

CHILD LABOUR AND THE ECONOMIC RECESSION OF 1999 IN COLOMBIA

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ABSTRACT

This paper examines the relationship between economic growth, households' income, child labour and school attendance in Colombia. It also analyses the impact of the economic recession of 1999 on child labour and education. An important contribution of this paper is the use of micro and macro data in the estimation of the empirical models, since they allow analysing micro and macro determinants of child labour. The results show that both households' earnings and economic growth are relevant for the families' decision-making process regarding education or labour activities of their children. I find that, in Colombia, child labour is counter-cyclical and education is procyclical to economic growth. Therefore, higher levels of social income increase children's welfare providing them with more education and less economic responsibilities. This implies that the main reason why children work in Colombia is poverty. The late nineties' economic crisis impact on child labour and education was a sharp increase of children in the labour force and a slight decrease of school attendance.

JEL Classification: J13; J21; J23

Key words: Child labour, economic recession.

RESUMEN

El artículo examina la relación entre crecimiento económico, ingreso de las familias, empleo infantil y asistencia escolar en Colombia. También analiza el impacto de la recesión económica de 1999 en la educación y empleo infantil. Una importante contribución del artículo es el uso de datos microeconómicos y macroeconómicos en la estimación de modelos empíricos, ya que nos permiten analizar determinantes microeconómicos y macroeconómicos de los determinantes del empleo infantil. Los resultados muestran que el ingreso de las familias y el crecimiento económico son relevantes para el proceso de decisión de las familias sobre la educación y empleo de

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los niños. Encontramos que en Colombia el empleo infantil es contra-cíclico y la educación es pro-cíclica respecto al crecimiento económico. En consecuencia, mayores niveles de ingreso social aumenta el bienestar de los niños ofreciéndoles mayor educación y menores responsabilidades económicas. Esto implica que la principal razón por la cual los niños trabajan en Colombia es la pobreza. El impacto de la crisis de finales de los años 90 sobre el empleo infantil y la educación fue un incremento fuerte de niños en la fuerza laboral y una leve reducción en la asistencia escolar.

Clasificación JEL: J13, J21, J23

Palabras clave: empleo infantil, recesión económica.

1. INTRODUCTION

After more than 90 years of stable and positive growth, Colombia's economy sharply dropped in late nineties collapsing into the most severe economic crisis in 1999. The social effects of this crisis, perhaps, were more severe than the economic ones. Large segments of the population lost their jobs, their houses and their economic opportunities, reducing their standards of living. The total unemployment rate rapidly increased and poverty indicators showed how people were becoming poorer.

One of the most worrying effects of the crisis was the increasing proportion of young people entering the labour market and, perhaps, dropping out of school. This study aims to analyse the impact of this economic recession on the evolution of child labour in Colombia. This topic is of the particular interest since the future of a country lies on its children and youth.

Economic growth theory has demonstrated that one of the main ways to reach high levels of development is through the accumulation of human capital. This accumulation is the result of a long process which entails providing children with both a high quality education and a good environment for their growing-up process. Colombia is a developing country which requires improving the standards of living and opportunities for its people. Therefore, if we look after our children and provide them with the conditions for a successful development, we can reach those objectives.

For the previous reasons, child labour is highly related to economic growth and development. More educated and healthy children today will assure more productive, imaginative, creative and ingenious adults tomorrow, who will contribute to boost the economic growth and development. On the contrary, child labour can be a barrier for this objective. Although, it provides more experience for a specific task, it can reduce the opportunity for a child to exploit his skills and acquire new abilities. Even if children combine work and school, the time spent working could reduce their understanding and learning capacity in comparison with full-time students.

Moreover, Bhalotra and Tzannatos (2002) have found that child labour has micro and macroeconomic adverse effects. On the one hand, it can be the source of a household's poverty trap: *"less educated parents tend to send their children to work and these children grow up to be less educated, who then send their children to work. Since education is a strong predictor of income, this is a mechanism that generates... a persistence of poverty from one generation to another"* (p. 4). On the other hand, they affirm that economic growth theories have demonstrated that *"the social return to human capital investment exceeds the private return"* (p.5), thus, that family's persistence of poverty also has macroeconomic effects. Since they are not investing enough in their children the social return to education is not sufficient to accelerate economic growth and countries remain underdeveloped.

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These previous arguments are of particular interest in Colombia. A recent study of United Nations and two Colombian governmental institutions¹ reveals that Colombian households are diminishing their expenditures (investment) on their children's education as a consequence of unemployment and the economic crisis. In addition, they have found that this situation is not only occurring in the poorest households but also in the richest ones. Recently, the ICBF's executive manager declared that "*a [Colombian] child, who regularly works, has 70% more probability of never returning to school*" (El Tiempo, 9 of July of 2003). For these reasons, both to understand the reasons why children work and to analyse the consequences of 1999's recession on child labour in Colombia, it is fundamental to propose policies which can contribute to alleviate the latter.

This study is based on two different sources. The macro one, which consists of the quarterly Colombian real Gross Domestic Product (GDP) per capita from 1985 to 2000 and the micro one, which is obtained from the National Household Survey or NHS (Encuesta Nacional de Hogares or ENH) of Colombia, performed by DANE.² It consists of a cross sectional quarterly data during the same period as GDP per capita. Child labour studies have mostly used either micro or macro data to corroborate their hypothesis. Those which have only used macro data, in general, have analysed the income-child labour or trade-child labour relations in a cross country framework. However, Bhalotra and Tzannatos *op. Cit* indicate that aggregate evidence is imprecise in identifying whether the changes in child labour were the result of individual-household decisions, macroeconomic policies or structural social changes. Other studies only utilize micro data to investigate the factors which determine child labour and its relation with other variables, e.g. income shocks. Nevertheless, in this case macroeconomic variables, such as GDP, inflation and governmental policies can influence families' decisions through expectations, uncertainty or risk aversion. In fact, parent's perception about the general economic behaviour can motivate or prevent them to send their children to work. As Bhalotra and Tzannatos *op. Cit* observed "*Poor households are likely to be particularly risk-averse and they may employ [their] children ex ante to diversify their sources of income*". In order to control for all these previous effects, this study makes use of micro and macro data.

The macro data consists of the quarterly Colombian Gross Domestic Product (GDP) per capita, from 1985 to 2000. One of the main questions of this paper is to identify whether child labour is pro-cyclical or counter-cyclical to GDP. The micro data comes from the Colombian National Households Survey (NHS) which is conducted quarterly over the same period of time. It allows us to identify children, parent and household characteristics as well as their incomes and environmental features.

The rest of this paper will attempt to investigate the causes and consequences of child labour in Colombia and its behaviour before, during and after recession. The next section will describe the policy context of the 1999 economic recession and the

¹ See United Nations, Colombian Economic Planning Ministry (DNP) and Colombian Family Welfare Institute (ICBF) (2003).

² National Department of Statistics (Departamento Administrativo Nacional de Estadística)

main characteristics of urban child labour in Colombia. The third explains in detail the database used for estimations. The main objectives of this paper are summarised in the fourth section. The fifth will review the relevant studies related to the hypotheses of this paper. Methodology and results are contained in the sixth section. Finally, the conclusions are stated.

2. THE COLOMBIAN CONTEXT

a. General Features

Historically the Colombian economy showed a strong and steady trend of growth. Nevertheless, from 1998 the economy began a downward trend, which in 1999 gave rise to the worst recession³ in its economic history (graph 1), having had severe effects on the welfare of the entire population. This situation was the result of some factors such as a fiscal decentralisation, the economic liberalisation of 1990-1991 and an unfavourable external economic situation.

Decentralisation resulted in a disproportionate increase in government expenditures and the economic liberalisation generated imbalances between agents' debits and credits. According to Cardenas (2001), in early 1990 the Colombian Government formulated a package of political and economic structural reforms. These reforms were focused on establishing a new Constitution and opening the economy to new markets, following a process of economic liberalisation.

First, the constitutional change restructured the political order with the purpose of creating a high decentralization level. In other words, the Central government attempted to assign more responsibilities to local authorities. The objective was transferring more money to municipalities, which knew their own problems much better, in order to provide all the public services (especially education and health) that people required. This fiscal decentralization resulted in a disproportionate increase in government expenditures.

Additionally, Cardenas (2001, p.2) states: "...This trend was reinforced by a deliberately expansionary fiscal management throughout most of the decade. In fact, the central government's deficit rose to more than 8% of GDP in 1999 from nearly zero in 1991". As a result of this fiscal deficit, market interest rates dramatically rose since financing necessities of the government were increasing the interest rates of internal public bonds.

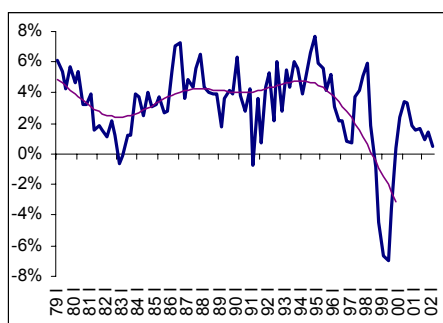
Second, another series of legal changes in the beginning of the decade drastically modified the economic regimes relating to trade, foreign exchange and foreign investment. The economic liberalisation of 1990-1991. generated excessive household and company expenditures, at a greater level than their incomes, which turned into micro-deficits that individuals could not sustain, mainly because of the high interest rates.

³ Colombian economic growth was negative during six consecutive quarters (from 1998 third quarter to 1999 fourth quarter). For this reason this paper considers that there was an economic recession in 1999.

Finally, the external economic situation was very unfavourable for Colombia. Ecuador and Venezuela, its main trade and business partners, were also facing a deep recession. In 1999, their economies fell 8.0% and 7.5% respectively.

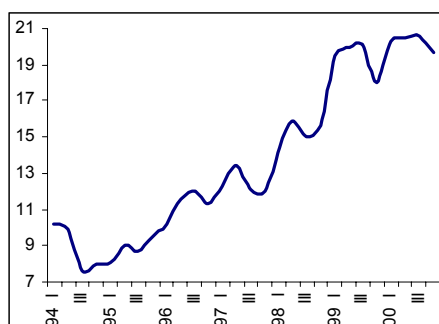
The 1999 crisis brought critical consequences not only on the economic context but also on the social one. One of the most severe effects on the population welfare was a dramatic increase of the unemployment rate, which reached the highest levels in its history in 2000 (graph 2).

Graph 1
Colombia's Economic Growth
1979 – 2002 (First Quarter)



Source: Dane - NPD – Colombia

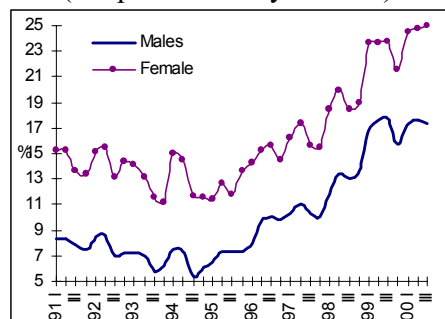
Graph 2
Urban unemployment rate



Source: Dane – NPD. Colombia

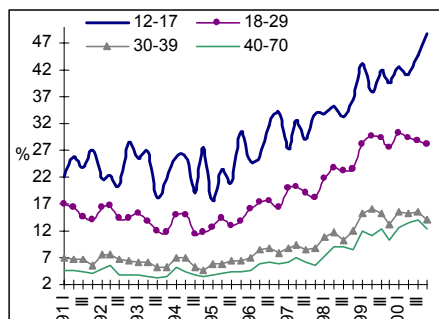
The increase in the unemployment rate dramatically affected the whole population (Graph 3 and 4). Nevertheless, young people have always suffered more from this situation than the rest of the people. As seen in Graph 4, from 1991 the unemployment rate among the youngest cohort has been not only the highest but also the one with the highest growth, especially between 1999 and 2000. During this period, unemployment rates for people older than 18 years were decreasing, while unemployment for people between 12 and 17 years old was still growing.

Graph 3
Unemployment Rate by gender
(People over 12 years old)



Source: Dane

Graph 4
Unemployment Rate by age



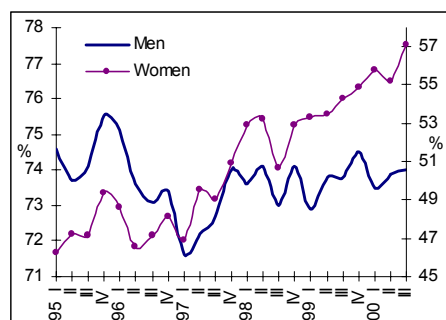
Source: NHS (ENH) – Author's calculations

Between 1999 and 2002, the Colombian Government attempted to explain the causes of this quick increase in the unemployment rate. It affirmed that there were two main types of factors behind the phenomenon: structural changes in the Colombian labour market and those produced by the current economic situation (DNP, 2002 p.23)

On the one hand, the structural changes were mainly originated from the economic liberalisation of 1990-1991. Since then, the productive sector, in order to increase its competitiveness, substituted low skilled labour demand for highly-skilled labour and labour for physical capital demand. For this reason, young people with low educational levels faced a higher unemployment rate (graph 4). In addition, the women labour supply had changed in the last two decades, increasing the participation of women in the labour market. For instance, the Colombian Economic Planning Ministry (DNP, 2002) states, “in 1982 one out of two women entered the labour market, nowadays, approximately two out of three women do” (p.23). This increase in the participation of the female population was, in part, because they have reached better educational levels and got more opportunities within the labour market.

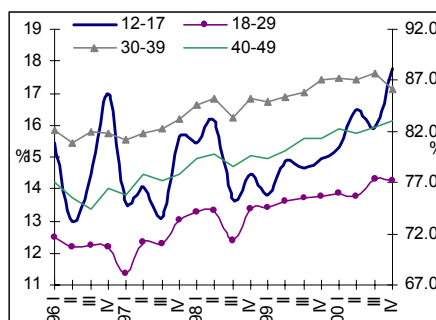
On the other hand, the economic recession caused an abrupt drop in household incomes, reducing their wealth and welfare. Consequently, young people and women, who were not working or interested in getting a job before of the crisis, entered the labour force in order to preserve or recuperate their standards of living. This implied an increase in women’s and young people’s participation rates in the labour market (graphs 5 and 6)

Graph 5
Participation Rate by gender



Source: Dane

Graph 6
Participation Rate by age



Source: NHS (ENH) – Author’s calculations

Table 1 summarizes the participation rates⁴ of men, women and children in Colombia. As can be seen, women participation rate in the labour market sharply increases by 13.3 percentage points from 1985 to 1999, which implies in average a

⁴ Participation rates are calculated as the sum of employed plus unemployed people divided by population older than 12 years who are those who can work.

growth of 0.9 percentage points per year. Nevertheless, between 1999 and 2000, growth rate doubled, reaching 2 percentual points in only one year. Boys' and girl's participation rates decrease since 1985, but, as in the women's case, in the last two years of the 1990's they increased by 1.8 percentual points each, possibly indicating the effects of recession.

Table 1
Participation rates² by gender

	1985	1995	1999	2000
Male	73.0	74.5	73.8	73.9
Adult Male	84.1	85.3	84.4	84.1
Female	41.6	47.5	54.0	56.1
Adult Female	47.0	53.5	60.3	62.2
Boys (12-17)	20.1	18.9	16.4	18.2
Girls (12-17)	13.9	13.0	12.7	14.5

Source: NHS (ENH) – Author's calculations

This paper focuses on studying the consequences of the economic recession on the labour market for people younger than 17 years old, in order to investigate the validity of those previous government explanations. Although in Colombia the population older than 12 years is considered part of the labour force, basic education is completed after 11 years of schooling (9 of them compulsory) and the official enrolment age in public education is at 6 years of age. This implies that a child must finish basic education at a minimum age of 17 years. For this reason, this study considers as child labour that which is performed by the population under 17 years old. The following section will describe the characteristics of urban child labour in Colombia in some detail.

b. Descriptive statistics for child labour in Colombia

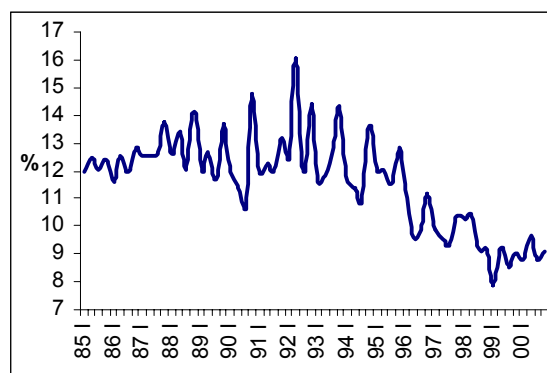
In order to analyse the causes and consequences of the economic deterioration on household wealth and children welfare, it is fundamental to understand the main features of urban child labour in Colombia. Bhalotra and Tzannatos (2002, p.7) have indicated the existence of some stylised facts for child labour. This section attempts to follow some of these stylised facts in order to describe the evolution of Colombian child labour market in urban areas for 1985, 1995, 1999 and 2000. These years were chosen because they capture the consequences of both the 1990-1991 economic liberalization and the recession of 1999, which can be compared with the conditions faced in 1985, before these changes occurred. Nevertheless, for the empirical analysis that will be performed in the coming sections, the complete sample period, 1985 – 2000, will be utilized.

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i. Participation rates

Bhalotra and Tzannatos (2002, p.8) affirm that children employment rates have been declining everywhere since 1950. Graphically, in Colombia the occupation rate of children has considerably decreased since 1992⁵ (Graph 7), corroborating the trend identified by Bhalotra and Tzannatos.

Graph 7
Child occupation rate⁶



Source: NHS (ENH) – Author's calculations

ii. Type of activity

Since the data used in this paper comes entirely from the seven main urban areas, the principal activity performed by children in this case is not agriculture, as Bhalotra and Tzannatos (2000) have identified as a stylised fact.⁷ Nevertheless, some specific activities in which they are involved can be identified.

Urban child labour in Colombia is concentrated in three principal activities: commerce, industry and services (table 2).

The main activity that children perform is personal services to households.⁸ In 1999 and 2000, 31% and 29.6% of them, respectively, were working in this activity. The second activity is retail trade; the percentage of children in this activity was 28.3% in 1999 and 28.7% in 2000.

⁵ There is not data available between 1950 and 1985

⁶ This rate is calculated as the ratio of employed children to 12-17 years old population.

⁷ This fact is a result of the sample data and does not imply that no children are working in rural areas.

⁸ This category includes children who are employed by families to perform cleaning services.

Table 2
Child labour by economic activity

Economic Sector	1985	%	1995	%	1999	%	2000	%
Agriculture, Forestry, Fishing and Hunting	2,072	1.4	1,417	0.7	1,404	1.0	1,095	0.8
Mining	310	0.2	371	0.2	43	0.0	292	0.2
Industry	25,174	17.4	37,455	19.8	21,217	15.5	23,474	16.2
Electricity, gas and water	48	0.0	515	0.3	578	0.4	34	0.0
Construction	9,574	6.6	19,257	10.2	4,978	3.6	6,660	4.6
Commerce, restaurants and hotels	37,826	26.1	58,073	30.7	48,400	35.3	52,514	36.1
Transport, storage and communication	3,688	2.5	6,729	3.6	4,445	3.2	4,211	2.9
Financial sector	1,178	0.8	3,438	1.8	2,945	2.1	2,717	1.9
Personal services	64,846	44.8	61,635	32.6	52,893	38.6	54,233	37.3
No information available	37	0.0	228	0.1	154	0.1	49	0.0
TOTAL	144,752	100.0	189,118	100.0	137,056	100.0	145,277	100.0

Source: NHS (ENH) – Author's calculations

There have not been large changes from 1985 to 2000 in the type of economic activities in which children are involved. The most important feature in this respect is that a lower number of children are working in personal services but more of them are working in commerce.

iii. School attendance and educational level

Work and school are not perfect substitutes for children. On the contrary, Bhalotra and Tzannatos *op. Cit* have found that many children combine work and school. Colombia is not the exception of the rule. As is illustrated in table 3, 37.7% of employed children attended school in 2000. The proportion of children who combine both activities has increased by 10 percentage points from 1985. Nevertheless, nowadays a considerable proportion of working children in Colombia do not attend school and remain as unskilled labour in the future. This represents a warning for the country since, as was stated above, low levels of human capital are the source of a poverty vicious circle delaying economic growth and development.

Although these statistics show that there has been a high proportion of children not attending school in the last twenty years, it is interesting to know if some of them have achieved a certain level of education. Table 4 shows the number of years that employed children have completed. Primary and secondary education

in Colombia consist of 5 and 6 years respectively, therefore basic education includes 11 years, although only 9 of them are compulsory.⁹ In 2000, 11.4% of urban working children completed secondary school, and 28.8% passed compulsory basic education. In 1985, only 1.6% could finalize secondary school and 7.9% basic education.

Table 3
Children who work and attend school

	year	School attendance	%
1985	Yes	40,299	27.8
	No	104,453	72.2
	Total	144,752	100.0
1995	Yes	67,197	35.5
	No	121,921	64.5
	Total	189,118	100.0
1999	Yes	48,946	35.7
	No	88,110	64.3
	Total	137,056	100.0
2000	Yes	54,786	37.7
	No	90,492	62.3
	Total	145,277	100.0

Source: NHS (ENH) – Author's calculations

Since the sample consists of 12-17 year-old children, some of them have not reached the required age to complete the nine compulsory years of basic education, but all of them must have achieved at least 6 years. In 1985, only 37.9% completed those six years. This percentage increased in 2000 by 28 percentage points, i.e. 66% of 12-17 children had completed at least 6 years of education. Although after 16 years there was an important improvement on the level of education of working children, it is still worrying that 34% of these children have not achieved the level of education corresponding to their age. It is of special interest that between 1999 and 2000, during the recession, the proportion of children who completed secondary school decreased by 1 percentage point.

⁹ The "Education General Law" of 1995 (Ley General de Educación) established as compulsory nine years of education. Before that Law, only primary education (5 years) was obligatory.

Table 4
Years of education completed by working children

	Years	1985	%	1995	%	1999	%	2000	%
Primary Education	0	4,179	2.9	4,201	2.2	2,915	2.1	3,429	2.4
	1	3,535	2.4	1,862	1.0	1,154	0.8	1,926	1.3
	2	9,788	6.8	7,064	3.7	4,240	3.1	3,260	2.2
	3	15,364	10.6	10,482	5.5	6,551	4.8	6,652	4.6
	4	17,069	11.8	12,556	6.6	8,298	6.1	7,483	5.2
	5	40,053	27.7	40,288	21.3	26,661	19.5	26,650	18.3
Secondary Education	6	19,990	13.8	27,417	14.5	14,594	10.6	18,716	12.9
	7	14,720	10.2	25,710	13.6	16,912	12.3	17,795	12.2
	8	8,607	5.9	18,949	10.0	17,264	12.6	17,469	12.0
	9	6,483	4.5	14,552	7.7	11,512	8.4	14,754	10.2
	10	2,684	1.9	9,453	5.0	9,700	7.1	10,590	7.3
	11	2,259	1.6	15,464	8.2	16,115	11.8	15,946	11.0
Univ.	12	22	0.0	518	0.3	604	0.4	520	0.4
	13			51	0.0	244	0.2	76	0.1
	n.a			552	0.3	294	0.2	13	0.0
Total		144,752	100	189,118	100	137,056	100	145,277	100

Source: NHS (ENH) – Author's calculations

3. DATA DESCRIPTION

The relation economic growth – child labour in Colombia in this paper is examined using micro and macro data. The micro data is obtained from the National Household Survey or NHS (Encuesta Nacional de Hogares or ENH) of Colombia, performed by DANE.¹⁰ It consists of cross-sectional quarterly data from 1985 to 2000. During this period, in average, the total survey consists of 18,677 observations for households and 82,895 observations for individuals on each quarter. The section regarding population aged 12-17 years contains, in average, 8,260.7 observations for children and 5,377.1 per household per quarter. The complete sample details between 1985 and 2000 are in table 5.

The survey contains urban information from the seven main Colombian cities: Bogotá D.C.,¹¹ Barranquilla, Cali, Medellín, Bucaramanga, Manizales and Pasto. Rural information is not included. In 1993, DANE performed the last population census in Colombia which included 1,059 cities in total. The seven cities used in this study corresponded to 43% of the urban census in 1993. Table 6 details the population distribution in those cities in 1993. GDP data by city in Colombia is not available, but Galvis (2001) found that 80% of the economic activity in Colombia is concentrated in the area between Bogotá, Cali, Medellín and Bucaramanga. Nevertheless, because of its population and location in the Atlantic coast, Barranquilla is one of the main ports of Colombia and its economic activity is of vital importance for the country.

¹⁰ National Department of Statistics (Departamento Administrativo Nacional de Estadística)

¹¹ Bogotá D.C. is the Capital of Colombia

Table 5
Number of observations for 12-17 year-old children in NHS
1985-2000

	Children's activity						
TOTAL	Employed	Unemployed	Participating in the labour force	Students	House working	Other activity	
Total Children	528683	63424	23296	86720	390411	27162	24390
Total Households	344135	45352	17975	63327	246982	18184	15642
Children per household	1.5	1.4	1.3	1.4	1.6	1.5	1.6
Children per total households	1.5	0.2	0.1	0.3	1.1	0.1	0.1

Source: NHS (ENH) – Author's calculations

Table 6
1993's Colombian census
Population by seven principal cities

Cities	Participation %					
	Total	Males	Females	Total	Males	Females
Bogotá D. C.	4,931,796	2,334,338	2,597,458	21.0	20.8	21.1
Barranquilla	990,547	469,069	521,478	4.2	4.2	4.2
Bucaramanga	410,065	192,245	217,820	1.7	1.7	1.8
Cali	1,641,498	775,326	866,172	7.0	6.9	7.0
Manizales	303,136	142,434	160,702	1.3	1.3	1.3
Medellín	1,551,160	714,382	836,778	6.6	6.4	6.8
Pasto	261,368	121,095	140,273	1.1	1.1	1.1
Total 7 cities	10,089,570	4,748,889	5,340,681	42.9	42.4	43.4
Total Colombia	23,514,070	11,211,708	12,302,362	100.0	100.0	100.0

Source: DANE - 1993 Census

The survey is composed of approximately 150 variables which allow the identification of characteristics among individuals and households and the environment that they face. The variables chosen in this paper comprise information about:

- Household information: size and income.
- Household head and spouse information: gender, age, years of education and income
- Children characteristics: gender, age, school attendance, number of years of education achieved, type of activity which they perform, income per month and occupation by economic sector.

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- Identification variables for city and strata. Strata variable is an urban categorization according to the people's standard of living. It is a social and economic classification, and divides the cities by different zones or areas, i.e. it is also a geographical organization. The lowest stratum (1) represents the poorest people and the highest (6) the wealthiest ones in each city.

Income variables were deflated with the quarterly consumer price index. The base year is 1994, thus all incomes are in Colombian pesos of the fourth quarter of 1994. One Sterling Pound corresponds to approximately 1,288.2 Colombian pesos in 1994 (december) and 4,574 Colombian pesos in August 2003.

Macro data involves the quarterly Colombian real gross domestic product (GDP) per capita over the same period.

4. OBJECTIVES

This paper attempts to achieve two central objectives: examining the main reasons why children work in Colombia and evaluating the impact of the 1999 economic decline on labour and educational opportunities of children.

In order to accomplish those two general objectives it is important to set out some specific areas of analysis. Those specific objectives will focus on:

- The significance of micro and macro variables of income on explaining child labour in Colombia. Are both of them relevant for the household's decision-making process regarding education or working activities for their children?
- The relation economic growth – child labour. Is child labour pro-cyclical or counter-cyclical to GDP per capita?
- The effects of children and parents' characteristics on child labour. How age, gender and educational level generate more or less probability of participating in the labour force.

The following sections will concentrate on providing the framework to respond and achieve those general and specific objectives.

5. LITERATURE SURVEY

Child labour has been a topic of great concern and controversy around the world. During the last ten years, an increasing number of researchers and institutions have been interested in understanding the causes and consequences of this problem in order to analyse and propose efficient policies which can alleviate it.

The scope of research on child labour has covered many fields. It ranges from individual decision-making to governmental laws and policies and from the domestic structure to foreign trade or external relations .

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This section attempts to summarise the main general findings regarding the causes and consequences of child labour and to review the specific studies that are essential to the objective of this paper.

The common belief has been that poverty is the main and only reason for children to work. Bhalotra and Tzannatos *op. Cit* have identified that there are more causes than poverty or subsistence constraints why children work. According to them child labour can be the result of supply and demand decisions.

On the one hand, either household features or market characteristics faced by households can influence the supply decisions. Among the former, poverty constraints and agency are the principal factors. First, if the household faces very low standards of living (or poverty), parents can be interested in sending their children to work instead of sending them to school because the family needs that additional income. Moreover, the opportunity cost of education is too high for this type of households. Second, agency plays an important role if parents, relatives or adult people who look after children are not altruistic enough. In that case, those adults value more their benefits from child labour than the children's benefits from performing activities related to childhood such as education or recreation.

Among the latter, incentives and imperfections in markets can determine child labour decisions. Parents can be interested in sending their children to work when the returns to education are too low, or returns to work experience are high enough. In this case, labour opportunities which households face motivate them to perform economic tasks rather than educational or recreational activities. Alternatively, credit market imperfections can reinforce poverty constraint factors. When households cannot easily have access to credit, they are forced to use their children's labour, in order to achieve better living conditions.

On the other hand, wage discrimination and technology influence the demand side decisions. In some countries, imperfections in the labour market permit firms to be more attracted to employ children than adults. Those cases arise when children can perform the same activity as adults but their salaries are lower, thus reducing the firm's costs. This type of discrimination would not occur in a competitive labour market, where wages would be equal for both children and adults since their marginal productivity is the same. Regarding technology issues, industries employ children because they have qualities or attributes which make their work more efficient, compared with adults, increasing their productivity. Nevertheless, history has proven that technological advances can eliminate those incentives for the firm since physical capital can substitute children attributes.

Some studies have studied the relation between GDP and child labour as this study attempts to do. Nevertheless, most of them have focused on cross-country evidence and the impact of globalisation and trade on the basis of anti-liberalisation arguments which claim that open markets stimulate child labour. For this reason, these studies only make use of macro data. Krueger (1996) finds a negative relation between GDP per capita and

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children occupation rates in several countries, concluding that a country's wealth can explain 80% of the worldwide cross-country variation in child labour.

Dehejia and Gatti (2002) explore the relation between child labour and borrowing constraints using aggregated data. Credit constraints are measured as private credit by deposit money banks to GDP for each country. Taking into consideration that, in general, poverty is the main source of child labour; they include GDP per capita in the model to control income effects. Their results showed that the impact of GDP per capita on children employment rates is much larger than the one from credit constraints.

Becchetti and Tovato (2002) try to explain how macro-economic variables (e.g. GDP) can affect a social indicator such as child labour and focus their study on the effects of globalisation and trade openness. Using an intra-household bargaining model on a panel of emerging countries,¹² they test the hypothesis that *"unskilled workers or raw material producers... have, by definition, low bargaining power and therefore do not benefit of the increased demand unless they exit the low skill trap"* (p. 7). The dependent variable is the occupation rate of children aged 10-14 years regressed on: GDP per capita, transfers (aid per capita), trade openness, parental education, quality of child education, rural life and labour market conditions. The main finding in this study is that globalisation has positive effects on child labour, reducing its incidence, but those benefits of globalisation *"may be mitigated if poor skills... prevent emerging countries from climbing up the value chain of tradable goods"* (p. 21).

Cigno, Rosati and Guarcello (2002) evaluate the effect of economic liberalisation on child labour using the trade ratio as a measure of trade openness. Trade ratio is the sum of exports plus imports divided by GDP. In the estimations, they used controls for income, using GDP per capita, health expenditure and the skill composition of each country. Their main result is that globalisation increases child labour if, and only if, raises the wage rate of uneducated relative to educated workers. Moreover, they found that although there is a negative association between income and child labour, for countries with similar levels of GDP per capita, there are very large variations on their extent of child labour. Therefore, GDP is not the only factor with an impact on child labour. Income distributions and governmental policies on health and education can also have effects on the prevalence of child labour.

There have been some other studies concerned about not only a general relation between GDP-child labour, but also about the impact of income shocks on households and children labour supply. These papers are relevant for this work since the Colombian economic recession of 1999 represented a negative income shock for households. Nevertheless, those empirical works focused on the use of income variables at a micro level without allowing for macro income shocks. Beegle, Dehejia and Gatti (2003) and Ferraz (2003) are examples of these analysis.

¹² Approximately 80 countries of Latin America, Asia and Africa were included

Beegle, Dehejia and Gatti (2003) show how in Tanzania, transitory income shocks can increase children labour supply if households have limited access to credit. Using a panel data set (micro data), they relate the hours that children work in a week to the value of crop loss due to different calamities¹³ (income shocks) and the value of household durable goods¹⁴ not connected to child labour (access to credit), controlling by individual, household and community characteristics, and fixed effects (households, time and survey round). Their results reveal two important facts. First, income shocks tend to increase the hours worked by children and second, the magnitude of this impact is much less (a half) for households which own more durable goods. Therefore, child labour is used as a financial source when households face reductions in their incomes.

Ferraz (2003) uses household unemployment periods generated from economic recessions in Brazil as an exogenous negative income shock to families. He bases his hypothesis on the *added worker effect*¹⁵ to relate those income shocks to increases on child labour. Through a model of inter-temporal labour supply and a panel database, he obtains two main findings. Firstly, in short periods of time (one month), the hours worked by children do not change when the household faces an income reduction. Thus, increases in child labour supply are only due to increases in children wages. Nevertheless, for longer periods, e.g. one year, the effects of wages lose significance, then increases in children's labour supply only respond with changes in household income. Hence, he suggests that "*at least in the short term, children are insured against shocks in household income*" (p. 13) however "*long lasting crisis can have pervasive effects on children by inducing them to work longer hours to cope with family shocks*" (p.15).

I am aware of only two empirical works using micro and macro data to investigate the impact of macroeconomic variables on households (micro) decisions or behaviour. Ray (2000) carries out a study comparing the sources and characteristics of child labour in Peru and Pakistan. He uses micro data to prove the validity of Basu and Van's luxury and substitution hypotheses¹⁶ in those both countries, finding that neither of them is valid in Pakistan and only the substitution one holds in Peru. Macro data on infrastructure and goods prices relates child labour to commodity markets and to control fixed community effects. Moreover, macro information was useful for Ray to propose policies contributing to alleviate child labour. He concludes that improving social infrastructure and living conditions can contribute to reduce the probability

¹³ Insects, rodents and fire.

¹⁴ Radios, bicycles, fans, lamps and pots. These type of access can be used as financial source in case of negative income shocks. It excludes cash holdings, business and land, which can be related to child labour.

¹⁵ Labour supply response of wives (or other family members) to their husbands' (household head) job losses.

¹⁶ Ray defines those hypotheses as follows: "*Luxury Hypothesis: a family will send the children to the labour market only if the family's income from non-child labour sources drops very low*" and "*Substitution hypothesis: child labour and adult labour are substitutes*" (p. 5)

that a child works and to increase school enrolments. Therefore, “*community infrastructure variables provide effective policy instruments in influencing child participation in employment and in schooling*” (Ray, p. 17)

Edmonds and Pavcnik (2002) develop an investigation on the impact of changes in the rice price in Vietnam on economic activities of children. They are interested in exploring the effects of economic globalisation on child labour based on arguments of market integration opponents. They have affirmed that the free flow of commodities from developing countries to developed ones increases the economic opportunities of children to work and consequently stimulate child labour in those countries.

Rice is one of the most important commodities in Vietnam. Not only do Vietnamese families base their diet on it, but there is also large scale production and exportation of the crop. Moreover, a high proportion of Vietnamese children work in the agricultural sector. For this reason, rice prices have a high influence on both household budget and labour market opportunities for children. Edmonds and Pavcnik *op. Cit* use a panel data of two rounds (1992-1993 and 1997-1998) of the Vietnam Living Standards Survey (VLSS). That survey allows knowing the individual, households and community characteristics; the individuals’ economic activity; households’ expenditure and wages rates. On the other hand, 1993 and 1998 rice prices relate to macro data and are available for each community in both rounds. Therefore, the data allows for regional and inter-temporal changes in both the relative price of rice and child labour.

They use linear probability (logit) model to estimate the probability that a child works. In a first stage, they regress a binary variable, (which equals one if a child j works in a community i at time t), on the natural logarithm of the real price of rice, the child’s characteristics, season and year controls, and community fixed effects. They found that increases on relative rice prices result in a significant reduction of child labour. Nevertheless, they realised that the benefits (damages) of price increments depend on the household’s contact to rice-related economic activities. Producers gain from price increases but consumers lose because they have to pay more for rice. For this reason, in a second stage they classify households in three groups: (rural) producers, (urban) consumers and those (in mixed areas) who are not directly producers, but perform activities related to rice production.

Through this differentiation, the authors found that prices have a positive effect on child labour only for producers and those children related to rice-agricultural activities. Since the sample was not big enough for urban and mixed communities, the analysis remains only for rural households. Then, they divide the sample in two groups: households where all children work and those where no children work. They estimate logit models using them as dependent variables. They find that increases in prices not only reduce the probability that a child works but also that all children of the same household work, as well as increasing the probability that no children of the same household work.

In a third stage Edmonds and Pavcnik explore the possibility of spurious regression between child labour and rice prices allowing for household fixed effects instead

of community fixed effects, interacting region dummies with time and including the community's accessibility. Those estimations did not show evidence of spurious regression. Additionally, they take into account infrastructure improvements in the model as a possibility of omitted heterogeneity that could produce spurious regression. The possible infrastructure improvements were in: roads, electricity, irrigation, schools, health or other. Those estimations generated similar results to those previously obtained, confirming their robustness.

The fourth stage consisted of considering idiosyncratic shocks to either rice prices or child labour that could be another source of a spurious relation between them. In order to do that, the change (declining) in child labour (?c) was regressed on the change in rice price (?p) using the instrumental variables model (2SLS). This estimation included controls for region, community accessibility and improvements in either schooling or total infrastructure. The results were consistent with those obtained previously: an increase in rice prices reduces the incidence of child labour in Vietnamese rural areas. Thus, there is no evidence of spurious regression due to idiosyncratic shocks.

In the further stages, the authors analyse the mechanism through which rice prices affect child labour. First, they include differences in landholdings to capture the impact of prices on households consistent with their heterogeneity: *“land is an important input into rice production, and households with greater production capacity should benefit more from price increases”* (p. 20) and subsequently, control for land redistribution. The results showed that children who work in households which own greater areas of land, are the main beneficiaries of the increase in rice prices.

Second, they examine the effect of wages. Since rice is the main agricultural commodity in Vietnam, its price increases must raise the marginal productivity of labour and therefore the wages in agriculture. This increase enlarges the incentives to work instead of studying for children, so the effect should be an increase in child labour supply. Allowing for this effect, the author included wages variables in the model. They found that child wages do encourage children to work but increments in adult wages counteract this effect, i.e. adult wages are related to less child labour. The total effect is consistent with a negative relation between rice prices and child labour.

Finally, they consider children gender and age differences concluding that *“rice price increases are associated with the largest declines in child labour for the age and gender groups that have the highest participation rates”* (Edmonds and Pavcnik, *op. Cit.*, pp. 29).

6. METHODOLOGY AND RESULTS

a. Graphical examination

A first step in this study is a graphical examination of a child labour–GDP relation. This examination has two objectives, first to check if there were significant changes

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on the level of children employment rates during the economic recession of 1999 and, second, to contrast GDP and child labour.

Initially, the occupation rate of children¹⁷ was regressed on time dummies, which identified each year of the sample between 1986 and 2000,¹⁸ and city dummies, using OLS estimations. Table 7 contains the results of this estimation. The estimated coefficients are significant since 1996 and show steady reductions in the employed children participation with respect to 1985 rates. All dummies for cities are significant. Graph 8 shows the fitted values of this occupation rate obtained from the last regression. It is evident that there was a dramatic level change on the children employment rate in the late 1990's, which in part can be a consequence of the economic behaviour of this period. Nevertheless, other factors different from economic ones are also included in time dummies and could have had effects on household decisions causing these changes.

Tabla 7
Graphical examination results

	(1) ECPR ¹
T86	-0.002 (0.44)
T87	0.008 (1.53)
T88	0.004 (0.91)
T89	0.007 (1.51)
T90	0.001 (0.15)
T91	-0.001 (0.25)
T92	0.014 (2.83)**
T93	0.002 (0.43)
T94	-0.005 (1.08)
T95	-0.007 (1.43)
T96	-0.016 (3.16)**
T97	-0.020 (3.97)**

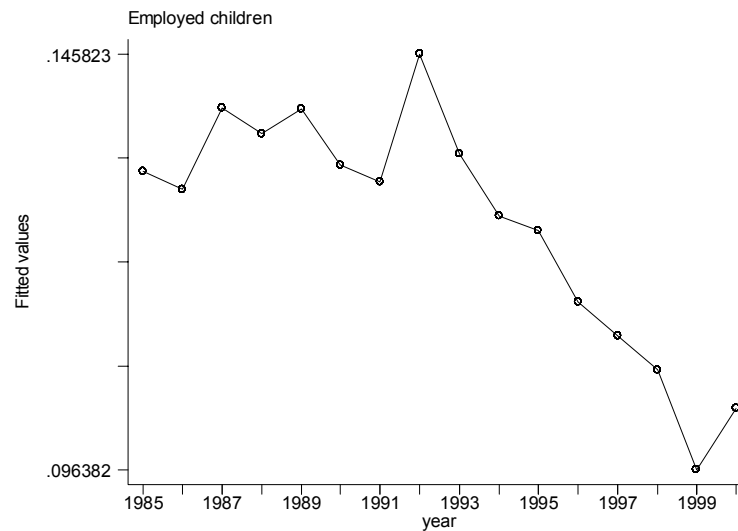
¹⁷ This is an aggregate (population) variable calculated as the ratio of employed children to 12-17 years old population.

¹⁸ 1985 was the dropped year.

Continuation Table 7

T98	-0.024 (4.79)**
T99	-0.035 (7.21)**
T00	-0.028 (5.72)**
C1	-0.062 (18.94)**
C2	0.038 (11.57)**
C3	-0.038 (11.79)**
C4	-0.048 (14.76)**
C5	-0.058 (17.93)**
C6	-0.019 (5.69)**
Constant	0.159 (38.85)**
Observations	448
R-squared	0.80
Absolute value of t statistics in parentheses	
* significant at 5%; ** significant at 1%	
1. ECPR: Employed children participation rate	

Graph 8
Fitted Child Occupation Rate



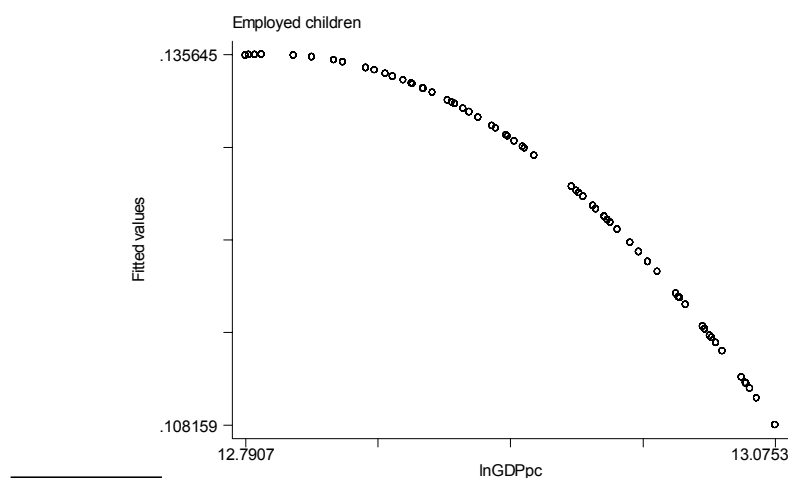
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The next step consisted on regressing, by OLS,¹⁹ the occupation rates of children on the natural logarithm of total GDP per capita ($\ln\text{GDPpc}$) and its square, calculating, then, the fitted values and plotting them against the $\ln\text{GDPpc}$. These results are shown in graph 9. The relation GDP-child labour is strongly negative. As the GDP per capita grows, the employment rate of children decreases, possibly reflecting the fact that poverty is the main reason why children work, because they need to contribute to their household income. Graph 10 presents the evolution of the fitted values on time (quarterly data from 1985 to 2000).²⁰ It confirms the change in occupation rates levels found in the first results of this graphical examination (graph 8).

Table 8
Occupation Rates Results

	(1) ECPR
$\ln\text{GDPpc}$	9.550 (1.22)
$\ln\text{GDPpc}^2$	-0.373 (1.23)
Constant	-61.005 (1.20)
Observations	448
R-squared	0.04
Absolute value of t statistics in parentheses	
* significant at 5%; ** significant at 1%	

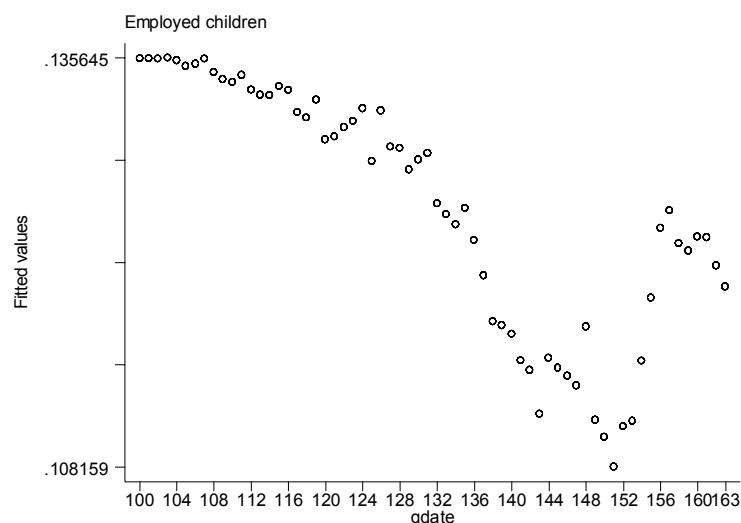
Graph 9
Fitted Child Occupation Participation Rate vs GDP



¹⁹ Table 8 shows the estimated coefficients.

²⁰ There are 64 quarters in the sample. Stata identifies quarterly dates with numbers beginning with 100 for the first quarter of 1985.

Graph 10
Fitted Child Occupation Participation Rate vs. Quarters



b. Models specification and results

The incidence of GDP on child labour in Colombia is shown, estimating the probability that a child performs activities related to either labour market or education.

The estimations will be obtained using probit models since they allow estimating the probability of occurrence of an event when the dependent variable is binary, assuming that the error term is normally distributed. The general specification of a probit model is:

$$y^* = \alpha' X + u$$

$y = 1$ if the event occurs
 $y = 0$ if not

Where: y^* : is the dependent variable
 α : is the vector of parameters
 X : is the matrix of independent variables
 u : error term – normally distributed

The choice process of explanatory variables (X matrix) attempts to follow three main objectives: first, the variables must identify the household and environment characteristics that children face; second, they must not be endogenous and third, they must capture micro, macro and time effects. In total 46 variables were used but not all of them were entered in all of the estimations. Table 9 contains the description of these variables.

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Table 9
Variables Description

Variable name	Description	Obs	Mean	Std Dev	Min	Max
year		528683	1992.072	4.604451	1985	2000
quarter		528683	2.478932	1.130251	1	4
deflect		528683	0.86039632	0.7086073	0.1158517	2.370848
ide004	atratum	528683	2.822625	0.9826497	1	6
ide010	city	528683	3.756213	1.915854	1	7
HHsize	household size	528676	5.955599	2.277456	1	43
HHHmale	household head's gender	528676	0.7788229	0.4150399	0	1
HHHage	household head's age	528650	45.87326	11.01939	10	98
HHHeduc	years of education of household head	527218	6.824037	4.313065	0	21
HHSfemale	spouse's gender	401393	0.978739	0.1442532	0	1
HHSage	spouse's age	401388	40.86862	9.11643	12	98
HHSeduc	years of education of spouse's	400731	6.64293	3.919302	0	21
educ001	school attendance	528676	0.8122517	0.3905114	0	1
educ	child's years of education achieved	525373	6.511031	2.336885	0	18
ft001	child's activity	528671	3.850718	1.531438	1	9
boy	boy	528683	0.485009	0.4997757	0	1
age	age	528683	14.54764	1.70852	12	17
HHHeduc2	years of education of household head ^2	527218	65.16997	74.53658	0	441
HHHY	household head's total income	528683	335066.3	588866.6	0	27600000
InHHHY	ln (household head's total income)	490136	12.34551	0.388687	-0.8632479	17.13322
HHSeduc2	years of education of head ^2	400731	59.48941	64.22209	0	441
HHSY	spouse's total income	528683	65400000	166000000	0	8.63E+08
InHHSY	ln (spouse's total income)	297699	14.87416	3.692526	0.3328151	20.57612
empch	dummy variable for employed children	528683	0.119966	0.3249221	0	1
STch	dummy variable for students	528683	0.7384595	0.439474	0	1
HWch	dummy variable for houseworking children	528683	0.0513767	0.2207651	0	1
GDPpc	GDP percapita	528683	419137.1	33877.51	358854	477015.8
lnGDPpc	ln (GDP percapita)	528683	12.94265	0.081448	12.79067	13.0753
lnGDPpc2	ln (GDP percapita) squared	528683	167.5189	2.107149	163.6012	170.9636
C1	dummy variable for city 1	528683	0.174057	0.3791589	0	1
C2	dummy variable for city 2	528683	0.1135558	0.3172712	0	1
C3	dummy variable for city 3	528683	0.2186774	0.4133196	0	1
C4	dummy variable for city 4	528683	0.0693856	0.3791589	0	1
C5	dummy variable for city 5	528683	0.2077937	0.3172712	0	1
C6	dummy variable for city 6	528683	0.1332122	0.3398042	0	1
C7	dummy variable for city 7	528683	0.0833184	0.2763631	0	1
S1	dummy variable for stratum 1	528683	0.0809029	0.2726862	0	1
S2	dummy variable for stratum 2	528683	0.2681872	0.443016	0	1
S3	dummy variable for stratum 3	528683	0.4629182	0.4986235	0	1
S4	dummy variable for stratum 4	528683	0.1350601	0.3417881	0	1
S5	dummy variable for stratum 5	528683	0.0412364	0.1988368	0	1
S6	dummy variable for stratum 6	528683	0.0116951	0.1075097	0	1

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Three sets of alternative estimations will be done to analyse the incidence of GDP per capita on child labour in Colombia. The first step will be to estimate a model with time dummies, which will identify the changes on probabilities of child labour and schooling over the sample period. The second step consists of understanding the general reasons why children work and analysing micro against macro effects. Finally, the third step will allow for a quadratic relation of GDP-child labour.

i. Time effects

Given that the subject of interest is urban children labour force behaviour, under the argument that more children enter to the labour market during the recession period, two models regarding this area were defined. The binary dependent variable for each of them reflects whether the child is employed or attending school. The complete specification of the model for a child i in stratum s in city c at quarter q at year t is:

$$y_{iscqt}^* = \alpha_1 T_t + \alpha_2 \ln(HHHY)_{iscqt} + \alpha_3 \ln(HHHS)_{iscqt} + \beta_i' X_{iscqt} + \delta_s + \lambda_c + u \quad (1)$$

Where y^* is either the probability that a child works or attends school,²¹ T_t are time dummies which equal one for each year on the sample and zero otherwise, the omitted year is 1985. Time variables are included to allow for economic growth and effects of the economic crisis. GDP per capita is not included in the model since it is collinear to the time dummy variables. $\ln(HHHY)$ and $\ln(HHHS)$ are the natural logarithm of the head of household and the spouse's income respectively. X_i describes the child, head of household and spouse characteristics,²² and the household size.²³ The individual characteristics are: gender, age, parents' education and parents' education square. Children's education is omitted because of its endogeneity. δ_s and λ_c are dummies which control for unobservable environmental characteristics and identify strata and cities, i.e. stratum and city fixed effects. Finally, u is the error term normally distributed.

When a child enters the labour market one of two events can occur: first, they dropped out education or, second, they began to combine school and work. If the first event occurs, the effect of the GDP will be a reduction in school attendance, but if the second one takes place, the latter will not be affected. This study is very interested in examining these effects; one of the main concerns of the Colombian government at the time was children's dropping out of school as a result of the economic crisis. For this reason, school attendance is also a binary dependent variable in the model.

²¹ $y = 1$ if the individual reports either being employed or attending the school, $y = 0$ otherwise.

²² Household head and his spouse are the child's parents in 81.9% of the sample, but they can also be relatives different from parents (13.2%).

²³ Although household size can be endogenous, this variable was included in all of the estimations.

Table 10 contains the estimated coefficients of this model. I plotted them with GDP per capita growth, in graph 11, in order to compare the evolution of child labour and economic progress over the sample period. The graph shows a counter-cyclical pattern between economic growth and employed children until 1995. From 1996, it seems that there was a change in this pattern and a pro-cyclical behaviour arises. This is of particular interest, since some Colombian economists have affirmed that the first signs of recession appeared in 1996. DNP (2002) states that in 1996 the Colombian economy initiated a negative trend that the government attempted to prevent through short run policies in 1997-1998, which generated an economic bubble. This bubble turned into the worst recession in 1999 because it increased the market interest rates, promoted a monetary attack and caused a crisis in the financial sector.

Table 10
Results Model 1

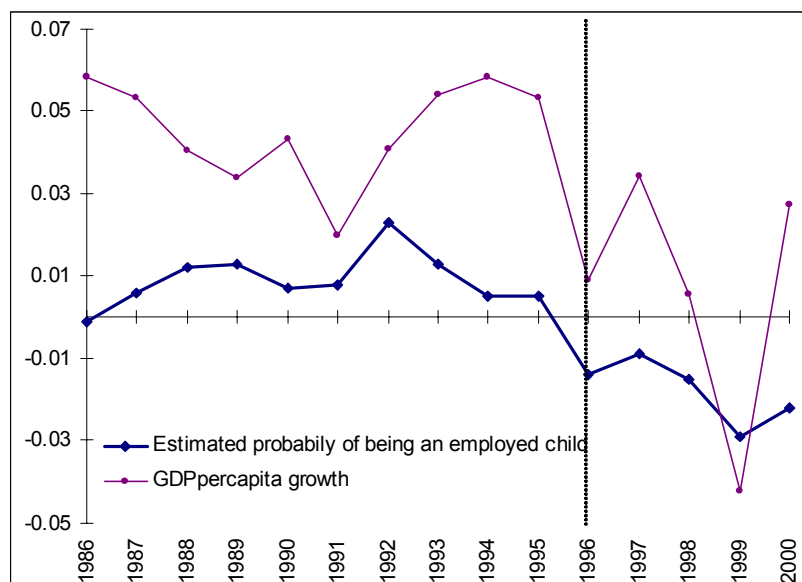
	(1)	(2)
	empch	school attendance
T86	-0.001	0.002
	(0.25)	(0.36)
T87	0.006	-0.003
	(1.41)	(0.55)
T88	0.012	0.001
	(2.60)**	(0.24)
T89	0.013	0.001
	(2.86)**	(0.26)
T90	0.007	0.017
	(1.50)	(3.59)**
T91	0.008	0.013
	(1.80)	(2.74)**
T92	0.023	0.004
	(5.14)**	(0.75)
T93	0.013	0.003
	(2.89)**	(0.74)
T94	0.005	0.021
	(1.08)	(4.60)**
T95	0.005	0.019
	(1.12)	(4.31)**
T96	-0.014	0.021
	(3.30)**	(4.59)**
T97	-0.009	0.014
	(2.19)*	(3.15)**
T98	-0.015	0.019
	(3.64)**	(4.12)**
T99	-0.029	0.023
	(7.14)**	(5.05)**
T00	-0.022	0.027
	(5.23)**	(5.89)**
boy	0.022	0.032
	(14.92)**	(19.23)**
age	0.047	-0.062
	(97.77)**	(111.01)**
HHsize	0.005	-0.009

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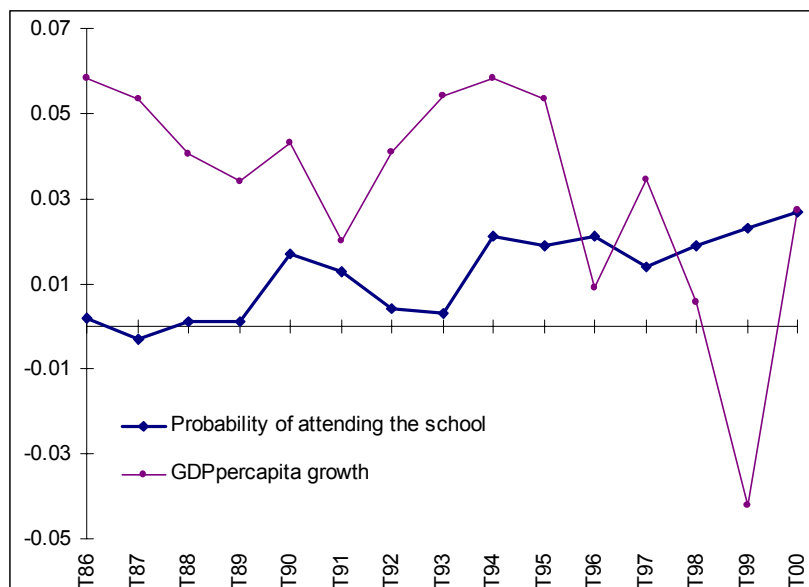
Continuation Table 10

	(11.18)**	(20.02)**
HHHmale	-0.022	0.013
	(1.59)	(0.77)
HHHage	-0.001	0.002
	(9.23)**	(12.08)**
HHHeduc	-0.010	0.015
	(14.20)**	(20.16)**
HHHeduc2	0.000	-0.001
	(12.22)**	(16.67)**
	(1)	(2)
	empch	school attendance
HHSfemale	-0.001	0.013
	(0.07)	(0.81)
HHSage	-0.003	0.003
	(19.90)**	(18.88)**
HHSeduc	-0.014	0.023
	(19.89)**	(29.65)**
HHSeduc2	0.001	-0.001
	(17.82)**	(24.63)**
lnHHHY	-0.008	0.020
	(6.96)**	(16.89)**
lnHHSY	-0.001	0.006
	(1.15)	(6.27)**
S1	-0.031	-0.020
	(5.20)**	(2.46)*
S2	-0.038	0.000
	(6.74)**	(0.05)
S3	-0.050	0.032
	(8.58)**	(4.45)**
S4	-0.033	0.028
	(6.15)**	(4.13)**
S5	-0.013	0.003
	(2.09)*	(0.40)
C1	-0.057	0.057
	(21.97)**	(19.21)**
C2	0.025	-0.007
	(8.24)**	(1.96)*
C3	-0.030	0.042
	(11.44)**	(14.21)**
C4	-0.046	0.026
	(14.26)**	(6.71)**
C5	-0.046	0.018
	(17.74)**	(5.84)**
C6	-0.020	0.019
	(6.82)**	(5.56)**
Observations	158194	158194
Robust z statistics in parentheses		
* significant at 5%; ** significant at 1%		

Graph 11
Probability of Child Labour vs. GDP percapita



Graph 12
Probability of School Attendance vs. GDP percapita



The recession seems to generate a decrease in the probability of children working in Colombia since 1996. During this period, firms faced a profound reduction of their profits, which forced them to reduce their costs. In order to do so, firms decided to lay their employees off. This situation not only increased the unemployment rate but also reduced labour demand. For this reason, possibly, the firms' demand for any labour force had dropped so much that the possibility of getting a job for a child 12-17 during the crisis was too low. On the contrary, the probability of school attendance remained approximately constant from 1994, showing a slight increase during the recession period 1998-2000 (graph 12). This could have been the result of family decision to avoid children idleness. Since the economy was not allowing them to work, it was better to send them to school rather than to remain at home doing nothing. Moreover, public²⁴ basic education in Colombia is free, thus the cost of education is low and the opportunity cost of education had decreased as a consequence of the few economic opportunities for children.

ii. Micro vs macro effects

The previous model is one of the alternatives to analyse the effects of GDP on child labour and school attendance. Nevertheless, it has the disadvantage that time dummies not only reflect the behaviour of the economy but also can include external effects such as weather, social conducts, government policies and other factors. For this reason, another way to evaluate the effects of GDP on child labour is including GDP per capita as an explanatory variable.

On the other hand, the Colombian government affirmed that one of the causes of high children unemployment in the late 1990's was the reduction of household income (DNP, 2002), which is a micro variable. Therefore, it is of interest for this study to include micro income effects, in addition to GDP per capita, as explanatory variables, regardless of their endogeneity. This allows analysing whether the decisions of households are determined only as a response to their private situation, or if they take into account their perception of the whole economic situation. People's expectations, uncertainty and risk aversion are very important in economics. Agents are often influenced by environmental or government policies as much as by their personal situation.

The Colombian Household Survey gives several types of household income variables: labour income, self-employment income, income from other sources, total income, head of household and spouse's total income. I had to decide which could be the less endogenous. Any classification of household income (labour, self employment and other sources) includes the child's income because they mainly work in commerce activities, which are sometimes related to the informal sector and are considered as self-employment in the survey. In addition, children work in the personal services sector as employees, therefore, both household labour and non-labour in-

²⁴ That one provided by the government

come contains children income. For these reasons, their endogeneity is more critical than taking into account only the parent's income. These two variables were included in the second set of estimations. The specification of this model is:

$$y_{iscqt}^* = \alpha_1 \ln(GDPpc)_{qt} + \alpha_2 \ln(HHHY)_{qt} + \alpha_3 \ln(HHHS)_{qt} + \beta_i' X_{isciq} + \delta_s + \lambda_c + u \quad (2)$$

Where y^* is either the probability that a child works or attends the school,²⁵ $\ln(GDPpc)$ is the natural logarithm of GDP percapita, $\ln(HHHY)$ and $\ln(HHHS)$ are the natural logarithm of head of household and spouse's income, respectively; and the rest of the variables keep the previous description.

Table 11 provides the results of this model. Column 1 presents the estimates of α_1, α_2 and α_3 for employed children and column 2 for school attendance. $\hat{\alpha}_1$ reveals that child labour is counter-cyclical and school attendance pro-cyclical to economic growth. This implies that increases in economic productivity reduce the probability of children working and stimulate their education. A 10 percent increase in GDP per capita is associated with a 0.57 percentage point decline in child labour and 0.79 percentage point increase in school attendance.

Table 11
Results Model 2

	(1) empch	(2) School attendance
lnGDPpc	-0.060 (6.19)**	0.095 (8.63)**
boy	0.022 (14.64)**	0.032 (19.32)**
age	0.047 (97.52)**	-0.062 (111.03)**
HHsize	0.005 (11.34)**	-0.009 (20.19)**
HHHmale	-0.024 (1.69)	0.014 (0.83)
HHHage	-0.001 (9.25)**	0.002 (12.05)**
HHHeduc	-0.010 (14.35)**	0.015 (20.22)**
HHHeduc2	0.000 (12.08)**	-0.001 (16.61)**
HHSfemale	0.003 (0.21)	0.012 (0.72)
HHSage	-0.003 (20.30)**	0.003 (19.00)**

²⁵ $y = 1$ if the individual reports being employed or attending the school, $y = 0$ otherwise.

Continuation Table 11

HHSeduc	-0.014 (20.30)**	0.023 (29.84)**
HHSeduc2	0.001 (17.72)**	-0.001 (24.62)**
lnHHHY	-0.005 (4.68)**	0.019 (16.32)**
lnHHSY	0.000 (0.23)	0.006 (5.77)**
S1	-0.030 (4.98)**	-0.021 (2.59)**
S2	-0.037 (6.55)**	-0.001 (0.07)
S3	-0.049 (8.30)**	0.031 (4.30)**
S4	-0.032 (5.83)**	0.027 (3.96)**
S5	-0.012 (1.94)	0.002 (0.30)
C1	-0.055 (21.13)**	0.057 (19.06)**
C2	0.028 (9.03)**	-0.007 (2.09)*
C3	-0.027 (10.17)**	0.042 (14.12)**
C4	-0.047 (14.49)**	0.026 (6.74)**
C5	-0.045 (16.85)**	0.018 (5.61)**
C6	-0.018 (6.15)**	0.018 (5.45)**
Observations	158194	158194
Robust z statistics in parentheses		
* significant at 5%; ** significant at 1%		

These results are crucial to explaining child labour. On one hand, it could be said that that poverty is the principal reason why children work. When the economy grows and people are better off, children do not need to work in order to contribute to household expenditures. On the other hand, economic growth encourages children to study. As GDP increases, the probability of attending school is higher.

Both previous results are highly related to the opportunity cost and returns of education and experience. Since children work mainly because of poverty constraints, the opportunity cost of education is too high at low levels of GDP and the returns to work and experience surpass the future returns to education. Nevertheless, since parents send their children to school when the family does not need that additional income, this leads to a signal that returns to education are high²⁶ in Colombia. In fact,

²⁶ Or the opportunity cost of education is low due to high future expected incomes.

Blom and Hansen (2002) have studied the returns to education in Colombia and found large differences in salaries by level of education. Table 12 has been taken from Blom and Hansen's study and shows that wages for workers with tertiary education are approximately three times those of workers with primary and secondary school. Blom and Hansen have also found that the returns of tertiary and postgraduate education have increased considerably from 1980 to 2000, while those to primary and secondary school have remained constant over the same period. In late 1990's, the returns to university education were two times those in 1980 while the returns to secondary school have only decreased in two decades by 0.8 percent points. Consequently, when families have been able to overcome poverty constraints or satisfied a certain level of subsistence needs,²⁷ those high levels of returns to education generate incentives to send children to school instead of work.

Table 12
Large differences in earnings due to education
(Earnings by level of education 2000)

Education level	Wage (Monthly) ('000 Col\$)	Wage (Monthly) (USD\$)	Wage in percentage of average
No schooling	137	62.4	42.6%
Primary	208	94.7	64.6%
Secondary	278	126.2	86.1%
Tertiary	886	402.7	274.5%
Total workforce	323	146.7	100.0%

Source: Blom and Hansen (2002), p. 4.

The estimated coefficients of α_2 and α_3 confirm family poverty constraints as the main cause of child labour. Micro income effects are significant and reveal that higher levels of head of household income have a positive effect on child labour, reducing it, and increase the educational opportunities of children. An increase of 10% in his father's earnings reduces the probability that a child has to work by 0.05% and increases the probability of him studying by 0.19%. His mother's earnings are not significant for child labour, however they also encourage the child's education.

In conclusion, both macro and micro variables are relevant for the household decision-making process regarding education and working activities of their children. They reflect a negative relation between income and child labour which arises from poverty constraints and a positive relation between school and income, due possibly to high returns to education.

²⁷ Bhalotra (2003) have found evidence that the boy's income in Pakistan is necessary to reach the subsistence expenditures of the households. This implies that if a household cross this "subsistence frontier" boy's child labour is not necessary and they can perform activities related to childhood.

The model includes controls for children and parental characteristics. These variables are also important for the objective of explaining the causes of child labour. As can be seen in table 11, gender differences indicate that boys tend to work and attend school more than girls do. Children age increases their probability of participating in the labour force and decreases the probability of being a student, while household size has negative effects on child labour and education.

With respect to parental characteristics, the head of household and spouse's gender are not significant for children educational and working choices. On the contrary, as was expected, higher parental age and level of education reduce the probability that children work, and increase their level of education.

Since I have included micro income variables in both previous models, it is relevant to know if the macro income variable is significant for the incidence of child labour by itself without allowing for micro effects. Moreover, the endogeneity of parental income can be a source of spurious correlation between GDP per capita and child labour. For this reason a third model will be estimated taking into account only macro effects. The model specification is now:

$$y_{iscqt}^* = \alpha_1 \ln(GDPpc)_{qt} + \beta_i' X_{isctq} + \delta_s + \lambda_c + u \quad (3)$$

Where y^* is either the probability that a child works or attends school,²⁸ $\ln(GDPpc)$ are the natural logarithm of GDP per capita, and the rest of the variables keep the initial description.

Table 13 presents the estimates of equation (3). $\hat{\alpha}_1$ is significant for both child labour and school attendance, and the magnitudes of the coefficients are not altered considerably, specially for child labour. This effect is associated to household expectations, uncertainty and risk aversion. As was indicated previously in this paper, Bhalotra and Tzannatos *op. Cit* observed that the poorer the household, the more risk aversion and, hence, more probability to send children to work in order to diversify its sources of income. If the economy, as a whole, faces a negative income shock, families are motivated to employ their children as a way to insure them against the risk of an income loss and as a way to smooth their consumption.²⁹ This implies that expectations and uncertainty on economic behaviour lead families to use child labour because of their risk aversion.

The exclusion of micro effects slightly weakens the relation between GDP and school attendance. Nevertheless, the impact of GDP on school attendance is still

²⁸ $y = 1$ if the individual reports being employed or attending the school, $y = 0$ otherwise.

²⁹ Some studies have shown that this effect is deeper if families face credit constraints. See for example Dehejia and Gatti (2002) and Beegle, Dehejia and Gatti (2003).

Table 13
Results Model 3

	(1) empch	(2) School attendance
lnGDPpc	-0.057 (5.88)**	0.079 (7.17)**
boy	0.022 (14.62)**	0.032 (19.23)**
age	0.047 (97.43)**	-0.061 (110.59)**
HHsize	0.005 (11.19)**	-0.009 (19.62)**
HHHmale	-0.026 (1.85)	0.021 (1.26)
HHHage	-0.001 (9.37)**	0.002 (12.18)**
HHHeduc	-0.010 (14.43)**	0.016 (20.65)**
HHHeduc2	0.000 (11.77)**	-0.001 (15.52)**
HHSfemale	0.002 (0.16)	0.012 (0.76)
HHSage	-0.003 (20.20)**	0.003 (18.81)**
HHeduc	-0.015 (20.64)**	0.024 (31.02)**
HHeduc2	0.001 (17.91)**	-0.001 (24.50)**
S1	-0.026 (4.29)**	-0.047 (5.58)**
S2	-0.033 (5.90)**	-0.022 (2.96)**
S3	-0.045 (7.75)**	0.013 (1.90)
S4	-0.029 (5.43)**	0.017 (2.39)*
S5	-0.011 (1.76)	-0.002 (0.31)
C1	-0.055 (21.17)**	0.058 (19.35)**
C2	0.027 (8.75)**	-0.003 (0.91)
C3	-0.029 (11.26)**	0.052 (18.19)**
C4	-0.046 (14.40)**	0.025 (6.36)**
C5	-0.045 (17.09)**	0.021 (6.67)**
C6	-0.020 (6.68)**	0.025 (7.51)**
Observations	158194	158194

Robust z statistics in parentheses
* significant at 5%; ** significant at 1%

high and significant, suggesting that economic growth promotes higher educational levels possibly through generating higher salaries for more educated people, i.e. increasing the returns to education and decreasing its opportunity cost.

iii. Quadratic GDP

Finally, it is of interest to evaluate a quadratic relation between child labour and GDP per capita instead of a simple linear one. This could be done including in models (2) and (3) the square of $\ln(\text{GDPpc})$. Nevertheless, this was not possible to perform for the probit models. Due to the fact that this data has in average 8,260 observations (individuals) by quarter and GDP is only available quarterly, GDP and its square generated collinearity because of lack of enough observations. For this reason, it was necessary to collapse the data by quarter and use the linear regression technique (OLS) to be able to do these estimations. The quarterly collapsed values for the binary variables which identify employment and school attendance were regressed on the $\ln\text{GDPpc}$ and its square. The new model is given by the equation:

$$y_{iscqt}^* = \alpha_1 \ln(\text{GDPpc})_{qt} + \alpha_2 [\ln(\text{GDPpc})_{qt}]^2 + C + u \quad (4)$$

Where y^* is the mean³⁰ of the binary variables stated above, i.e. either the occupation rate of children or the proportion of children attending school; $\ln(\text{GDPpc})$ is the mean of the natural logarithm of GDP per capita; $[\ln(\text{GDPpc})]^2$ is the mean of the natural logarithm of GDP per capita squared; C is the constant and u is the error term which contains the omitted variables.

The results are reported in table 14. The results for employed children and school attendance confirm those obtained above. At low levels of GDP per capita more children enter to work as part of the Colombian labour force. Nevertheless, as GDP grows their incentives to work diminish. The turning point³¹ of this quadratic relation, calculated as the derivative $\frac{\partial y^*}{\partial \ln(\text{GDPpc})} = 0$, is at a $\ln(\text{GDPpc})$ value equal to 12.8.

During the recession period (1999-2000) the $\ln(\text{GDPpc})$ was on average 12.99 which is on the right hand side of the maximum, i.e. more children were entering the labour force as a result of poverty constraints.

In the same way, at low levels of GDP per capita, school attendance increases but when GDP is too high, economic opportunities generated by this growth create incen-

³⁰ "Collapse" command in Stata calculates the mean of the binary variables which have values $y = 1$ if the individual reports being employed or attending the school, $y = 0$ otherwise.

³¹ The turning point is either the maximum or minimum of the function, where the slope, i.e. the marginal value, is equal to zero.

tives for children to work instead of studying, consequently, decreasing school attendance. The turning point, in this case, occurs at a $\ln(\text{GDPpc})$ value of 13.06. Since, in this case, the value of the natural logarithm of GDP during recession is less than the turning point, the economic reduction possibly caused a decline in children's school attendance.

Graph 13 plots the fitted values obtained from equation (4) against $\ln(\text{GDPpc})$. It confirms the negative relation between GDP and child labour and the positive relation between GDP and education. Higher economic growth reduces the child's incentives to work and increases school attendance. Graph 14 also plots the fitted values of model 4 on the sample period.³² It shows how in the recession period 1998-2000 (quarters 152-163), more children could have entered the labour market. It is important to notice that school attendance, during the same quarters, remains approximately constant, possibly as a result of children combining labour and school activities.

7. CONCLUSIONS

This paper has examined the link between micro and macro income, child labour and educational opportunities for children in Colombia, and has analysed the impact of the 1999 economic recession on the activities performed by children. It has described the economic and political context which led to that crisis and the extent and main features of child labour in Colombia.

An important contribution of this paper is the use of micro and macro data in the estimations since they allow an analysis of micro and macro reasons explaining child labour. I have found that both household earnings and economic growth influence family decisions regarding child labour and education. The economic behaviour generates expectations and uncertainty which through household risk aversion positively or negatively affect the likelihood of sending children to work or to school.

Through empirical results, I have shown that child labour is counter-cyclical and education is pro-cyclical to Colombian economic growth. Therefore, higher levels of social income increase children welfare providing them with more education and less economic responsibilities. This implies that children in Colombia work, mainly, as a result of poverty constraints. The impact of the late 1990's economic crisis on child labour and education was a sharp increase of children involved in the labour force and a slight decrease in school attendance.

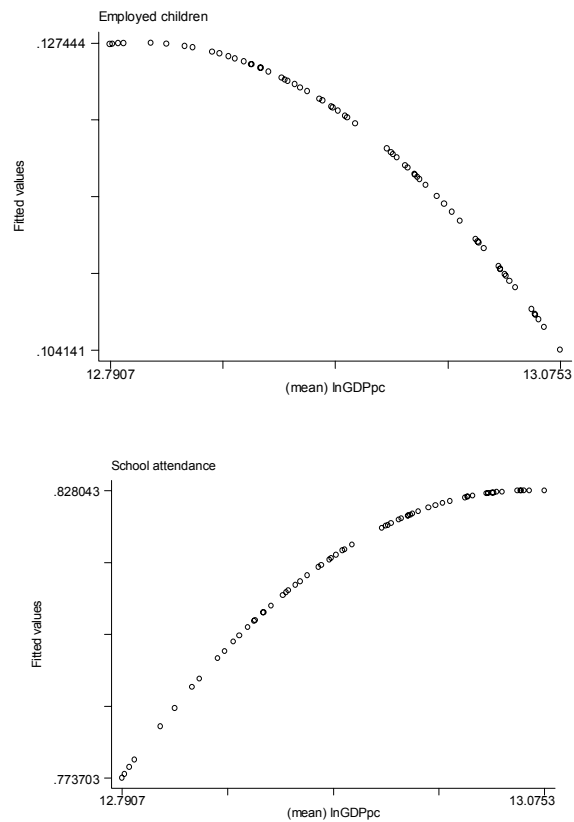
The new challenge for the government after the 1999 recession is to generate incentives for families and children to keep the latter as full-time students. The principal strategy to achieve this objective is alleviating poverty constraints. In general, the economic growth required to reduce poverty is very difficult to reach in the short run; hence, it is necessary to apply other policies, which can rapidly contribute to this

³² There are 64 quarters in the sample. Stata identifies quarterly dates with numbers beginning with 100 for the first quarter of 1985.

Table 14
Results Model 4

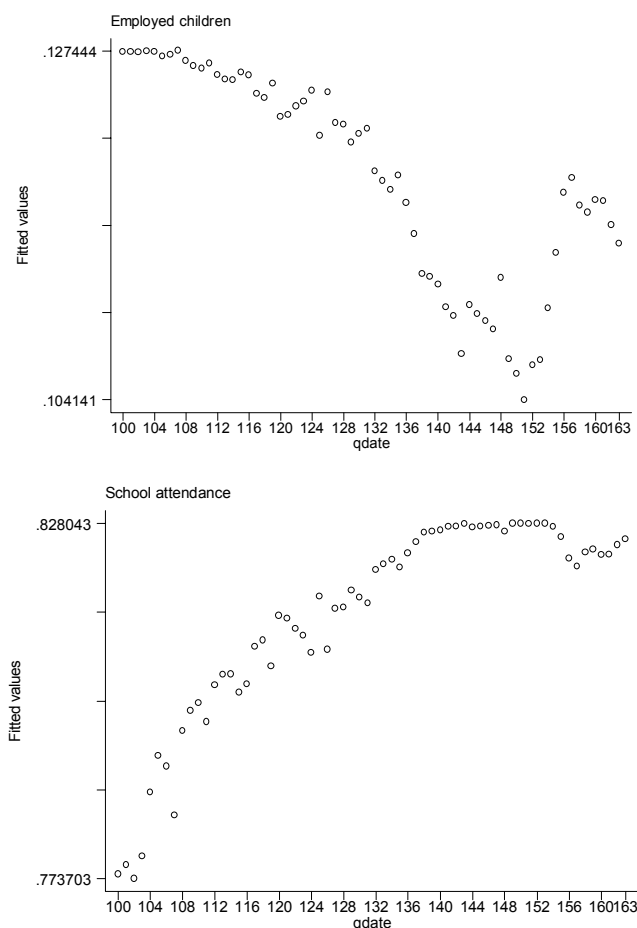
	(1) (mean) empch	(2) (mean) School Attendance
(mean) lnGDPpc	8.448 (1.18)	18.884 (3.38)**
(mean) lnGDPpc2	-0.330 (1.19)	-0.723 (3.35)**
Constant	-53.978 (1.16)	-122.532 (3.39)**
Observations	64	64
R-squared	0.22	0.68
Absolute value of t statistics in parentheses		
* significant at 5%; ** significant at 1%		

Graph 13
Collapsed fitted values vs. GDP percapita



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Graph 14
Collapsed fitted values vs. Quarters



purpose. Some studies have demonstrated that limited access to credit and an inequitable income distribution strengthen the effects of poverty constraints. Dehejia and Gatti (2002) have proved that credit constraints are an important source of child labour since families that cannot borrow money employ children as a way to smoothen their consumption patterns. Cigno, Rosati and Guarcello (2002) found that a group of countries with similar levels of GDP per capita show very large variations in child labour. Therefore, not only GDP per capita can affect child labour participation but income distribution and governmental policies on health and education can also influence household labour decisions.

From this previous analysis, two main areas for further research arise regarding the effects of household access to credit and income distribution in Colombia on child

labour. Another important area of further research is how the economic liberalization of 1990-1991 affected the incidence of child labour. This area requires additional examination, especially because it could contribute to define other types of strategies for the government such as educational policies. Some studies³³ have found that globalisation can diminish child labour, if and only if the country owns a high level of human capital when economic liberalisation occurs. Hence, if this was not the Colombian case, educational policies must focus on generating higher levels of human capital.

REFERENCES

- Bhalotra, S. (2003). "Is Child Work Necessary?". *University of Bristol*. Discussion Paper 03/554.
- Bhalotra, S. and Tzannatos, Z. (2002) "What Have We Learnt?". *The World Bank Social Protection Discussion Paper*, December 2002
- Becchetti, L. and Tovato, G. (2002). "The Child Labour–GDP percapita Relationship: is there something beyond it?". *Vergata University, CEIS. Departmental Working Papers* No. 171.
- Beegle, K., Dehejia, R. and Gatti, R. (2003). "Child Labour, Income Shocks and Access to Credit". *Mimeo*.
- Blom, A. and Hansen, T. (2002) "Economic Perspectives of Tertiary Education; The Case of Colombia". *World Bank, Department of Human Development, LCSHD Paper Series*. July.
- Cardenas, M. (2001). "Economic growth in Colombia: A reversal of "Fortune"?"". *Harvard University, Centre for International Development*. Working paper # 83
- Cigno, A., Rosati, F. and Guarcello, L. (2002). "Globalisation and Child Labour". In *Harnessing Globalisation for Children: A report to UNICEF edited by Giovanni Andrea Cornia*. Chapter 6.
- Dehejia, R. and Gatti, R. (2002). "Child Labor: The Role of Income Variability and Access to Credit across Countries". *NBER Working Paper Series*. Working paper No. 9018. June.
- DNP (2002). "Balance macroeconómico 1998-2002 y Perspectivas para 2003". *Bogotá: National Planning Department. Documento Conpes* No. 3181.
- Edmonds, E. and Pavcnik, N. (2002). "Does Globalization Increase Child Labour? Evidence From Vietnam". *NBER Working Paper Series*. Working paper No. 8760. February.

³³ See for example: Becchetti, L. and Tovato, G. (2002) and Cigno, Rosati and Guarcello (2002)

El Tiempo, 9 of July of 2003. "Familias Colombianas están invirtiendo menos dinero en la educación de sus hijos". Newspaper Article.

Ferraz, C. (2003). "The impact of income Shocks on Child Labour: Evidence from Brazil". *ARE, University of California – Berkeley*. Mimeo.

Galvis, L. (2001). "La Topografía Económica de Colombia". *Banco de la República, Cartagena. Documentos de trabajo sobre economía Regional* No. 22.

Krueger, A. (1996). "Observations On International Labor Standards and Trade". *NBER Working Paper Series*. Working paper No. 5632. June

Ray, R. (2000). "Analysis of Child Labour in Peru and Pakistan: A Comparative Study". *Journal of Population Economics*, 13, 3 – 19.

United Nations, DNP and ICBF (2003). "Familias Colombianas: estrategias frente al riesgo". Bogotá.