in treatment areas are included. The estimation method takes into account the anticipation effects.

** indicates statistical significance at 5% and * at 10%.