Graduate School of Development Studies

Education in time of economic crisis:

Effects of the Global Financial Crisis on Children´s Education in Ecuador

A Research Paper presented by:

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(Ecuador)

in partial fulfillment of the requirements for obtaining the degree of

MASTERS OF ARTS IN DEVELOPMENT STUDIES

Specialization:

Public Policies and Management
(PPM)

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The Hague, The Netherlands
December, 2012

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List of Acronyms

BCE	Central Bank of Ecuador
BDH	Bonus of Human Development
ECV	Living Standards Household Survey
ENEMDU	Employment, Unemployment and Underemployment National Survey
FDI	Foreign Direct Investment
INEC	National Institute of Statistics and Census
LPM	Linear Probability Models
ODA	Official Development Aid
PAE	Food School Program
SENPLADES	National Secretary of Planning and Development
SIISE	Integrated System of Social Indicators of Ecuador
US$	Dollar of United States of America
WB	World Bank

Acknowledgements

First, I want to thank God for giving me the opportunity of studying abroad and conducting this research work. Second, I would like to thank my supervisor, Prof. Arjun Bedi, for his encouragement, guidance, patience, and invaluable support throughout all the research process. I would like also to thank my second reader, Prof. Sylvia Bergh, for her helpful, constructive and encouraging feedback.

I am truly grateful to my beloved family who has always been there for me during my studies. I would like to express my love and my deepest gratitude to my mother, María Teresa Salgado, and fiancé, Mauricio David Pico, for their unconditional love, patience, support, understanding, and motivation.

My gratitude also goes to my friends of the Ministry of Coordination for Social Development, Ministry of Coordination of Economic Policy, Central Bank and National Institute of Statistics and Census for providing the information needed to pursue this research.

Abstract

This paper analyzes the short-run effects of the global financial crisis of 2008-2009 on schooling outcomes for children aged 5-14 and 15-17 in Ecuador. We estimate linear probability models using repeated cross-sectional samples of the annual nationally representative employment, unemployment and underemployment household survey over the period of 2004-2010. The study reveals that the global crisis did not affect children´s school enrollment and attendance, but it shifted enrollment towards public schools. We also explore one of the main transmission channels of the global crisis for Ecuador: remittances. We find that the reduction in remittances during the crisis is not associated with decreases in enrollment and attendance for either of the two age groups. Nevertheless, we observe that the fall in remittances affected the choice of school type. In particular, we find that the drop in remittances led to changes from private to public schools for younger children, but not for older children. This suggests that investments in education of older children were protected during the time of the crisis at the expenses of the quality of education of younger children. Several robustness tests and sensitivity analyses were carried out, including a placebo or falsified shock and estimates controlling for the major social protection and education policy in Ecuador.

Relevance to Development Studies

The main contribution of this study is that it provides empirical evidence of the effects of aggregate economic shocks on children´s schooling, showing the differentiated impacts across economic and social strata, so that policies can be better designed to protect children´s well-being in the event of future crises.

Key words

Aggregate economic shocks, crisis, school enrollment, school attendance, shifts towards public schools, remittances.

Introduction

After the profound economic crisis and dollarization process of 1999-2000, Ecuador has been able to maintain macroeconomic stability and steady economic growth, that have improved living conditions and children´s well-being.

In the last quarter of 2008, depressed aggregate demand in the US and Europe transmitted the global financial crisis to Ecuador. The main transmission channels were a decline in exports, a reduction in remittances and a collapse of oil prices[1]. The quarterly GDP growth rate turned negative for three consecutive quarters, starting in the last quarter of 2008, and exports and remittances decreased by 30% and 11% between 2008 and 2009, respectively.

The disruptive changes in the economic conditions in Ecuador raised serious concerns about the impact of the global crisis at the macroeconomic level and on outcomes such as: employment, inflation and economic activity. However, little concern has been devoted to the impact of the crisis on children´s well-being and accumulation of human capital. This paper examines the effect of this global crisis on children´s schooling outcomes in Ecuador.

A number of papers have been written about the impact of aggregate economic crisis on children´s education and health. The majority of the literature on Latin-American countries point out that, schooling outcomes tend to behave in a counter-cyclical manner in the face of adverse economic shocks and that health outcomes are generally pro-cyclical. Nevertheless, there is also literature that shows that economic crisis have negative effects on children´s education, and that the impact of a crisis depends among other factors, on the context of the country, the nature, length and depth of the crisis.

These insights suggest that questions, such as how economic shocks affect individuals, how the impacts are distributed across economic and social strata, and how households respond to crisis, are fundamentally empirical issues.

To address these questions, this paper analyzes the short-run effects of the global financial crisis on schooling outcomes in Ecuador, exploiting repeated cross-sections of the annual household survey of employment, unemployment and underemployment, *Encuesta de Empleo, Desempleo y Subempleo* (ENEMDU), over the period of 2004-2010. The paper begins by analyzing the trajectory of school outcomes during the period of 2004-2010 and shows that the trend of increased enrollment and attendance among school-age children decelerated during the time of the crisis. Turning to the repeated cross sections, we estimate linear probability models (LPM) and demonstrate that the economic shock did not have an adverse effect on school enrollment and attendance for either younger or older children. These results concur with other Latin American studies about the effects of economic shocks on schooling outcomes, such as McKenzie (2003) in Mexico and Schady (2004) in Peru, which show that school enrollment and attendance were very similar before and during the crisis.

As a way to explore the coping mechanisms that households may have used to face the crisis, the paper also analyzes shifts from private to public schools. The results of the LPM show that the economic shock shifted enrollment towards public schools for younger and older children. To enhance the analysis, the paper also directly examines the effect of one of the main channels through which the crisis may be transmitted, that is, remittances. We find that the steady reduction in remittances during 2007-2010 did not result in decreases in school enrollment and attendance. However, we find that the reduction of remittances did have an effect on shifting enrollment towards public schools for younger children but not for older children. It seems that investments on the quality of education of older children were protected at the expenses of the quality of education of younger children.

[1] The price of the Ecuadorian oil barrel declined from US$ 117 in July 2008 to US$ 27 in January 2009 (BCE).

This paper is organized as follows. Chapter 1 discusses the context of the crisis. Chapter 2 presents a theoretical framework and literature review. Chapter 3 describes the Ecuadorian education system and the main education policies and programs, and discusses the trends in children's education. Chapter 4 presents the empirical framework and the results. Chapter 5 provides conclusions.

Chapter 1

Context and Timing of the Crisis for Ecuador

1.1 General Background

With a per capita income of US$ 4.082 in 2010, in current prices (BCE 2012), Ecuador is classified as an upper-middle income country. It is divided in 24 provinces separated in three main regions: Coast (8), Sierra (10) and Amazonía (6). According to the National Census of 2010, Ecuador has a population of 14,5 millions habitants, divided into four main ethnicities: Mestizos[2] (79%), Afro-Ecuadorians (7%), Indigenous (7%), and Whites (6%). Most of the population lives in urban areas (63%), and females surpasses very slightly the male population[3] (SIISE 2012). Throughout the history, indigenous and afro populations have been discriminated and excluded, becoming groups in disadvantage. However, the new constitution of 2008 ratifies their equality rights, and specifically states policies to eliminate discrimination against these groups and close the gaps in education and health.

In the last decade, Ecuador´s annual economic growth has been steady and was particularly high in 2004 and 2008[4]. After the recovery of the economic crisis of 1999-2000[5], Ecuador has achieved impressive results in improving living conditions and children´s well-being. Poverty has reduced from almost 50% in 2003 to 32,8% in 2010; net attendance for children aged 5-14 has increased from 88,6% in 2003 to 94,8% in 2010; and child mortality rate has decrease from 15.2 in 2003 to 10.5 in 2010 (SIISE 2012).

Historically, and especially since the dollarization process in 2000, Ecuador´s economy has been substantially dependent on exports, as they have represented approximately 37% of total GDP over the past decade. Similarly, Ecuador´s economy relies significantly on remittances since they constitute more than 6% of national GDP. Moreover, Ecuador´s public sector depends largely on petroleum resources, as they have accounted for more than 30% of its total revenues in the last ten years (BCE 2012).

1.2 The crisis in Ecuador

In the second half of 2007, problems in the US subprime mortgage default rates marked the collapse of the US credit market and produced a financial crisis that required public interventions. At the end of 2008, the financial crisis was translated into the trade sector, as the volume of world trade experienced a 20% reduction. At the same time, there was also a collapse in foreign direct investment and cross-border mergers and acquisitions (Bergeijk et al. 2011:5-10).

As world trade decreased, and remittances and oil prices declined, the global economic shock was transmitted directly to Ecuador. After almost eight years of relatively high economic growth, Ecuador started experiencing a deceleration of its economy in the last quarter of 2008; quarterly GDP (at constant prices of 2000) fell by 0,46% as compared to the previous quarter. The negative growth rate in the last quarter of 2008 put in evidence that the global economic crisis was starting to hit the Ecuadorian economy and that it will develop

[2] Mixed of Amerindian and White.
[3] Males (49,6%), and females (50,4%).
[4] GDP growth rate reached 8.8% in 2004 and 7.2% in 2008 (BCE 2012).
[5] In 1999-2000, Ecuador suffered a severe domestic financial and foreign exchange crisis, with GDP contracting by 5.3% (BCE 2012).

further in 2009. As the Central Bank points out in its Quarterly National Accounts Report number 67 (2009:7): "In Ecuador, the global economic crisis started to be felt stronger in the first quarter of 2009, affecting directly consumer´s purchasing power and constraining consumption".

As indicated in Fig. 1, for three consecutive quarters, from the last quarter of 2008 till the second quarter of 2009, Ecuador experienced negative GDP growth rates[6], and thereafter there was a very modest recovery in the three next quarters (during these three quarters, average quarterly GDP growth rate was only 0,19%). Similar to GDP, exports fell for four consecutive quarters, from the third quarter of 2008 till the second quarter of 2009. Between 2008 and 2009, total exports experienced a 30% decrease, with exports to the US decreasing by 45%. Imports as well as exports exhibited negative growth rates.

During the hardest months of the crisis, households experienced negative results in terms of their consumption. As indicated in Figure 2, during the first two quarters of 2009, households reduced their consumption by 2% on average. The credit for consumption to households during the time of the crisis was reduced and seemed to have followed a pro-cyclical path. Consumption credit was constrained from the fourth quarter of 2008 until the end of the second quarter of 2009 (those were the hardest quarters for the Ecuadorian economy); however, recovery started in the third quarter of 2009 (See Figure 3).

Although final consumption of the government was not drastically reduced during the time of the crisis, it did not grow at similar rates as in 2007 and 2008, years that are known for large increases in public spending for social and productive policies. As indicated in Annex I, even in 2009, when the Ecuadorian economy was hit the hardest by the crisis, the government increased the National State Budget by almost 13%, and education expenditure by 8%. Certainly, in order to maintain the public expenditure and the commitments made to the population, the government had to acquire new external and domestic debt, as a response to the collapse of the oil prices. Annex II details the composition of Ecuador´s State budget. As indicated in Annex II, Ecuador faced in 2009 a devastating fall in oil exports revenues due to the fall of oil prices. The oil revenues that had grown at a rate of almost 162% in the previous year, suddenly crashed, reaching a negative growth rate of -40%. As expected, the deficit had to be covered by debt. Ecuador contracted a debt of US$ 2.232 million in 2009. This debt was far the biggest debt to fund the national budget over the entire decade.

Another important macroeconomic variable for Ecuador are remittances. Since the economic crisis of 1999-2000, international migration has substantially increased. Thousands of Ecuadorians migrated to Europe, especially to Spain and Italy. Figure 4 shows the amount of remittances received from 2007 to 2010. It can be seen that, since the first quarter of 2008, remittances have been falling, with some recoveries in some quarters in 2009 and 2010.

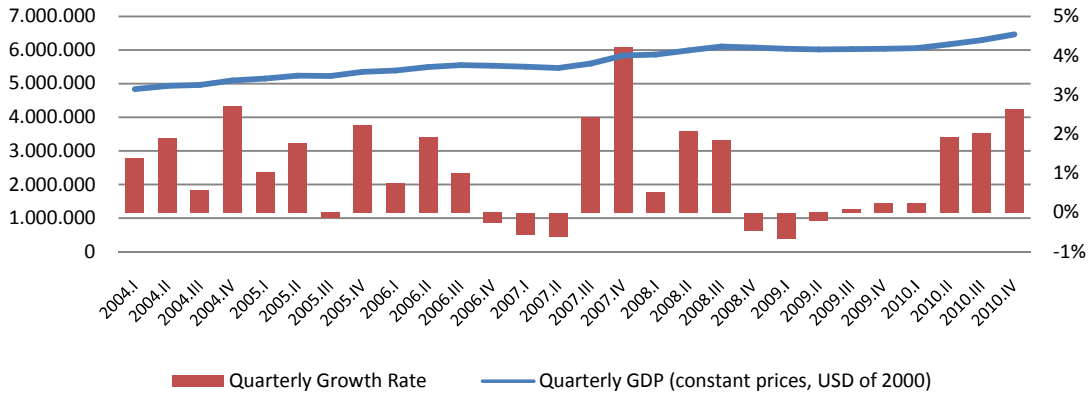
Ever since 2003, and after the catastrophic hyperinflation[7] during the economic crisis of 1999-2000, Ecuador was able to maintain one-digit inflation. However, during the time of the crisis, inflation again reached two digit figures (10%). The months with the highest inflation rates were June, July, August, September and October of 2008. The effects of the crisis on employment were reflected through all of 2009 and half of 2010. The unemployment rate during this period reached 9%, compared to unemployment rates of 5%-6% in previous years.

[6] The strongest fall in the GDP took place in the first quarter of 2009.

[7] In 2000, annual inflation rate reached 95,51%, and in 2001, it reached 40,26% (INEC 2012).

Figure 1: Quarterly GDP and Quarterly Growth Rate

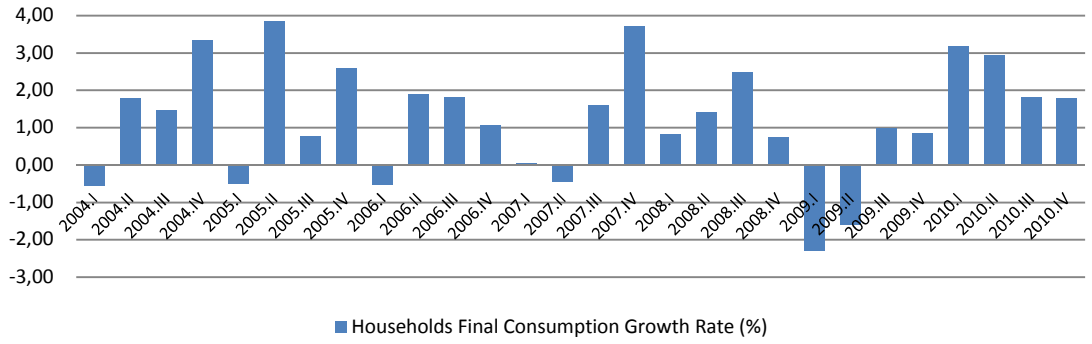
(Constant Prices, US$ of 2000)



Source: Author´s analysis based on data from BCE 2012

Figure 2: Households' Final Consumption Growth Rate

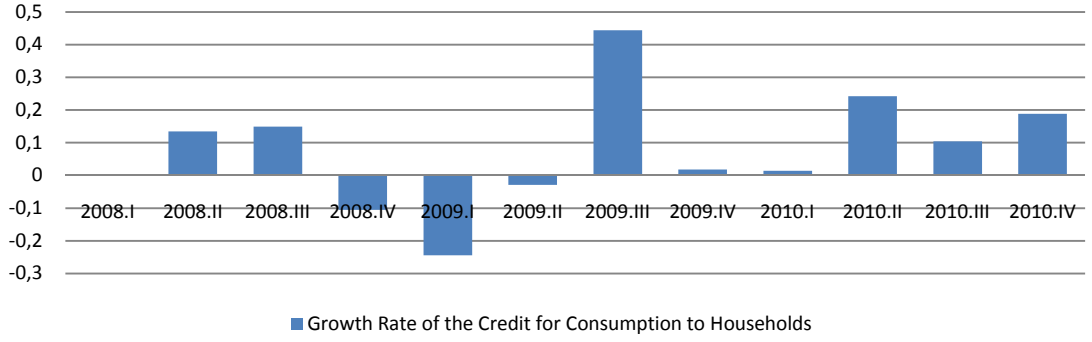
(Constant Prices, US$ of 2000)



Source: Author´s analysis based on data from BCE 2012

Figure 3: Growth Rate of Credit for Consumption to Households

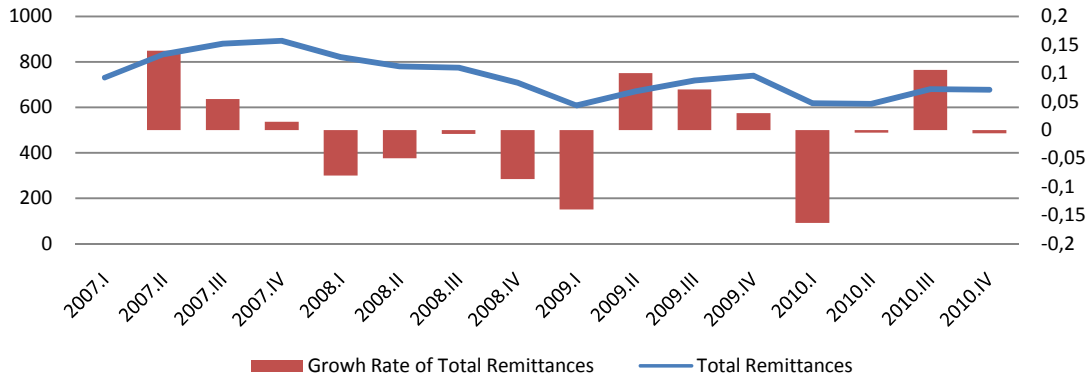
(Constant Prices, US$ of 2000)



Source: Author´s analysis based on data from BCE 2012

Figure 4: Quarterly Remittances

(Millions of US$)



Source: Author´s analysis based on data from BCE 2012

Transmission Mechanisms

As Bergeijk et al. (2011:8) point out, the major transmission mechanisms of the global economic crisis of 2008-2009 for developing countries were: (i) the reduction in Foreign Direct Investment (FDI); (ii) the decline in trade; (iii) the reduction on remittances; (iv) and the decrease in Official Development Aid (ODA). Given the links of the Ecuadorian economy to the epicenters of the global crisis, one can argue that in the Ecuadorian case, the major transmission channels of the crisis were the decline in trade, more explicitly a decline in exports, and a reduction in remittances. FDI and ODA are not considered major transmission mechanisms for Ecuador as they historically have had a very modest role in the economy and public funding (FDI represents on average from 2000 to 2010 just 1,5% of GDP). In this work we focus on the analysis of remittances, and explore if its reduction during the time of the crisis is associated with adverse effects in schooling outcomes in Ecuador.

Over the last decade, Ecuador has experienced a large international migration due to the deterioration of living standards caused by the economic crisis and the dollarization process of 1999-2000. It is estimated that over the decade about 1.147.800 Ecuadorians have migrated to Spain, United States, Italy, Germany, United Kingdom and other Latin-American countries (WB 2011). As Calero et al. (2009:1145) state: “While previous waves (prior to the late 1990s) of Ecuadorian migration had been directed mainly to the United States, the more recent wave of migration has been directed mainly to Spain”.

According to the Living Standards Household Survey from 2005-2006, *Encuesta de Condiciones de Vida* (ECV), about 16% of Ecuadorians live in a household that receives remittances. These households receive on average US$ 29 per capita per month (which is equivalent to about 21% of monthly household income) and most of them reside in urban areas, and belong to the third, fourth and fifth income quintiles. Households which receive remittances report that they use the money from remittances mainly for education, food, health and rent[8] (Calero et al. 2009:1145-46).

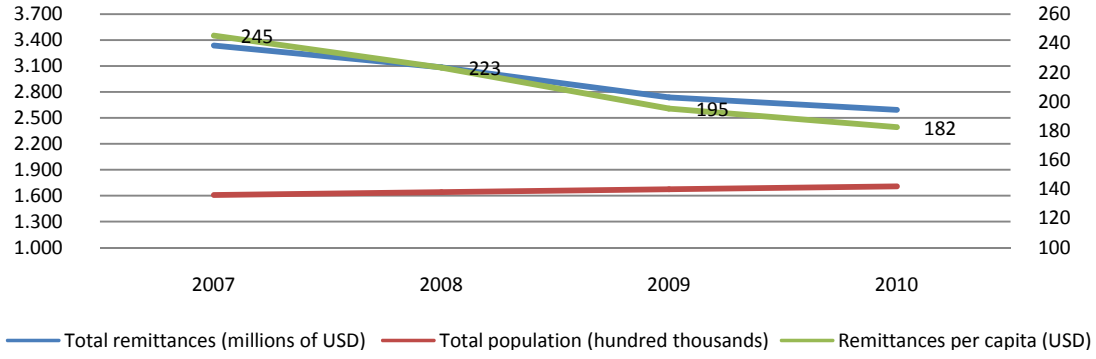
As expected, the most visible consequence of this international migration is the substantial increase in capital inflows from remittances. From 2000 to 2007 remittances showed strong growth and turned into the second most important source of foreign income of the economy. During this period remittances grew at an average rate of almost 15%, reaching

[8] Almost 90% of the income from remittances goes to cover these expenses.

a peak in 2007 of US$ 3.335 million (around 7.3% of GDP). In 2008, remittances started to decline (-8-%), and continue with this trend till 2010. The sharpest decline occurred in 2009, when remittances decreased by 11%. Figure 5 shows the total amount of remittances, total population and annual remittances per capita over the period of 2007-2010. As previously discussed above, one can see that remittances steadily declined from 2007 to 2010. Concurrent with the decline in total remittances, remittances per capita per year fell from US$ 245 in 2007 to US$ 182 in 2010 (26% decrease).

Giving the importance of remittances in the Ecuadorian economy, some studies have been carried out to explore the impact of remittances on children´s well-being. Calero et al. (2009) investigate how remittances affect education investments in Ecuador. They show that remittances increase school enrollment and decrease child work, especially for girls and children in rural areas. Furthermore, they find that remittances affect the choice of school type. They show that remittances led to shifts from public to private schools, hence increasing the quality of education children receive.

Figure 5: Remittances per capita



Source: Author´s analysis based on data from BCE and INEC.

Based on the data we have analyzed in this section, one can argue that the global economic crisis of 2008-2009 did affect the Ecuadorian economy. This is based on the narrative provided above which shows that for about four consecutive quarters, from the third quarter of 2008 to the second quarter of 2009, the main macro-variables deteriorated considerably. The year 2009, was the hardest year for the Ecuadorian economy since the previous domestic crisis of 1999-2000.

After the crisis, Ecuador has experienced a recovery in 2011, with GDP growing at 8%. Key macroeconomic variables such as exports, inflation, employment and households' final consumption have showed significant improvement between 2010 and 2011[9]. Nevertheless, other variables, such remittances and government final consumption, have been experiencing important slowdowns and even negative growth rates after the time of the crisis. Government final consumption´s growth rate has decelerated, reaching only 4.1% between 2010 and 2011; whereas in the two previous years to the crisis it grew at 8.8% on average. Likewise, remittances have slowdown its growth in 2011, as they grew at only 3,1%; meanwhile in previous years they reached growth rates above 13%. Moreover, remittances show negative growth rates in the first semester of 2012 (remittances in the first semester of 2012 decreased by 10% compared to total remittances in the first semester of 2011).

[9] Exports increased by 8.2%; annual inflation decreased to 4.47%; unemployment decrease to 5%; and households' final consumption increased by 5.9% (BCE 2012)

Given the links of the Ecuadorian economy to the epicenters of the crisis (mainly through trade, remittances, oil prices and access to credit), the slowdown of world economy in 2012, and the forecasts that the real effects of the crisis are yet to come, this study is of particular interest for policy purposes as children´s well-being and the accumulation of human capital could be in jeopardy.

The aim of this research is to measure the short-run effect of the recent global crisis on schooling outcomes, such as school enrollment and attendance, and analyze one important transmission mechanism of the crisis: remittances. In addition, this work examines the shifts from private to public schools as a way to explore the coping mechanisms Ecuadorian households may have used to face the economic crisis.

Chapter 2

Theoretical Framework and Literature Review

2.1 Aggregate Income Shocks and Schooling Outcomes

In this section, we outlined the conceptual framework for understanding and explaining the likely impact of aggregate economic shocks on schooling outcomes. We use a simple conceptual framework developed by Ferreira and Schady (2008) on educational choice, which draws on the ideas of the models of investments in human capital and intertemporal time-allocation decisions, such as the ones developed by Becker (1965, 1991) and Ben-Porath (1967).

Ferreira and Schady (2008) consider an intertemporal model, with two periods, in which individuals derive utility from their private consumption. In the first period, individuals have to decide how to allocate their time between school and work. If they choose to work in the first period they are paid an unskilled wage. In the second period, the individual wage depends on the amount of human capital they have acquired in the first period. In this model, the level of human capital is a function of how much individuals study and also of the quality of their education. The schooling process that builds human capital does not derive utility directly by itself, as it is used only as a way to increase future earnings. Thus, the key trade-off, is between child work that increases consumption in the first period and education that increases consumption in the second period (Ferreira and Schady 2008:3).

Under these premises, this model shows that the optimal educational choice depends on three factors: (i) the child wage rate in period 1 (w); the expected future earnings in period 2 (π); and the quality of education (q)". The model states that the schooling choice also depends on access to credit markets. If families have access to credit markets, then families can separate their investment decisions from their inter-temporal consumption decisions. If credit markets work, the educational choice will also depend on the interest rate. However, if credit markets do not exist or they do not function correctly, the school choice will be influenced by the initial income or consumption level. (Ferreira and Schady 2008:4).

The basic insight of the model is illustrated in Figure 6. The graphic plots the optimal schooling choice against the child wage rate. One can see that the relationship between the quantity of schooling demanded (understood as the share of child´s time spent in school) and the child wage is a negative one. This negative relationship reflects the demand for schooling and shows that, as child´s wage increases, demand for schooling decreases. The other key determinants can be thought of as factors that shift the curve. So, for example, when there are no credit markets, there would be three basic shift variables: the expected future earnings in period 2 (π); the quality of education (q); and the initial income or consumption levels (c_1) (Ferreira and Schady 2008:4).

Based on this model, before an aggregate shock (for example, a recession), a particular household is at point *A,* investing S_0 in education (the child spends a share $1- S_0$ of his/her time working). When a recession hits the economy, the shock affects mainly two parameters in the schooling choice: the unskilled wage rate in period 1 (which falls from w_0 to w_1), and other sources of household income that finance household´s consumption in period 1 (c_1) (Ferreira and Schady 2008:4).

The effect of the aggregate shock on schooling depends, first, on whether the household has access to credit markets. If it does, the recession does not affect the schooling choice, as the household is able to borrow money to handle the income shock. Nevertheless, there is a substitution effect, as child wage has fallen. The substitution effect reduces the

opportunity cost of studying and corresponds to a movement along the original demand curve for schooling, from point A to point B. This implies that when there is access to credit markets and when education is seen as an investment rather than a consumption good, one should expect education to behave counter-cyclically: education outcomes, such as enrollment and attendance, should increase during recessions, and fall during expansions (Ferreira and Schady 2008:4-5).

However, there are some limitations to these forecasts. First, if the recession lowers expectations for future earnings, the demand curve will shift downwards, offsetting the quantity demanded. This could happen, for example, if the recession has a proportionately greater effect on the income of more skilled workers, and if a part of this reduction were expected to be permanent. Second, a similar effect is obtained if the recession reduces the quality of education in the current period; for example, when there are reductions in public expenditure in education (Ferreira and Schady 2008:5).

However, in most developing countries, access to credit markets is very limited. When credit markets are not available, or they do not function correctly, the consumption of first period shifts the demand for schooling. As the consumption in first period falls (C_1), so does the quantity of schooling demanded at every child wage rate. This happens because the marginal utility of consumption in period 1 rises relative to the utility of consumption in period 2. The rise in the marginal utility of consumption in period 1 shifts the schooling demand curve downwards; then, the new schooling demand could be a curve such as D1 or D2. In this case, one can see two effects from the recession: an income effect (which corresponds to segments AC or AE), and the same substitution effect (which corresponds to arcs CD or EF) (Ferreira and Schady 2008:5).

A direct implication is that, when credit markets are limited or do not function correctly, the effect of a recession on the quantity of schooling demanded, usually measured through school enrollment and attendance, is theoretically ambiguous. When the income effect is smaller than the substitution effect (that is what happens in curve D1), then the end-point could be one such as D, where the quantity of schooling demanded is still above the initial level S_0. In this case, the result is similar to the scenario with functioning credit makers, as the substitution effect dominates[10]. The schooling outcomes under this scenario tend to be counter-cyclical. If, on the other hand, the income effect is larger than the substitution effect (as in curve D2) then the household could end up at a point such as F, where the quantity of schooling demanded is below the initial level S_0. In this last case, the schooling outcomes tend to be pro-cyclical (Ferreira and Schady 2008:5-6).

As one can see, this framework shows us the theoretical ambiguity of the effect of aggregate income shocks, and provides us with some basic knowledge about what factors are likely to determine whether the income or substitution effect dominates. Ferreira and Schady (2008) highlight four important factors:

First, access to credit markets. When there is scare access to credit markets, the initial level of income matters. For example, at higher initial levels of income, the reduction in income from a recession will shift the demand curve downwards by less than in the case of lower levels of initial income. This is why one could expect richer countries[11] to be more likely to behave in a counter-cyclical manner regarding schooling demand as compared to poor countries (Ferreira and Schady 2008:6).

Second, the degree of development of credit markets. One can expect smaller income effects, and smaller decreases in the quantity of schooling demanded in countries where access to consumer credit is developed and capable to reach middle-income and poor households than in those where credit markets are limited and accessible only for households in better economic conditions (Ferreira and Schady 2008:6).

[10] The substitution effect that arise from the lower child wage.

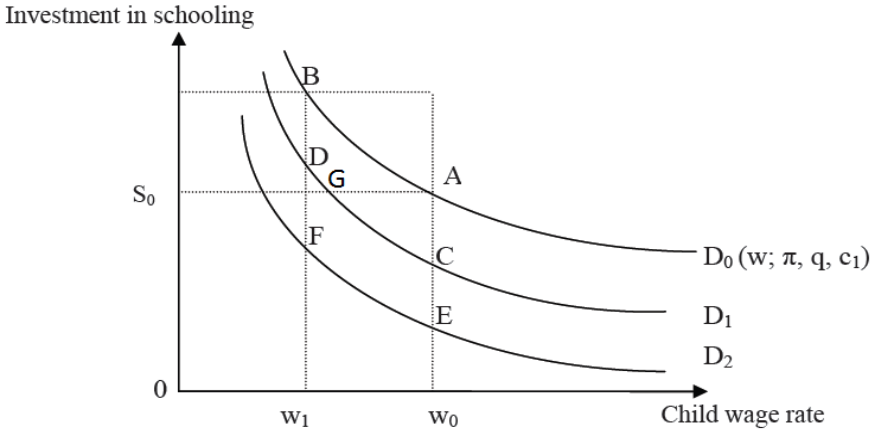
[11] Like the United States or the richer Latin American countries.

Third, the magnitude and expected duration of the crisis. Given an initial income level, deeper and longer crises shift the demand for schooling down by more, for every child wage rate (Ferreira and Schady 2008:6).

Finally, reductions in public spending. Substantial reductions in public spending on education can be thought as "quality effect" that reinforces the income effect, resulting in a larger reduction in the demand for schooling at every given wage rate. This would lead one to expect that the demand for schooling to be more likely to behave in a counter-cyclical manner when public spending on education is protected during recessions (Ferreira and Schady 2008:6).

The basic insights of this model allow us to speculate the likely impact of the global financial crisis on schooling in Ecuador. Given that in Ecuador, credit markets are limited, undeveloped and mostly targeted to better-off households, one can argue that, in the Ecuadorian case, the main basic shifter of the demand for schooling is the initial level of consumption. Established this premise, one can realized that, the effect of the global crisis on schooling in Ecuador is theoretical ambiguous, given that households are not able to borrow to smooth out the income shock of the crisis. Nevertheless, given the context and the nature of the crisis in Ecuador, one can somehow anticipate two potential scenarios. First, one in which the demand for schooling increases in the face of the crisis; and the second one, in which the quantity of schooling demanded remains the same. The ideas behind these potential scenarios is that, one can suspect that the global crisis produced small income effects and therefore, small downward shifts of the demand for schooling, as Ecuador entered the global crisis with higher levels of per capita income and lower levels of poverty than previous crisis. The suspicion of small income effects in Ecuador can be reinforced by the fact that the duration and depth of the crisis in Ecuador was not as hard as in other countries of the region (Ecuador started to recovery from the crisis at the beginning of 2010 and achieved important economic growth in 2011). However, on the hand, to anticipate whether the substitution effect was big or small is a more complicated issue; and is exactly the part that can turn the results from one to the other scenario. If the substitution effect would have been bigger than the income effect, then, we could expect to find the quantity of schooling demanded situated in a point similar to D in Figure 6, where the demand for schooling is higher than the initial level (point A). Yet, if the substitution effect would have been as big as the income effect, then, we could expect to find the demand for schooling located in a point such as G, where the quantity of schooling demanded is the same than initial one in point A. We will find out which of these potential scenarios turn out to be the correct one in Ecuador through the empirical analysis.

Figure 6: Aggregate Income Shocks and the Demand for Schooling



Source: Ferreira and Schady (2008)

2.2 Literature Review

There are several papers that analyze the impact of aggregate economic shocks on schooling outcomes in the developed and developing world. Goldin´s (1999) study examines schooling outcomes during the Great Depression in the United States. Goldin shows that the biggest increase in high-school enrollment and graduation rates took place between 1928 and 1938. Even more, Goldin highlights that the states that were hard hit by the crisis, such as Delaware, New Jersey and New York, experienced the greatest graduation rates. This counter-cyclical behavior on enrollment and graduation rates can be explained with the educational choice model discussed above. During the great depression, salaries were falling and there were high unemployment rates; thus, reducing the opportunity cost of schooling. With salaries falling and a lot of unemployment, the logical thing to do was to enroll in school and finished the education process, as the great depression last for quite a few years. One can say that in this case, the substitution effect dominated the income effect. This counter-cyclical pattern in education in the US appears also more recently with Betts and McFarland´s (1995) study, which show that increases in the unemployment rate are associated with greater increases in community college attendance.

The counter-cyclical behavior can also be found in some Latin-American countries. For example, Blinder (1999) analyzes the relationship between changes in per capita GDP and school retention and continuation rates in Mexico. Blinder shows that school retention and continuation rates generally exhibited a counter-cyclical behavior and had sharply positive spikes in periods when the economy was contracting.

Likewise, McKenzie (2003) analyzes the effect of the Mexican Peso crisis of 1995-1996 on several outcomes, including school attendance, and studies the adjustment mechanisms used by households to cope with the shock. McKenzie uses the National Household Survey of Income and Expenditures for 1992, 1994, 1996, and 1998, and estimates second differences of time effects, controlling for age and long-run (cohort) effects. He shows that school attendance remained unchanged for many age groups, and that for some age groups, school attendance actually increased during the period of the crisis. For example, children between 15 to 18 years old had higher school attendance rates in 1996 than in 1994, meanwhile there were little increases for this age group between 1992 and 1994 (the period before the crisis). McKenzie also shows that households adjusted to the crisis by changing the composition of their consumption (for example, households reduce the consumption of primary health care), reducing expenditure on durable and nonessential items, and reducing saving rates. McKenzie found that inter-households transfers, which is a mechanism that households use to smooth idiosyncratic shocks, did not serve as an important coping mechanism during the time of the Peso crisis, given its wide spread nature. In contrast, McKenzie finds that transfers income from abroad, from families and family members in the United States, played an important role in helping households during the crisis. McKenzie concludes that: “While an aggregate shock reduces the scope for risk pooling within the country, cross-country risk pooling still remains a possibility”.

Furthermore, McKenzie demonstrates that the coping strategy of adding more households members to the labor force and increasing hours of work was not used during the time of the crisis, as the crisis reduced labor market opportunities. McKenzie concludes that: “While increasing labor supply in response to an idiosyncratic shock is a viable option for households, an aggregate shock leads to weak labor demand, preventing this channel from serving the same role as a coping mechanism during aggregate crises. This reduction in labor market opportunities does reduce the opportunity cost of schooling, and hence we find that school attendance rates actually rose among 15–18 year olds during the crisis”.

Duryea and Arends-Kuenning (2003) study the effects of two macroeconomic crises on schooling outcomes in urban Brazil, focusing on whether the income effect or substitution

effect dominates as macroeconomic conditions change over time. The first macroeconomic shock took place between 1981 and 1983, when GDP per capita fell by 13 percent; and second shock took place between 1990 and 1992, when GDP per capita fell by 8 percent. Duryea and Arends-Kuenning use 12 annual Pesquisa Nacional Amostra de Domicilios household surveys over the period of 1977 to 1998, and estimate bivariate probit models. Duryea and Arends-Kuenning demonstrate that employment rates for 14 to 16 year old boys and girls increased as local labor market conditions improved; children were more likely to drop-out of school as local employment opportunities became more favorable. For example, in a non-crisis year, a 20% increase in state-level wage decrease the probability of school attendance by 1.6 percentage points, and increase the probability of working by 1.3 percentage points; meanwhile, the effect of a 20% in wage in school attendance in a crisis year is reduced by more than half, and has no effect on the probability of working.

Schady (2004) analyzes the impact of the Peruvian macroeconomic crisis of 1988-1992 on school attendance, child employment and years of schooling completed for children from 6 to 17 years old. He uses nationally representative living standard household surveys (LSMS) for 1985/1986, 1991 and 1997, and constructs a pooled sample with the three surveys. He estimates probit regressions for contemporaneous events for school attendance and child employment, and estimates ordinary least squares for the number of grades passed for age. Schady shows that the probability of being enrolled in school was similar before, during and after the crisis and that there is no specific effect for population groups, such as the poor. Schady also finds that the percentage of children who combine school and work declined during the crisis. Moreover, Schady shows that the number of grades completed for a given age was higher for children exposed to the crisis than for those who were not, and that the number of years completed increase with the number of years of exposure to the crisis. For example, children in school age exposed to the crisis completed about 0.25 more years of schooling than those who were not in school age during the crisis.

Maluccio (2005) investigates the effects of the reduction in the price of coffee between 2000 and 2002 in Nicaragua. He uses data collected for the impact evaluation of the Nicaraguan Pilot Conditional Cash Transfer (CCT) program, called Red de Protección Social (impact evaluation with random allocation of treatment and control groups). Maluccio shows that per capita consumption for households in the control group fell by 10 percent on average, and that reduction in coffee-growing areas was much larger (approximately 27 percent). Maluccio also show that school enrollment of children aged 7-12 increased, especially in coffee-growing areas, possibly reflecting the decreases in rural labor demand. On the other hand, Maluccio shows that nutrition status of children ages 6-48 months considerably deteriorated over the time of the crisis.

Similar to Maluccio´s study, Kruger (2007) examines the effects of changes in the value of coffee production in coffee-growing areas in Brazil. Kruger finds that in regions where coffee is economically important, a decrease in the value of coffee production increases the probability of enrollment for children in low and middle income levels. Kruger concludes that during periods of economic growth, education may be adversely affected, especially for the poor. Kruger (2007:462) state that: “Economic growth may not be a panacea to all problems related to poverty, since some income-constrained households sacrifice their child's education when the local economy is growing in order to increase household income with child labor.

López Bóo (2008) examines the effect of labor market opportunities on schooling-employment decisions for secondary-school aged children in urban Argentina. The study covers a 12 year period (1992-2003) and focuses on the recession period from 1998-2002. López Bóo uses individual and household level observations from the Argentine Permanent Household Survey and estimates Multinomial Logit Models for School-Employment Decisions. López Bóo shows that households, including poor households, did not make cutbacks in key human capital investments. López Bóo demonstrates that during years when there was a deterioration of employment conditions, the probability of attending school increased and the

probability of combining work and school decreased. In fact, the probability of attending school for high-school children was about 6 percent higher in 2002 than in 1998.

Contrary to most of the evidence from Latin-American countries that schooling outcomes tend to behave in a countercyclical manner in the presence of adverse economic shocks, Funkhouser (1999) finds a pro-cyclical patter in school enrollment and child employment in Costa Rica during the recession of 1981-1983. Funkhouser shows that between 1981 and 1982, there was a drop in school enrolment rates of approximately 6 percentage points, and an increase in the proportion of children working. However, when Funkhouser compares the years of education completed between the children that were exposed to the crisis and those who were not, at ages above 18 years old, he finds that there are no difference in educational attainment between the two groups. Funkhouser concludes that the drop in school enrollment was only temporary, and that children who were exposed to the crisis recovered the schooling deficits after the crisis.

León (2000) examines the impact of the financial and economic crisis of 1999 on children´s schooling in Ecuador, and explores the strategies used by households to cope with the crisis. He uses a nationally representative survey designed to collect information of the effects the crisis on the beneficiaries of the Bonus of Human Development (BDH), a cash transfer program targeted to poor households. León finds that during the time of the crisis, school drop-out rates and child work increased among children living in households that receive the BDH. León also finds that households adapted to the crisis through several coping strategies such as changes in consumption[12], increases in households indebtedness, delaying of payments[13], delaying of medical treatments[14], and deaccumulation of durable goods.

More recently, Duryea and Morales (2011) study the effects of the global financial crisis on school attendance and child employment in El Salvador. Duryea and Morales (2011) use a pooled sample of 10-16 years old children over the period of 2000-2008, and estimate linear probability models. Duryea and Morales show that the financial crisis decreased school attendance and increase child employment, especially for boys. Duryea and Morales also show that financial crisis shifted attendance towards public schools. Duryea and Morales state that the results in El Salvador are not representative of the effect of the crisis on children´s education in the Latin-American region, as most countries did not exhibit falls in school attendance or increases in child work. They state that their exceptional findings may be related to the duration and depth of the global economic crisis in El Salvador as well as particular conditions of the country. Finally, Duryea and Morales (2011:542) concludes that: "Countries in Latin America in general entered the most recent financial crisis in better fiscal conditions than had been the case in previous crises, allowing for a more flexible and rapid response. As a whole, the region avoided the precipitous declines in social expenditures that occurred in numerous previous crises. However, El Salvador's ability to respond aggressively with countercyclical policies was constrained by its monetary policy of dollarisation in addition to a low tax base already highly directed by earmarks. Whereas Mexico, also very heavily hit by the crisis, responded with fiscal stimulus at the end of 2008 followed quickly by social programmes, El Salvador's response came later in June 2009 and included expanded social programmes". Duryea and Morales´s findings concur with the theoretical framework used in this paper, as the initial level of income, span and magnitude of the crisis, as well as the constrained fiscal policy seem to have been the main downward-shifters of the demand for

[12] Households reported that they were buying food with less quality; households decreased and even stopped consuming certain type of food such as meat, milk and chicken; and households decrease the number of meals per day.

[13] For example, households reported that they stopped paying the house rent and the bills with the small-local-food-store (tienda in Spanish) during the time of the crisis.

[14] 66,5% of households interviewed reported that they delayed medical treatment of children under 15 years during the time of the crisis.

schooling in El Salvador, suggesting that the income effect dominated the school-substitution effect.

Outside of Latin-America, there is also evidence of the pro-cyclical behavior of schooling outcomes when aggregate income shocks occur. Jensen (2000) analyses the effects of weather shocks on school and health outcomes in Côte d'Ivoire. He uses panel data from the Côte d'Ivoire Living Standards Survey (CLSS) from 1986 and 1987. Jensen examines whether children living in regions that experienced adverse weather shocks had lower investments in education and health. Jensen shows that in the time before the shock, there were small differences in enrollment rates in shock and non-shock regions, confirming that in the absence of weather shocks, the two kinds of regions would have followed a similar path in enrollment. However, after the shock, school enrollment declined by 11 and 14 percentage points among boys and girls (respectively) living in areas that experienced adverse weather shocks, while it increased in all other areas. Jensen also shows that after the weather shock malnutrition doubled in shock-regions.

Thomas et al. (2004) studies the effect of the 1998 economic and financial crisis on schooling outcomes in Indonesia. He uses a panel data of the Indonesia Family Life Survey (IFLS) from 1997 to 1998. Thomas shows that households' spending on education decreased during the time of the crisis, especially for the poorest and middle-income households. Thomas find that young children were much less likely to be in school in 1998, relative to 1997; meanwhile, older children were slightly more likely to in school. Thomas concludes that: "poor household apparently sought to protect investment in the schooling of older children at the expenses of the education of younger children".

From the literature review one can observe that there are a number of papers that have studied the impact of aggregate economic shocks on schooling and child employment outcomes. We have seen that most of the literature analyzes the effects of economic shocks that are produced within the country´s economy. These domestic shocks include exchange rate and financial crisis, such as the Peso Crisis in Mexico and Argentina; mismanagement macroeconomic crisis, such as in Peru during 1988-1990; and crises produced by the reduction on prices of specific, economically important agriculture products. However, there is limited work on studying the particular effects of global economic crises on children's well-being in developing countries that are closely, economically linked to the epicenters of such crises.

Within the literature about the effects of domestic economic crisis on schooling and child employment outcomes, one can see that the majority of studies show little evidence that school enrollment and attendance declined during economic contractions. In fact, most of the studies find that school enrollment and attendance were very stable before and during the crisis, and that in some cases, they even increase during economic contractions. Nevertheless, there is also some literature that shows that economic crises have had adverse effects on schooling outcomes, such as Funkhouser (1999), León (2000), and Thomas (2004) in Costa Rica, Ecuador and Indonesia, respectively. Furthermore, a different picture emerges from Duryea and Morales´s (2011) study of the effects of the global financial crisis on children´s school and employment outcomes in El Salvador, as they find that schooling and child employment outcomes have been adversely affected by the crisis.

Given that the effect of aggregate economic shocks on schooling outcomes is ambiguous in theory; that there is mixed evidence about the effects of economic crisis on children´ education; and taken into account that the specific conditions of a country determine whether schooling outcomes behave in a counter-cyclical or pro-cyclical manner when facing aggregate economic shocks, it is necessary to empirically country-specific examine the effects of the global financial crisis on children´s education. This paper analyzes the effect of the global financial crisis of 2008-2009 on education outcomes in Ecuador, including school enrollment, attendance and shifts from private to public schools. Based on the analysis, the paper aims to provide basic insights of the effect of economic shocks on children´s education, so that key public policy actions can take place to guarantee children´s well-being.

Chapter 3

Education in Ecuador

This section starts with a description of the Ecuadorian education system and the main education policies and programs implemented over the period of 2004-2010. Then, the paper analyzes the trajectory of schooling outcomes[15] in Ecuador, focusing on changes at the time that the crisis hit the Ecuadorian economy. We examine these changes across gender, area, ethnicity, and economic status.

3.1 Education System, Policies and Programs

Since 1996, the Ecuadorian education system for children and teenagers is divided into two main parts: General Basic Education, *Educación General Básica* (EGB), and Upper Secondary School, *Bachillerato*. General Basic Education consists of 10 years of schooling, and begins at age 5 and continues until age 14. Upper Secondary School consists of 3 years of schooling, and covers teenagers aged 15-17. Up to 2008, children in Ecuador had to compulsorily attend General Basic Education, according to the Ecuadorian Constitution of 1998. In October of 2008, when a new Constitution was launched, compulsory attendance was increased up to Upper Secondary School or its equivalent[16]. Even though education in Ecuador has been compulsory for several years, no legal sanction has been made to cases in which this condition is not satisfied. Public education in Ecuador is secular at all levels, and since the introduction of the new Constitution it is free up to tertiary education. Historically, public education has been seen as inferior to private education in terms of quality. Children from public schools show lower educational achievements, such as lower test scores and graduation rates, and higher repetition and drop-out rates[17]. Moreover, public's schools exhibit higher ratios of student-teacher[18] and student-class[19] than private schools (SIISE 2012, Ponce 2000).

Several policies have been implemented in the last decade to improve school enrollment and attendance in Ecuador. One of the main policies is the Bonus of Human Development, *Bono de Desarrollo Humano* (BDH) that dates back from 1998. The BDH started being implemented in 1998 as a mechanism to compensate for the high cost of living and the reduction of subsidies in gas and electricity. In 2003, the government transformed the BDH into an unconditional cash transfer that promotes education and health human capital, and set conditions on parents, such as sending children to school and take children to regular medical check-ups. It is important to mention that BDH is an unconditional cash transfer as there is no universal monitoring of the conditions on education and health, and there is sanction to parents who do not meet the conditions.

Since 2003, the BDH program has been selecting its beneficiaries based on a proxy means test that includes individual and household socio-economic characteristics (known as the Beneficiary Identification and Selection System, or Selben). The beneficiaries of this

[15] In this paper, we use the term "schooling outcomes" to refer to school enrollment, school attendance and public enrollment, as this term is often used in econometric papers, such as Ferreira and Shady (2008), Duryea and Morales (2011), etc.

[16] Upper Secondary School also considers technical high schools.

[17] Repetition rates for children aged 14 in private schools is 3,6% compared to 6% in public schools. Similar, drop-out rates for children aged 14 in private schools is 1,5% versus 5,3% in public schools (SIISE 2012).

[18] The student-teacher ratio in public schools is 19,5 compared with 13,8 in private schools (SIISE 2012).

[19] The student-class ratio in public schools is 26 compared with 16 in private schools (SIISE 2012).

program are mothers with children up to 18 years old and belong to the two poorest quintiles[20]. Up to 2006, the BDH´s beneficiaries received a monthly transfer of US$ 15. At January of 2007, the amount of the transfer was doubled, and by mid-2009 the transfer was increased by US$ 5. Currently, the BDH beneficiaries receive a monthly transfer of US$ 35 through the banking system. In 2010, the BDH´s budget reached the amount of $US 443 millions[21], that represent almost 1% of national GDP. Around 31% of the Ecuadorian households receive the BDH.

Several impact evaluations have been carried out to examine the effects of the BDH on schooling and health outcomes. Most of the studies have shown that the BDH has led to an increase in school enrollment and regular attendance, and has had large and negative effect on child employment. For example, Schady and Araujo (2006) show that the BDH transfer increased school enrollment by about 10 percentage points, and decreased child work by about 17 percentage points. However, on the other hand, it has been seen that BDH does not exert a positive impact on students' test scores. Ponce and Bedi (2010) find the BDH has no impact on mathematics and language tests, and suggest that attempts at building human capital require additional and alternative interventions. The impact of the BDH in health is much more modest than in schooling. Paxon and Schady (2010) find that BDH had positive effects on the physical, cognitive, and socio-emotional development of young children, but no effect on increasing health clinics visits for growth monitoring.

Other program that aims to improve schooling outcomes is the School Food Program, *Programa de Alimetación Escolar* (PAE) that has been implemented since 1999. Currently, the PAE consist mainly in the delivery of school breakfast in the poorest schools of Ecuador for children in General Basic Education. From 2006 till 2008, the number of beneficiaries averaged 1.250.000 children. In 2009, there was a substantial increase in the number of beneficiaries of around 20%.

Other programs aiming to reduce the barriers to school access are the Free School Texts Program, *Programa de Textos Escolares Gratuitos* and the Free School Uniforms Program, *Programa de Uniformes Escolares Gratutitos*. As the program names indicate, these are programs designed to deliver free school texts and school uniforms to children in General Basic Education. The Free School Texts Program was nationally launched in 2007, and delivered schools texts to 2.323.169 students. By 2009, the number of students who receive free school texts increases by 12%. Similarly, the Free School Uniforms Program started being implemented in 2007 and delivered a modest quantity of school uniforms (82.997 students received school uniforms). However, in 2008, the number of students who received school uniforms increased by almost 775% (725.060 children received school uniforms). By 2009, the amount of beneficiaries increased by 14% and continued increasing during 2010. It is important to mention that the Free School Uniforms Program is mainly targeted to rural schools.

Finally, another important action towards increasing school enrollment was the elimination of the so called "Voluntary School Support". Public schools used to charge the amount of US$ 25 to children in primary schools and US$ 30 to children in high schools at the beginning of the school-year, during the registration process. The so called "Voluntary School Support", more than a voluntary contribution was an obligation that parents need to meet in order to get their children to be enrolled in school. The schools argued that the Ministry of Education did not give them enough money to cover expenses for cleaning and maintenance; and that therefore, they need to charge these expenses to the parents. In 2006, the Ministry of Education abolished the so-called "Voluntary Support" for primary schools, and in 2008, the

[20] It is important to clarify that the BDH do not cover all the households in the two poorest quintiles.

[21] This budget represents only the amount of money transferred to mothers and not the money of the assistance pension for poor elderly and poor people with disabilities.

voluntary support for high schools was removed. Ministry of Education set an extra budget to cover these expenses.

3.2 Schooling Outcomes

In order to analyze the effect of the global economic crisis on schooling outcomes in a temporal manner, Tables 1 through 6 show net enrollment[22], net attendance[23] and public enrollment rates for each year over the period of 2004/2005-2010. These education outcomes are calculated using the Ecuadorian survey for employment, unemployment and underemployment, *Encuesta Nacional de Empleo, Desempleo y Subempleo* (ENEMDU), a nationally representative household survey conducted by the National Institute of Statistics and Census, *Instituto Nacional de Estadésticas y Censos* (INEC), in November-December each year.

3.2.1 Schooling outcomes among children of age 5-14

Enrollment

Over the period 2005-2008, net enrollment for children aged 5-14 grew at an annual average rate of 1,26%; and had grown at a rate of almost 2% between 2007 and 2008. In 2009, this rising tendency fell sharply as net enrollment rate decreased by 0,4%. When we analyze enrollment by gender, one can see that males suffered the sharpest declines in the path of growth. Male net enrollment rate, that had grown by 2% from 2007 to 2008, decreased by 0,6% in 2009. We even see larger negative growth rates for children self-identified as White, and children belonging to the second and third income quintile (- 2%, -1% and -1,7% in 2009, respectively).

The simple differences in net enrollment rates between 2008 and 2009 show us the disruptive effect of the crisis on enrollment. As an exercise to compare what should have been the enrollments rates, giving the trend in previous years and have an idea of the disruptive effect, we compute the predicted net enrollment rate for 2009. Column 8 in Table 1 shows the predicted net enrollment rate for 2009 using a linear trend with data from 2005 to 2008; and Column 9 reports the difference between the actual and predicted net enrollment rate. We can see that national net enrollment rate was 1,4% less than the predicted by the linear trend, and that the population groups that seem to have been the most affected by the crisis were males, rural, White and Mestizo children, and children in the second and third income quintile.

[22] Number of students that are enrolled in schools of a determinate education level and that belongs to the age group, that according international standards corresponds to such education level, expressed as percentage of the total population of that age group (SIISE 2012). Enrollment refers to whether a person enrolled (registered) at the beginning of the school-year in any accredited educational institution.

[23] Number of students that go to schools of a determinate education level and that belongs to the age group, that according international standards corresponds to such education level, expressed as percentage of the total population of that age group (SIISE 2012). Attendance refers to whether a person attends any accredited educational institution.

Table 1: Net enrollment rate among children of age 5-14

Category	Subcategory	2005	2006	2007	2008	2009	2010	Growth Rate between 2008 and 2009	Predicted Net Enrollment Rate for 2009	% Δ (Actual 2009 - Predicted 2009)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ecuador	National	89,76%	91,37%	91,59%	93,19%	92,83%	94,61%	-0,4%	94,11%	-1,4%
Gender	Male	89,50%	91,10%	91,40%	93,30%	92,70%	94,20%	-0,6%	94,25%	-1,6%
	Female	90,10%	91,70%	91,80%	93,10%	93,00%	95,00%	-0,1%	93,95%	-1,0%
Area	Urban	92,08%	93,36%	93,73%	94,93%	94,65%	96,15%	-0,3%	95,76%	-1,2%
	Rural	85,99%	88,14%	88,04%	90,36%	89,88%	92,15%	-0,5%	91,39%	-1,6%
Ethnicity	Indigenous	87,80%	89,00%	89,30%	91,00%	91,20%	92,80%	0,2%	91,75%	-0,6%
	White	91,30%	93,30%	90,10%	94,10%	92,20%	96,90%	-2,0%	93,50%	-1,4%
	Mestizo	89,80%	91,70%	92,00%	93,40%	93,10%	95,00%	-0,3%	94,50%	-1,5%
	Afroecuadorian	90,10%	88,30%	90,40%	92,70%	92,30%	92,60%	-0,4%	92,85%	-0,6%
Income Quintile	Quintile 1	85,50%	87,34%	89,03%	90,50%	91,18%	93,19%	0,8%	92,26%	-1,2%
	Quintile 2	88,20%	90,02%	89,83%	93,26%	92,35%	94,15%	-1,0%	94,07%	-1,8%
	Quintile 3	90,50%	92,68%	92,46%	94,16%	92,55%	94,57%	-1,7%	95,14%	-2,7%
	Quintile 4	92,16%	94,71%	93,99%	94,71%	95,63%	97,03%	1,0%	95,63%	0,0%
	Quintile 5	94,66%	96,16%	96,22%	95,74%	95,66%	96,00%	-0,1%	96,51%	-0,9%

Source: Author´s analysis based on data from SIISE 2012 and SENPLADES

Attendance

Similar to enrollment, net attendance for children aged 5-14 grew at an annual average rate of 1% over the period of 2004-2008; and had grown at a rate of almost 2% between 2007 and 2008. In 2009, this trend experienced a considerable deceleration as net attendance grew by only 0,4%. Consistent with the enrollment figures, children in the second[24] and third quintile[25], males[26] and White[27] children experienced slowdowns in attendance growth, and even experienced negative growth rates. We observe no differences in attendance by urban-rural location.

When we compare the actual and the predicted net attendance rate for 2009, we observe that national net attendance rate was only 0,3% less than the predicted by the linear trend. Like enrollment, it seems that the global financial crisis has had a more negative effect in males, rural and Mestizo children, and children in the second, third and fifth income quintile (See Table 2).

[24] Children in the second quintile experienced a drastic deceleration of attendance growth, as from 2008 to 2009 their attendance rate was stagnated.

[25] Children in the third quintile (lower middle class) experience the deepest decline in attendance, as their net attendance rate fell from 94,2% in 2008 to 93% in 2009.

[26] Male net attendance rate that had grown by 2,2% from 2007 to 2008, grew at only 0,1% in 2009; whereas, female net attendance grew at 0,7%, more the national figure.

[27] We seen negative growth rates in the population self-identified as White as their enrollment rate fell from almost 94% in 2008 to 92,9% in 2009.

Table 2: Net attendance rate among children of age 5-14

Category	Subcategory	2004	2005	2006	2007	2008	2009	2010	Growth Rate between 2008 and 2009	Predicted Net Attendance Rate for 2009	% Δ (Actual 2009 - Predicted 2009)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ecuador	National	89,36%	89,29%	91,18%	91,39%	93,11%	93,47%	94,78%	0,4%	93,75%	-0,3%
Gender	Male	89,19%	89,07%	91,04%	91,17%	93,20%	93,28%	94,42%	0,1%	93,77%	-0,5%
	Female	89,54%	89,52%	91,32%	91,62%	93,02%	93,66%	95,17%	0,7%	93,73%	-0,1%
Area	Urban	92,20%	91,55%	93,22%	93,62%	94,81%	95,23%	96,41%	0,4%	95,27%	0,0%
	Rural	84,70%	85,60%	87,86%	87,70%	90,35%	90,63%	92,18%	0,3%	91,26%	-0,7%
Ethnicity	Indigenous	84,11%	87,52%	88,87%	88,86%	91,17%	92,21%	93,08%	1,1%	92,75%	-0,6%
	White	91,60%	91,28%	91,47%	89,88%	93,97%	92,88%	96,91%	-1,2%	92,64%	0,3%
	Mestizo	89,86%	89,27%	93,64%	91,89%	93,29%	93,70%	95,15%	0,4%	94,43%	-0,8%
	Afroecuadorian	88,40%	89,49%	87,37%	89,69%	92,61%	92,76%	93,33%	0,2%	92,10%	0,7%
Income Quintile	Quintile 1	84,91%	85,40%	86,69%	88,71%	90,51%	91,70%	93,44%	1,3%	91,60%	0,1%
	Quintile 2	87,65%	88,00%	89,51%	89,56%	93,00%	93,00%	93,97%	0,0%	93,22%	-0,2%
	Quintile 3	91,18%	90,62%	92,48%	92,26%	94,20%	93,01%	94,79%	-1,3%	94,45%	-1,5%
	Quintile 4	92,98%	91,59%	95,21%	94,03%	94,58%	96,03%	97,13%	1,5%	95,37%	0,7%
	Quintile 5	94,72%	95,14%	96,76%	96,12%	95,77%	96,19%	96,67%	0,4%	96,63%	-0,5%

Source: Author´s analysis based on data from SIISE 2012

Enrollment in Public Schools

Enrollment in public schools over the period of 2005-2008 grew at an annual average rate of 1,4%. In 2009, this trend experienced a considerable increase as enrollment in public schools grew at 2, 6%. Females, and children living in urban areas as well as children in the fifth income quintile experienced the biggest increases in enrollment in public schools between 2008 and 2009. When we compare the actual and the predicted enrollment in public schools for 2009, we observe that public enrollment was almost 2% more than the predicted by the linear trend. The global financial crisis has had a stronger effect in shifting enrollment towards public schools for females, urban children and for children in the third and fifth income quintile (See Table 3).

Table 3: Enrollment in public schools among children of age 5-14

Category	Subcategory	2005	2006	2007	2008	2009	2010	Growth Rate between 2008 and 2009	Predicted Enrollment in Public School for 2009	% Δ (Actual 2009 - Predicted 2009)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ecuador	National	75,17%	76,19%	76,44%	78,37%	80,44%	80,60%	2,6%	79,01%	1,8%
Gender	Male	75,43%	77,22%	76,57%	77,94%	79,63%	80,55%	2,2%	78,51%	1,4%
	Female	74,90%	75,13%	76,30%	78,83%	81,30%	80,65%	3,1%	79,53%	2,2%
Area	Urban	66,00%	66,99%	67,69%	69,58%	72,28%	71,80%	3,9%	70,43%	2,6%
	Rural	91,31%	92,16%	92,00%	93,46%	94,26%	95,36%	0,9%	93,80%	0,5%
Income Quintile	Quintile 1	90,56%	91,91%	91,03%	93,38%	92,30%	93,04%	-1,2%	93,61%	-1,4%
	Quintile 2	84,45%	85,19%	85,15%	88,68%	89,70%	88,89%	1,2%	89,03%	0,8%
	Quintile 3	79,27%	80,03%	78,83%	80,51%	82,03%	83,12%	1,9%	80,28%	2,2%
	Quintile 4	64,68%	64,83%	65,52%	66,92%	68,03%	69,44%	1,6%	67,34%	1,0%
	Quintile 5	35,56%	37,78%	41,47%	38,56%	48,58%	44,59%	26,0%	41,51%	17,0%

Note: indicators by ethnicity were not statistically significant; therefore, they were not included in this Table.
Source: Author´s analysis based on data from ENEMDU 2005-2010

3.2.2 Schooling outcomes among children of age 15-17

Enrollment

From 2005 to 2008, net enrollment rate for children aged 15-17 grew at an average annual rate of around 4%. In 2009, this trend was substantially reduced; net enrollment grew by only 1,5% which means more than a 50% reduction if we compare it with the average growth rate over the period of 2005-2008. The slowdown in the national enrollment rate translated into negative growth rates for some population groups. Urban and Mestizo children, as well as children in third quintile experienced decreases between 0,4% and 0,7%; whereas, children self-identified as Afro-Ecuadorian and children in the fifth quintile experienced decreases of greater than 5%.

When we compare the predicted upper-secondary-school net enrollment rate and the actual rate, one can see that the actual rate was 2,4% less than the predicted by the linear trend. It seems that the global crisis had a negative impact on females, Mestizos, Afro-Ecuadorians, children living in urban areas, as well as on children in the first, third and fifth income quintile (See Table 4).

Table 4: Net enrollment rate among children of age 15-17

Category	Subcategory	2005	2006	2007	2008	2009	2010	Growth Rate between 2008 and 2009	Predicted Net Enrollment Rate for 2009	% Δ (Actual 2009 - Predicted 2009)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ecuador	National	47,41%	48,88%	51,73%	53,17%	53,99%	59,75%	1,5%	55,33%	-2,4%
Gender	Male	45,90%	46,80%	48,00%	50,20%	51,90%	57,00%	3,4%	51,25%	1,3%
	Female	49,10%	51,10%	55,70%	56,10%	56,20%	62,80%	0,2%	59,40%	-5,4%
Area	Urban	56,24%	58,15%	61,61%	62,32%	61,90%	68,50%	-0,7%	65,01%	-4,8%
	Rural	30,84%	31,72%	34,55%	37,30%	40,25%	45,46%	7,9%	39,16%	2,8%
Ethnicity	Indigenous	27,30%	24,30%	28,30%	33,30%	41,00%	40,10%	23,1%	33,80%	21,3%
	White	49,60%	50,80%	50,90%	48,90%	56,50%	65,90%	15,5%	49,55%	14,0%
	Mestizo	50,10%	51,10%	54,60%	56,20%	55,80%	63,10%	-0,7%	58,45%	-4,5%
	Afroecuadorian	28,70%	44,20%	34,50%	42,70%	40,50%	49,60%	-5,2%	45,60%	-11,2%
Income Quintile	Quintile 1	27,14%	31,26%	36,55%	40,26%	40,67%	45,79%	1,0%	44,96%	-9,5%
	Quintile 2	37,87%	39,03%	43,38%	45,36%	50,15%	55,40%	10,5%	48,12%	4,2%
	Quintile 3	41,91%	46,44%	51,74%	54,04%	53,82%	60,62%	-0,4%	58,95%	-8,7%
	Quintile 4	55,33%	59,36%	59,22%	57,92%	62,95%	68,30%	8,7%	59,87%	5,1%
	Quintile 5	71,29%	74,88%	73,54%	75,99%	71,68%	81,11%	-5,7%	77,11%	-7,1%

Source: Author´s analysis based on data from SIISE 2012 and SENPLADES

Attendance

Net attendance grew at a average annual rate of around 4,5% during the period of 2004-2008. As previously seen in enrollment, in 2009, this trend was significantly reduced as net attendance growth rate experienced a 50% reduction compared to the average rate over the period 2004-2008. It can be seen that females, urban children and children in the poorest quintile experienced the main slowdowns in the pace of growth during 2009. For example, net attendance for children in the poorest income quintile was stagnant between 2008 and 2009, whereas, in 2008 it has grown in more than 12%. We see even negative growth rates in the population self-identified as Afro-Ecuadorians, and in children in the third and fifth income quintile.

Comparing the actual attendance rate with the predicted rate, one can see that the actual rate was 1% less than the predicted by the linear trend. Based on the results of the predicted rates, it seems that the global crisis has had a negative impact on females, Mestizos, Afro-Ecuadorians, teenagers in urban areas and in teenagers in the first, third and fifth income quintile. The same cannot be said for rural and indigenous teenagers as they were more likely to be in school in 2009 than would be expected in the absence of the crisis (See Table 5).

Table 5: Net attendance rate among children of age 15-17

Category	Subcategory	2004	2005	2006	2007	2008	2009	2010	Growth Rate between 2008 and 2009	Predicted Net Attendance Rate for 2009	% Δ (Actual 2009 - Predicted 2009)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ecuador	National	45,03%	46,55%	47,89%	51,18%	53,62%	54,83%	59,39%	2,2%	55,40%	-1,0%
Gender	Male	44,37%	44,48%	45,96%	47,46%	49,89%	52,31%	56,80%	4,8%	50,64%	3,3%
	Female	45,75%	48,83%	49,98%	55,15%	57,31%	57,45%	62,23%	0,2%	60,24%	-4,6%
Area	Urban	54,40%	55,21%	56,87%	60,93%	62,59%	63,11%	68,12%	0,8%	64,63%	-2,4%
	Rural	27,75%	30,30%	31,28%	34,22%	38,07%	40,46%	45,12%	6,3%	39,69%	1,9%
Ethnicity	Indigenous	16,59%	26,83%	24,23%	28,52%	34,07%	41,10%	39,65%	20,6%	37,04%	10,9%
	White	45,21%	48,19%	50,04%	49,69%	51,13%	57,08%	66,18%	11,6%	52,85%	8,0%
	Mestizo	48,23%	49,25%	49,35%	54,05%	56,51%	56,69%	62,74%	0,3%	57,89%	-2,1%
	Afroecuadorian	35,04%	27,94%	44,13%	33,46%	42,78%	41,03%	49,72%	-4,1%	42,97%	-4,5%
Income Quintile	Quintile 1	26,33%	29,26%	31,04%	36,13%	40,54%	40,54%	45,27%	0,0%	43,25%	-6,3%
	Quintile 2	35,32%	37,83%	38,07%	43,56%	46,21%	50,63%	55,07%	9,6%	48,45%	4,5%
	Quintile 3	46,07%	45,35%	45,49%	50,71%	54,25%	53,95%	60,42%	-0,5%	54,89%	-1,7%
	Quintile 4	55,97%	57,37%	57,37%	59,06%	59,16%	63,41%	67,80%	7,2%	60,21%	5,3%
	Quintile 5	68,06%	70,39%	74,05%	72,08%	75,48%	72,22%	80,89%	-4,3%	76,97%	-6,2%

Source: Author´s analysis based on data from SIISE 2012

Enrollment in Public Schools

Enrollment in public schools for children aged 15-17 over the period of 2005-2008 grew at an annual average rate of 1,3%. In 2009, this trend experienced a substantial increase as enrollment in public schools grew at 4,6% (almost four times more than the average annual rate). Females and children living in urban areas experienced the biggest increases in enrollment in public schools between 2008 and 2009. When we compare the actual and the predicted enrollment rate in public schools for 2009, we observe that public enrollment was 4% more than the predicted by the linear trend. Based on the comparison of actual and predicted rates, it seems the global financial crisis has had a stronger effect in shifting enrollment towards public schools for females and urban children. (See Table 6).

Table 6: Enrollment in public schools among children of age 15-17

Category	Subcategory	2005	2006	2007	2008	2009	2010	Growth Rate between 2008 and 2009	Predicted Enrollment in Public School for 2009	% Δ (Actual 2009 - Predicted 2009)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ecuador	National	69,48%	70,97%	70,41%	72,12%	75,46%	75,46%	4,6%	72,58%	4,0%
Gender	Male	69,46%	71,17%	71,74%	70,56%	72,52%	72,04%	2,8%	71,70%	1,1%
	Female	69,49%	70,78%	69,18%	73,49%	78,28%	78,87%	6,5%	73,34%	6,7%
Area	Urban	64,38%	66,51%	65,82%	67,03%	71,23%	69,77%	6,3%	67,75%	5,1%
	Rural	86,94%	86,12%	84,63%	86,87%	86,77%	89,46%	-0,1%	85,72%	1,2%

Note: indicators by ethnicity and income level were not statistically significant; therefore, they were not included in this Table.
Source: Author´s analysis based on data from ENEMDU 2005-2010

Chapter 4

Empirical Framework and Results

4.1 Data

This analysis draws on a series of nationally representative employment, unemployment and underemployment household surveys for Ecuador, *Encuensta Nacional de Empleo, Desempleo y Subempleo* (ENEMDU). The ENEMDU provides a range of socio-economic indicators for households and individuals, including school enrollment, school attendance and child work activities. The annual ENEMDU is conducted around November-December, typically sampling on average approximately 79.340 households, and is representative at the provincial level. Our unit the analysis is the individual.

Since the ENEMDU is representative at the provincial level, we pool the annually repeated cross-sections from 2004 to 2010. This yields a pooled sample of 555,373 total observations, with 162,741 observations for children aged 5-17. We analyze school attendance using this pooled sample over the period 2004-2010; meanwhile school enrollment and shifts from private to public schools are analyzed using the same pooled sample but over the period 2005-2010. The removal of the year 2004 from the pooled sample is because the annual ENEMDU started asking questions about school enrollment and type of school only since 2005; no information is available on neither school enrollment nor kind of school in the years before.

On the other hand, as previously explained, to enhance the analysis, the paper also examines the effect of one of the main transmission channels of the crisis, that is, remittances. We analyze the relationship between remittances and schooling outcomes, using two sets of data: pooled data and panel data. The pooled data set is the same as described in the paragraph above, but covers only the period from 2007 to 2010. We reduce the pooled sample to the period 2007-2010 as information on remittances by province is only available since 2007. With the pooled sample over period 2007-2010, we examine school enrollment, attendance, and enrollment in public schools.

In addition, we use panel data to analyze the immediate effects of the decline in remittances on school attendance. The panel data we used draws on interviews on households that were interviewed in both March 2008 and March 2009. We have selected this panel, as March 2008 represent a good point in time before the crisis, and March 2009 correspond to the hardest time during the crisis. Our analytical sample is a balanced panel that contains information on 13.896 individuals living in 4.648 households. It is important to mention that this kind of rotating ENEMDU´s panels contains information on individuals age 10 and above and are conducted only in urban areas. Also, it is important to considerer that the panel data only contains information on school attendance and not on school enrollment or type of school. Therefore, our analysis based on panel data examines only school attendance, and covers only children aged 10-14 and 15-17 living in urban areas.

Information on remittances includes the annual amount of remittances per province and annual population per province, data that comes from the Central Bank of Ecuador, and the National Institute of Statistics and Census, respectively. With this information we construct the remittances variable of interest, which is, monthly remittances per capita per province.

Table 7 through 10 present descriptive statistics for the pooled sample and panel data, and Table 11 presents monthly per capita remittances per province for the period 2007-2010.

Table 7: Selected descriptive statistics, pooled sample for children aged 5-17 (2004-2010)

Variables	Children aged 5-14		Children aged 15-17	
	Mean	sd	Mean	sd
School attendance	0,933	0,251	0,738	0,440
Female	0,487	0,500	0,484	0,500
Age	9,648	2,825	15,987	0,817
Child is indigenous	0,086	0,281	0,075	0,263
Rural area	0,381	0,486	0,361	0,480
Female head of household	0,191	0,393	0,219	0,414
Head of household education: none	0,073	0,260	0,075	0,264
Head of household education: primary	0,505	0,500	0,505	0,500
Head of household education: secondary	0,278	0,448	0,260	0,439
Head of household education: higher	0,111	0,315	0,119	0,324
Household size	5,842	2,312	5,742	2,320
Per capita income	99,070	240,786	114,936	179,287

Source: Author´s analysis based on data from ENEMDU 2004-2010

Table 8: Selected descriptive statistics, pooled sample for children aged 5-17 (2005-2010)

Variables	Children aged 5-14		Children aged 15-17	
	Mean	sd	Mean	sd
School enrollment	0,938	0,240	0,751	0,432
Enrollment in public schools	0,778	0,415	0,744	0,437
Female	0,488	0,500	0,485	0,500
Age	9,666	2,822	15,990	0,816
Child is indigenous	0,085	0,278	0,074	0,262
Rural area	0,381	0,486	0,363	0,481
Female head of household	0,194	0,395	0,223	0,417
Head of household education: none	0,072	0,259	0,074	0,262
Head of household education: primary	0,502	0,500	0,501	0,500
Head of household education: secondary	0,281	0,450	0,263	0,440
Head of household education: higher	0,110	0,313	0,120	0,324
Household size	5,814	2,296	5,716	2,300
Per capita income	101,931	253,519	117,810	183,095

Source: Author´s analysis based on data from ENEMDU 2005-2010

Table 9: Selected descriptive statistics, pooled sample for children aged 5-17 (2007-2010)

Variables	Children aged 5-14		Children aged 15-17	
	Mean	s.d.	Mean	s.d.
School attendance	0,946	0,227	0,767	0,423
School enrollment	0,946	0,225	0,769	0,422
Enrollment in public schools	0,789	0,408	0,751	0,433
Monthly per capita remittances	17,381	17,713	17,579	17,666
Female	0,486	0,500	0,488	0,500
Age	9,705	2,810	15,986	0,817
Rural area	0,381	0,486	0,369	0,483
Female head of household	0,202	0,402	0,237	0,425
Head of the household is married	0,520	0,500	0,530	0,499
Head of household education: none	0,067	0,250	0,071	0,257
Head of household education: primary	0,501	0,500	0,501	0,500
Head of household education: secondary	0,283	0,451	0,265	0,441
Head of household education: higher	0,111	0,314	0,117	0,321
Household size	5,737	2,224	5,670	2,282
Home owner	0,264	0,440	0,256	0,436
Dirt floor	0,042	0,201	0,036	0,186
Access to water by public network	0,640	0,480	0,669	0,470
Access to electricity	0,945	0,229	0,954	0,210
In-house toilet: sewer system	0,480	0,500	0,516	0,500
Telephone	0,276	0,447	0,333	0,471

Source: Author´s analysis based on data from ENEMDU 2007-2010

Table 10: Selected descriptive statistics, data panel for children aged 10-17 (March 2008-March 2009)

Year	Variables	Children aged 10-14		Children aged 15-17	
		Mean	sd	Mean	sd
2008	School attendance	0,959	0,197	0,871	0,335
	Monthly per capita remittances	21,599	16,107	22,564	16,965
	Female	0,477	0,500	0,462	0,499
	Age	12,074	1,409	15,954	0,815
	Female head of household	0,214	0,410	0,247	0,431
	Head of household education: none	0,034	0,180	0,034	0,180
	Head of household education: primary	0,395	0,489	0,375	0,484
	Head of household education: secondary	0,368	0,482	0,355	0,479
	Head of household education: higher	0,171	0,376	0,198	0,399
	Household size	4,226	1,396	4,327	1,408
2009	School attendance	0,962	0,191	0,862	0,345
	Monthly per capita remittances	19,400	13,998	19,523	14,768
	Female	0,478	0,500	0,474	0,500
	Age	12,460	1,175	15,982	0,805
	Female head of household	0,204	0,403	0,269	0,444
	Head of household education: none	0,025	0,155	0,032	0,177
	Head of household education: primary	0,400	0,490	0,385	0,487
	Head of household education: secondary	0,357	0,479	0,353	0,478
	Head of household education: higher	0,178	0,383	0,185	0,388
	Household size	4,234	1,400	4,273	1,399

Source: Author´s analysis based on data from ENEMDU panel March 2008- March 2009

Table 11: Monthly per capita remittances per province over period 2007-2010

Province	2007	2008	2009	2010
Azuay	73,33	59,25	54,75	57,25
Bolivar	4,58	2,58	1,25	1,42
Cañar	150,67	89,58	62,50	61,92
Carchi	6,58	2,42	2,25	4,58
Cotopaxi	8,33	6,92	5,08	4,50
Chimborazo	25,25	14,58	11,25	10,75
El Oro	20,58	18,75	13,17	11,33
Esmeraldas	5,00	7,17	4,42	4,50
Guayas	13,50	20,33	18,17	17,08
Imbabura	18,33	12,08	10,58	9,67
Loja	61,75	38,83	26,00	21,42
Los Ríos	7,25	6,08	4,67	4,17
Manabí	8,42	7,25	5,33	5,00
Morona Santiago	58,25	30,92	17,75	18,58
Napo	4,33	3,75	2,50	2,08
Pastaza	22,08	14,00	9,67	8,00
Pichincha	11,83	13,42	16,33	13,83
Tungurahua	21,08	18,83	15,17	14,58
Zamora Chinchipe	37,17	12,08	7,25	6,17
Sucumbíos	2,42	2,00	1,50	1,50
Orellana	2,33	1,08	0,83	1,00
Total	26,81	18,19	13,83	13,30

Note: Santa Elena and Santo Domingo are not considered as there is no information about remittances for these provinces.

Galapagos is also not considered as the ENEMDU do not provide information on this province.

Source: Author´s analysis based on data from BCE and INEC.

4.2 Empirical Approach

The empirical approach we use in this section is similar to the one used by Duryea and Morales (2011) to explore the effects of the global financial crisis of 2008-2009 on children´s schooling and employment outcomes in El Salvador.

We study school attendance using linear probability models for a pooled sample of 5-17-years-olds over the period 2004-2010, and explore school enrollment and shifts towards public schools using linear probability models for a pooled sample of children in the same age range but over the period 2005-2010. As stated by Duryea and Morales (2011:535): "The repeated cross-sections of data effectively allow us to isolate the effect of the crisis after introducing fixed effects of age, gender and [Province] with a time trend". In this paper, we add a fixed effect of ethnicity.

We use linear probability models[28]as they provide semi-parametric identification and are flexible in managing unobserved heterogeneity, as well as, estimates based on these models are simple to interpret (Hyslop 1999:1257, Wooldridge 2009: 249). Also, we estimate linear probability models because of the consistency of their results in the presence of heteoroskedasticity, once heteoroskedasticity is dealt with, especially since we are using a large enough sample (Duryea and Morales 2011:535). Furthermore, as we are interested in the effects of the crisis on different population groups (using interaction terms), the linear probability models help us track these effects more easily than probit models.

[28] Probit specifications were estimated as robustness tests. We find that the results from the probit model did not differ much from the results of the LPM.

Since it is possible to differentiate impacts for children in different ages, we analyze two age groups: children from 5 to 14 years old (General Basic Education) and children from 15 to 17 years old (Upper Secondary School). The analysis by age group is motivated by the findings in Thomas et al. (2004) study, in which he demonstrates that in Indonesia during the crisis of 1998, poor households protected investments in the schooling of older children at the expense of the education of younger children.

The economic crisis shock is operationalized as the two year period of 2009-2010.

For each outcome, the equation estimated is as follows:

$$y_{ipt} = \beta\, X_{ipt} + \rho\, G_p + \theta\, S + \varepsilon_{ipt} \quad (1)$$

Where y_{ipt} represents school outcomes for child *i* in province *p* in time *t*; X_{ist} is a vector of socio-demographic characteristics of the child that includes age dummies, gender, area, ethnicity, income level, and a time trend; and G_p is a vector of geographic fixed effects that includes province dummies.

Our parameter of interest is θ, which is a dummy variable that takes the value 1 for observations from 2009 and 2010 and 0 otherwise. This parameter of interest is intended to capture the effect of the crisis shock, *S*, after controlling for the time trend. Nevertheless, we acknowledge that the parameter of interest,θ, might be picking up a time-fixed effect and not only the crisis effect. Therefore, as a robustness test to validate the estimates, we construct a placebo, defining the period of 2007-2008 as a falsified shock. We do this to see if just the division the time series into two periods (one considered a period before the crisis and the other considered the period after the crisis) can have an effect on schooling outcomes even if the criteria for such division is arbitrary. If the results from the placebo effect are qualitatively similar to those of the real crisis, then, our coefficient of interest, θ, is not able to completely distinguish between the time-fixed effect and the crisis effect. However, if the results from the falsified shock are qualitatively different from those of the crisis shock, then θ may well be picking up a crisis effect. The shock is interacted with the child´s gender and ethnicity, income quintiles and urban-rural location to analyze group-specific effects. The final term, ε_{ipt} is the error term. The linear probability models are corrected for heterocedasticity using robust standard errors with clustering at province level.

The dependent variables of the specification, school enrollment, school attendance and enrollment in public schools are defined as binary outcomes. Children are considered to be enrolled in school if they responded positively to the question of being enrolled in the current school year. Similarly, children are considered to be attending school if they responded positively to the question of attending school in the last week. Finally, children are considered to be enrolled in a public school if they responded to be enrolled in a public school to the question of in which kind of school you enrolled. All the responses that say that a child enrolled in a public school receive the value of 1 and 0 otherwise (private schools). The regression results are displayed in Tables 12-15.

As previously explained, in order to enhance the analysis of the effects of the global crisis in schooling in Ecuador, we examine the effects on one of the main transmission channels of the crisis, which is, remittances. We explore the effect of remittances on schooling outcomes using linear probability models for a pooled sample of children aged 5-17 over the period 2007-2010. Again, we analyze two age groups: children aged 5-14 and 15-17. The absolute amount of monthly per capita remittances per province is our main explanatory variable of interest.

The equation estimated is as follows:

$$y_{ipt} = \beta\, X_{ipt} + \rho\, G_p + \theta\, R + \varepsilon_{ipt} \quad (2)$$

Where y_{ipt} represents school outcomes for child *i* in province *p* in time *t*; X_{ipt} is a vector of socio-demographic characteristics of the child and the household that includes age, gender, area, information of the head of the household (gender, marital status, level of education), household size, living conditions (home ownership, type of floor, type of sanitation, and access to electricity, water and telephone), and a year dummies; and G_p is a vector of geographic fixed effect that include province dummies. Our parameter of interest is θ, and it captures the effect of remittances, *R*, which is the monthly amount of remittances per capita per province. The final term, ε_{ipt} is the error term. The linear probability models are corrected for heterocedasticity using robust standard errors with clustering at province level. The dependent variables of the specification are same detailed in the previous section: school enrollment, school attendance and public enrollment. The results are displayed in Tables 16 and 17.

In addition to the pooled sample results, we estimate linear probability fixed-effect models to analyze the immediate impact of the substantial reduction in remittances on school attendance, during the hardest time of the crisis, using the panel data of March 2008-March 2009. The advantage of using panel data is that we are able to control for the impact of omitted variables. Frequently, it is argued that the reason for finding or not finding certain effects is due to the lack of knowledge of the effects of certain variables that are correlated with the explanatory variables included in the model. Panel data contains information on both the time dynamics and the individuality of the entities; and therefore, allow us to control for the effects of missing or unobserved variables (Hsiao 2007:4, Wooldridge 2009:456-59). Hence, we are interested in examining whether the results of the LPM using pooled data, are consistent with those based on fixed-effects models.

The equation estimated is as follows:

$$y_{ipt} = \beta\, X_{ipt} + \rho\, G_p + \theta\, R + \ a_i + \varepsilon_{ipt} \quad (3)$$

Where y_{ipt} represents school outcomes for child *i* in province *p* in time *t*; X_{ipt} is a vector of socio-demographic characteristics of the child and the household that includes age, gender, information of the head of the household (gender and level of education), household size, and a year dummy for 2009; G_p is a vector of geographic fixed effects that include province dummies; and a_i is a child-fixed effect that captures all unobserved, time-constant factors that may affect y_{ipt}. Our parameter of interest is θ, which captures the effect of remittances. The dependent variable in this specification is only school attendance and it was constructed in the same way it was done for the pooled data analysis. The regression results are displayed in Table 18.

4.3 Results

This section presents the results of the linear probability models on schooling outcomes using the pooled sample and panel data.

4.3.1 Results for children aged 5-14

The linear probability model in Table 12 shows a statistically significant relationship between school enrollment and geographic location: children living in rural areas are almost 5 percentage points less likely to be enrolled in school than children living in urban areas. We also see a strong significant relationship between school enrollment and economic status, with children in the richest income quintile almost 6 percentage points more likely to be enrolled in school than children in the poorest income quintile, the omitted quintile dummy. We find differences by ethnicity, with Mestizo and Afro-Ecuadorian children more likely to be enrolled in school than indigenous children, the omitted ethnicity variable. There is a small significant difference in school enrollment by gender (with females more likely to be enrolled in school that males), and one can observe a positive significant trend over time.

We find that the economic shock in Ecuador resulted in a small reduction of school enrollment by approximately 0,5 percentage points. This coincides with the descriptive statistics, which shows that national school enrollment decreased by 0,4% in 2009. As robustness test, we run the placebo previously defined in the empirical approach and estimate the same set of regressions we did for the crisis shock. Likewise the results in Column 1 in Table 12, the effect of the falsified shock also has a significant adverse effect on school enrollment (See Column 1 in Table 13). These results suggest that our parameter of interest, θ, is not completely capturing only the effect of the crisis; however, the results show that the time of the crisis was not a particularly critical time for children´s school enrollment in Ecuador. The shock was found to have different effects on school enrollment by ethnicity, with Afro-Ecuadorian children less likely to be enrolled in school during the time of the crisis.

In Column 3 and 4 of Table 12 we explore whether the probability of attending school is associated with the economic crisis. As previously seen with school enrollment, there is a significant relationship between school attendance and geographic area[29]. We again see a strong significant relationship between school attendance and economic status[30], and a small significant difference in school attendance by gender. Moreover, we see again that Mestizo and Afro-Ecuadorian children are more likely to attend school than Indigenous children.

We find that the crisis shock did not have an adverse effect on school attendance for children aged 5-14. This finding concurs with the aggregate data on attendance, which shows that total school attendance did not decrease in either 2009 or 2010. We use the same falsified shock defined for enrollment and estimate the same attendance regressions. We observe that the results from the falsified shock are very similar to the ones of the real shock, suggesting that during the time of the crisis, school attendance was very stable. However, the shock was found to have different effects on school attendance by ethnicity, with Mestizo and Afro-Ecuadorians children less likely to attend school during the time of the crisis.

Finally, in Column 5 and 6 of Table 12 we explore the probability of being enrolled in a public school with the economic shock. As expected, there is a large and significant relationship between public enrollment and geographic location, with children from rural areas almost 10 percentage points more likely to be enrolled in a public school than children

[29] Children living in rural areas are almost 5 percentage points less likely to be attending school than children that live in urban areas.

[30] Children in the richest income quintile are almost 7 percentage points more likely to be attending school than children in the poorest income quintile.

living in urban areas. Also, we see a strong significant relationship between public school enrollment and economic status: children in the richest quintile are almost 36 percentage points less likely to be enrolled in a public school than children in the poorest quintile. The results in Column 5 of Table 12 suggest that the economic shock is associated with an almost 2 percentage point increase in the probability of being enrolled in a public school for children aged 5-14. This finding suggests that the shifting towards public schools was indeed one of the household coping mechanisms to reduce expenditures in education. The shock was found to have a significant different effect by gender, economic status and ethnicity, with stronger effect for children in the fifth income quintile and Mestizo and Afro-Ecuadorian children.

We estimate the falsified shock we did previously for enrollment and attendance. Unlike the results in Column 5 in Table 12, the effect of the falsified shock[31] does not have a increasing effect on enrollment in public schools, providing further evidence that global crisis indeed shifted enrollment towards public schools. These results suggest that during the time of the crisis, the public sector in Ecuador had to bear a greater burden in education at the same time it was experiencing serious fiscal constraints due to the fall in oil prices.

4.3.2 Results for children aged 15-17

Table 14 shows the linear probability model with school enrollment for children aged 15-17 as the dependent variable. As expected, there is a large, significant, negative relationship between school enrolment and geographic location, with children living in rural areas almost 18 percentage points less likely to be enrolled in school than children living in urban areas. We again observe a significant relationship between school enrollment and economic status: children in the richest income quintile are 14 percentage points more likely to be enrolled in school than children in the poorest quintile. Also, we observe a significant relationship between enrollment and ethnicity, with White, Mestizos and Afro-Ecuadorian children between 4 and 8 percentage points more likely to be enrolled in school than indigenous children. Furthermore, we observe significant difference in school enrollment by gender, with females 1,5 percentage points more likely to be enrolled in school than males.

We find that the economic shock does not result in decreases in enrollment for older children. However, the shock was found to have a positive significant effect for children living in rural areas, and negative effect for Mestizo and Afro-Ecuadorian children. We run the same placebo effect we did for younger children in the previous section, and find that the falsified shock has also no significant effect on school enrollment for older children (See Table 15). This provides evidence that school enrollment for older children was very stable during the time of crisis.

In Column 4 and 5 of Table 14 we explore with the same specification whether the probability of attending school is associated with the economic crisis for older children. We again observe a significant relationship between school attendance, geographic area[32], and economic status[33]. Correspondingly to what we observe in enrollment, White, Mestizos and Afro-Ecuadorian children are between 5 and 9 percentage points more likely to be attending school than Indigenous children. We also observe a significant difference by gender, with female teenagers 1.5 percentage points more likely to attend school than male teenagers.

Similarly to what we observed in school attendance for younger children, the economic shock is not associated with decreases in attendance for children aged 15-17. In

[31] See results of the falsified shock in Table 13.

[32] Children living in rural areas are almost 19 percentage points less likely to be attending school than children that live in urban areas.

[33] Children in the richest income quintile are 15 percentage points more likely to be attending school than children in the poorest income quintile.

accordance with the enrollment findings, the shock was found to have a positive effect and rural children and negative effect on Mestizo and Afro-Ecuadorian children. This findings concur with the descriptive statistics and trends, which show that Mestizo, Afro-Ecuadorian and urban children were affected by the crisis. As before, we estimate the falsified effect. We observe that, the falsified shock did not have an effect on school attendance, demonstrating that the crisis period of 2009-2010 is not associated with decreases in attendance for children aged 15-17.

Lastly, Column 5 and 6 in Table 14 show the same econometric specification with public enrollment as the dependent variable. As expected and previously seen for younger children, there is a large and significant relationship between public enrollment and geographic location[34], and socioeconomic status[35]. Also, there is a significant difference in school enrollment in public schools by gender and ethnicity. Similar to the results for younger children, the economic shock is associated with a 2,8 percentage point increase in the probability of being enrolled in a public school. This shock was found to be slightly stronger for females. The results of the placebo in Column 5 in Table 15, show that the economic shock in fact resulted in an increase in the probability of being enrolled in a public school for children aged 15-17.

As the period of the analysis coincides with the implementation of social and education policies that could lead to confounding effects, we run the same set of regression on schooling outcomes, controlling for the biggest social protection and access to education policy in Ecuador, the cash transfer known as Bonus of Human Development (BDH). The estimates of the crisis controlling for the BDH were almost the same of the estimates without this control, demonstrating that the results are robust to choice of specification. Besides, the specification controlling for the BDH, we estimate two additional specifications for all the schooling outcomes: the first one, excluding the year 2010 from our analysis period; and the second one, including 2011. The results including and excluding these individual years did not differ qualitatively from the results presented in Tables 12 and 14. Also, as a way of complementing this study, we briefly explore the effects of the global financial crisis on child work in Ecuador. We find that the economic shock did not have an adverse effect on child work for either children aged 5-14 or 15-17.

Based on the results we have analyzed through all of this section, one can argue the global financial crisis of 2008-2009 is not associated with decreases in school enrollment and attendance for either younger or older children in Ecuador. Nevertheless, the economic shock was found to have differentiated effects on children aged 5-14 by ethnicity, with negative impacts for Mestizo and Afro-Ecuadorian children. Similarly, the crisis shock was found to have negative effects for Mestizo and Afro-Ecuadorian children aged 15-17, but a positive impact for children living in rural areas.

Relating these findings to our theoretical framework, one can argue that in Ecuador, the income effect of the crisis was not strong enough to decrease children´s school enrollment and attendance; and that there could have been a small school-substitution-effect that might have offset the decreases in income. One plausible explanation for not finding an adverse effect of the crisis on children´s school enrollment and attendance may be related to the fact that Ecuador entered this global financial crisis in better economic conditions than previous crises. For example, in 2008, which was the year when the crisis start hitting the Ecuadorian economy, Ecuador had had the second biggest increase in per capita income during the entire decade (in 2008 per capita income at constant prices increased by 6% with respect to 2007). The full launch of new education policies in 2007/2008, might have reinforced the positive

[34] Children from rural areas are almost 4 percentage points more likely to be enrolled in a public school than children living in urban areas.

[35] Children in the richest income quintile are almost 30 percentage points less likely to be enrolled in a public school than children in the poorest income quintile.

effect of the booming Ecuadorian economy during 2008, and alleviated households' burdens on education expenditure. Nevertheless, it is important to highlight, that we do not observe increases in enrollment and attendance during the time of the crisis as has happened in richer countries such as the US and some well-positioned Latin-American countries such as Mexico, Brazil and Argentina in previous episodes of domestic crisis. This suggests that in the Ecuadorian case, the school-substitution effect is not as strong as in other Latin-American countries, and that this may be related to the fact that in Ecuador, credit markets are still very limited and do not function properly, excluding mainly low and middle class people.

On the other hand, even though the global crisis did not affect school enrollment and attendance in Ecuador, it did affect the quality of education children receive. We observe changes from private to public schools for younger and older children, with stronger shifts towards public schools for females, Mestizos, Afroecuadorians and children in the fifth income quintile. These results tied to the ones in school enrollment and attendance suggest that, the effect of the global financial crisis, given its nature, are more likely to be felt not by low-income and rural households (who are not closely linked to the foreign economy), but by those households that live in urban areas and are relatively better off.

Table 12: LPM of schooling outcomes among children of age 5-14

	Enrollment		Attendance		Enrollment in Public Schools	
	Coefficient (Std. Err.) (1)	Coefficient (Std. Err.) (2)	Coefficient (Std. Err.) (3)	Coefficient (Std. Err.) (4)	Coefficient (Std. Err.) (5)	Coefficient (Std. Err.) (6)
Shock	-0.00478*	0.01000	-0.00133	0.0208***	0.0165***	-0.0190**
	(0.00275)	(0.00708)	(0.00245)	(0.00675)	(0.00403)	(0.00741)
Female	0.00276*	0.00173	0.00326**	0.00240	-0.00158	-0.00454*
	(0.00149)	(0.00189)	(0.00142)	(0.00174)	(0.00215)	(0.00267)
Rural	-0.0461***	-0.0482***	-0.0488***	-0.0511***	0.0986***	0.0979***
	(0.00169)	(0.00216)	(0.00161)	(0.00198)	(0.00227)	(0.00286)
Quintile 2	0.0165***	0.0198***	0.0164***	0.0196***	-0.00809***	-0.0120***
	(0.00222)	(0.00285)	(0.00212)	(0.00263)	(0.00235)	(0.00295)
Quintile 3	0.0266***	0.0334***	0.0296***	0.0358***	-0.0513***	-0.0558***
	(0.00232)	(0.00295)	(0.00221)	(0.00271)	(0.00298)	(0.00371)
Quintile 4	0.0419***	0.0491***	0.0451***	0.0521***	-0.152***	-0.157***
	(0.00236)	(0.00302)	(0.00227)	(0.00280)	(0.00399)	(0.00492)
Quintile 5	0.0554***	0.0666***	0.0607***	0.0713***	-0.355***	-0.370***
	(0.00228)	(0.00285)	(0.00218)	(0.00266)	(0.00526)	(0.00639)
White	0.00721	0.00892	0.0156***	0.0194***	-0.0475***	-0.0529***
	(0.00465)	(0.00553)	(0.00435)	(0.00502)	(0.00615)	(0.00704)
Mestizo	0.0131***	0.0158***	0.0199***	0.0240***	-0.00797***	-0.0148***
	(0.00311)	(0.00384)	(0.00296)	(0.00354)	(0.00289)	(0.00346)
Afro-Ecuadorian	0.0128***	0.0189***	0.0186***	0.0252***	0.0195***	0.0132**
	(0.00490)	(0.00588)	(0.00466)	(0.00546)	(0.00529)	(0.00620)
Other ethnicity	0.00206	0.00134	0.0133	0.0153	-0.0196	-0.0375
	(0.0219)	(0.0278)	(0.0219)	(0.0277)	(0.0300)	(0.0398)
Age dummies	YES	YES	YES	YES	YES	YES
Province dummies	YES	YES	YES	YES	YES	YES
Female*shock		0.00311		0.00301		0.00918**
		(0.00301)		(0.00291)		(0.00446)
Rural*shock		0.00738**		0.00923***		0.00133
		(0.00341)		(0.00330)		(0.00465)
Q2*shock		-0.00990**		-0.0109**		0.0111**
		(0.00443)		(0.00430)		(0.00482)
Q3*shock		-0.0207***		-0.0223***		0.0127**
		(0.00466)		(0.00449)		(0.00609)
Q4*shock		-0.0219***		-0.0252***		0.0143*
		(0.00464)		(0.00449)		(0.00833)
Q5*shock		-0.0352***		-0.0394***		0.0498***
		(0.00459)		(0.00442)		(0.0112)
White*shock		-0.00398		-0.0142		0.0162
		(0.00960)		(0.00932)		(0.0139)
Mestizo*shock		-0.00757		-0.0152***		0.0208***
		(0.00595)		(0.00574)		(0.00495)
Afro*shock		-0.0176**		-0.0230***		0.0181**
		(0.00858)		(0.00825)		(0.00844)
Other*shock		0.000749		-0.0104		0.0513
		(0.0450)		(0.0448)		(0.0580)
Year	0.00984***	0.00983***	0.00961***	0.00958***	0.00538***	0.00537***
	(0.000799)	(0.000799)	(0.000586)	(0.000586)	(0.00113)	(0.00113)
Constant	0.806***	0.801***	0.783***	0.777***	0.804***	0.817***
	(0.00648)	(0.00698)	(0.00607)	(0.00646)	(0.00829)	(0.00872)
Observations	104,214	104,214	123,697	123,697	97,254	97,254
R-squared	0.076	0.077	0.082	0.083	0.166	0.167

* Statistical significance at 10% level;** Statistical significance at 5% level; *** Statistical significance at 5% level

Source: Author´s analysis based on data from ENEMDU 2004/2005-2010

Table 13: LPM of schooling outcomes among children of age 5-14 (falsified shock)

	Enrollment		Attendance		Enrollment in Public Schools	
	Coefficient (Std. Err.) (1)	Coefficient (Std. Err.) (2)	Coefficient (Std. Err.) (3)	Coefficient (Std. Err.) (4)	Coefficient (Std. Err.) (5)	Coefficient (Std. Err.) (6)
Falsified shock	-0.0116***	-0.00314	-0.000628	0.0141*	-0.00355	-0.0114
	(0.00421)	(0.00930)	(0.00356)	(0.00841)	(0.00600)	(0.00983)
Female	0.00170	0.00160	0.00239	0.00268	-0.00458*	-0.00568
	(0.00189)	(0.00280)	(0.00174)	(0.00234)	(0.00267)	(0.00383)
Rural	-0.0482***	-0.0520***	-0.0510***	-0.0554***	0.0965***	0.0985***
	(0.00216)	(0.00318)	(0.00199)	(0.00264)	(0.00287)	(0.00412)
Quintile 2	0.0200***	0.0255***	0.0197***	0.0235***	-0.0125***	-0.0185***
	(0.00285)	(0.00421)	(0.00262)	(0.00352)	(0.00296)	(0.00426)
Quintile 3	0.0335***	0.0415***	0.0358***	0.0428***	-0.0572***	-0.0616***
	(0.00297)	(0.00433)	(0.00272)	(0.00360)	(0.00374)	(0.00528)
Quintile 4	0.0491***	0.0559***	0.0521***	0.0584***	-0.160***	-0.174***
	(0.00304)	(0.00447)	(0.00282)	(0.00376)	(0.00494)	(0.00703)
Quintile 5	0.0663***	0.0798***	0.0709***	0.0829***	-0.373***	-0.378***
	(0.00289)	(0.00416)	(0.00269)	(0.00354)	(0.00640)	(0.00904)
White	0.00973*	0.0135*	0.0204***	0.0273***	-0.0457***	-0.0414***
	(0.00558)	(0.00807)	(0.00506)	(0.00658)	(0.00713)	(0.0101)
Mestizo	0.0164***	0.0178***	0.0250***	0.0286***	-0.00926**	-0.00859*
	(0.00390)	(0.00559)	(0.00358)	(0.00466)	(0.00364)	(0.00493)
Afro-Ecuadorian	0.0165***	0.00785	0.0236***	0.0209***	0.0186***	0.0133
	(0.00616)	(0.00877)	(0.00569)	(0.00736)	(0.00666)	(0.00891)
Other ethnicity	0.00483	0.0651**	0.0172	0.0838***	-0.0260	0.0370
	(0.0278)	(0.0297)	(0.0277)	(0.0297)	(0.0397)	(0.0616)
Age dummies	YES	YES	YES	YES	YES	YES
Province dummies	YES	YES	YES	YES	YES	YES
Female*fals. shock		0.000292		-0.000618		0.00223
		(0.00377)		(0.00347)		(0.00534)
Rural*fals. shock		0.00735*		0.0108***		-0.00385
		(0.00429)		(0.00394)		(0.00569)
Q2*fals. shock		-0.0110*		-0.00926*		0.0119**
		(0.00566)		(0.00521)		(0.00587)
Q3*fals. shock		-0.0161***		-0.0178***		0.00863
		(0.00585)		(0.00537)		(0.00736)
Q4*fals. shock		-0.0137**		-0.0159***		0.0291***
		(0.00595)		(0.00548)		(0.00977)
Q5*fals. shock		-0.0269***		-0.0301***		0.00928
		(0.00561)		(0.00523)		(0.0127)
White*fals. shock		-0.00767		-0.0187*		-0.00839
		(0.0109)		(0.00989)		(0.0137)
Mestizo*fals. shock		-0.00303		-0.0103		-0.00139
		(0.00745)		(0.00682)		(0.00625)
Afro*fals. shock		0.0164		0.00459		0.0104
		(0.0107)		(0.00971)		(0.0106)
Other*fals. shock		-0.0910*		-0.105**		-0.0967
		(0.0482)		(0.0482)		(0.0797)
Year	0.0146***	0.0145***	0.00974***	0.00970***	0.00715***	0.00712***
	(0.00189)	(0.00189)	(0.00124)	(0.00124)	(0.00267)	(0.00268)
Constant	0.784***	0.781***	0.767***	0.762***	0.822***	0.826***
	(0.00823)	(0.00940)	(0.00740)	(0.00812)	(0.0104)	(0.0112)
Observations	70,829	70,829	90,312	90,312	65,57	65,57
R-squared	0.082	0.083	0.087	0.088	0.174	0.174

* Statistical significance at 10% level;** Statistical significance at 5% level; *** Statistical significance at 5% level

Source: Author´s analysis based on data from ENEMDU 2004/2005-2010

Table 14: LPM of schooling outcomes among children of age 15-17

	Enrollment		Attendance		Enrollment in Public Schools	
	Coefficient (Std. Err.) (1)	Coefficient (Std. Err.) (2)	Coefficient (Std. Err.) (3)	Coefficient (Std. Err.) (4)	Coefficient (Std. Err.) (5)	Coefficient (Std. Err.) (6)
Shock	0.00981	0.0547**	0.0111	0.0625***	0.0281***	0.0417**
	(0.00901)	(0.0241)	(0.00796)	(0.0228)	(0.00949)	(0.0202)
Female	0.0145***	0.0133**	0.0154***	0.0136**	0.0123**	0.00209
	(0.00474)	(0.00595)	(0.00442)	(0.00535)	(0.00497)	(0.00633)
Rural	-0.181***	-0.198***	-0.186***	-0.202***	0.0394***	0.0402***
	(0.00539)	(0.00682)	(0.00503)	(0.00614)	(0.00531)	(0.00680)
Quintile 2	0.00469	0.00550	0.00736	0.00825	-0.0113*	-0.00942
	(0.00736)	(0.00937)	(0.00686)	(0.00841)	(0.00638)	(0.00826)
Quintile 3	0.0110	0.0167*	0.0181**	0.0255***	-0.0364***	-0.0371***
	(0.00759)	(0.00960)	(0.00708)	(0.00863)	(0.00693)	(0.00890)
Quintile 4	0.0615***	0.0736***	0.0712***	0.0842***	-0.101***	-0.0992***
	(0.00774)	(0.00971)	(0.00723)	(0.00875)	(0.00794)	(0.00998)
Quintile 5	0.140***	0.153***	0.154***	0.168***	-0.301***	-0.296***
	(0.00769)	(0.00970)	(0.00723)	(0.00879)	(0.00970)	(0.0120)
White	0.0623***	0.0818***	0.0674***	0.0853***	-0.0730***	-0.0638***
	(0.0151)	(0.0179)	(0.0138)	(0.0158)	(0.0151)	(0.0180)
Mestizo	0.0822***	0.102***	0.0934***	0.112***	-0.0166*	-0.00629
	(0.0105)	(0.0128)	(0.00964)	(0.0114)	(0.00874)	(0.0113)
Afro-Ecuadorian	0.0439***	0.0665***	0.0546***	0.0764***	0.00823	0.00724
	(0.0159)	(0.0189)	(0.0148)	(0.0171)	(0.0144)	(0.0177)
Other ethnicity	0.102	0.105	0.102	0.0986	-0.0465	0.0107
	(0.0633)	(0.0781)	(0.0624)	(0.0760)	(0.0666)	(0.0688)
Age dummies	YES	YES	YES	YES	YES	YES
Province dummies	YES	YES	YES	YES	YES	YES
Female*shock		0.00235		0.00468		0.0282***
		(0.00984)		(0.00947)		(0.0102)
Rural*shock		0.0490***		0.0535***		-0.00261
		(0.0111)		(0.0106)		(0.0108)
Q2*shock		-0.00123		-0.000598		-0.00452
		(0.0150)		(0.0144)		(0.0129)
Q3*shock		-0.0156		-0.0230		0.00307
		(0.0155)		(0.0149)		(0.0140)
Q4*shock		-0.0362**		-0.0447***		-0.00530
		(0.0159)		(0.0153)		(0.0163)
Q5*shock		-0.0396**		-0.0532***		-0.0172
		(0.0156)		(0.0150)		(0.0201)
White*shock		-0.0585*		-0.0638**		-0.0221
		(0.0321)		(0.0311)		(0.0325)
Mestizo*shock		-0.0604***		-0.0661***		-0.0265*
		(0.0204)		(0.0196)		(0.0158)
Afro*shock		-0.0689**		-0.0775***		0.00561
		(0.0289)		(0.0279)		(0.0233)
Other*shock		-0.0226		-0.0133		-0.164
		(0.134)		(0.133)		(0.156)
Year	0.0165***	0.0165***	0.0188***	0.0187***	-0.00378	-0.00367
	(0.00252)	(0.00252)	(0.00182)	(0.00182)	(0.00265)	(0.00265)
Constant	0.717***	0.703***	0.666***	0.653***	0.808***	0.801***
	(0.0171)	(0.0190)	(0.0158)	(0.0172)	(0.0176)	(0.0193)
Observations	31,719	31,719	37,184	37,184	23,142	23,142
R-squared	0.097	0.098	0.106	0.108	0.111	0.112

* Statistical significance at 10% level;** Statistical significance at 5% level; *** Statistical significance at 5% level

Source: Author´s analysis based on data from ENEMDU 2004/2005-2010

Table 15: LPM of schooling outcomes among children of age 15-17 (falsified shock)

	Enrollment		Attendance		Enrollment in Public Schools	
	Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)
	(1)	(2)	(3)	(4)	(5)	(6)
Falsified shock	-0.0191	-0.0110	-0.0109	0.0131	-0.0182	-0.00830
	(0.0133)	(0.0307)	(0.0110)	(0.0274)	(0.0144)	(0.0280)
Female	0.0135**	0.00976	0.0140***	0.0113	0.00210	0.00280
	(0.00594)	(0.00850)	(0.00535)	(0.00696)	(0.00633)	(0.00891)
Rural	-0.197***	-0.204***	-0.201***	-0.209***	0.0394***	0.0556***
	(0.00684)	(0.00972)	(0.00615)	(0.00797)	(0.00683)	(0.00948)
Quintile 2	0.00722	0.0379***	0.0101	0.0333***	-0.0100	-0.00532
	(0.00938)	(0.0134)	(0.00842)	(0.0110)	(0.00829)	(0.0117)
Quintile 3	0.0198**	0.0344**	0.0284***	0.0449***	-0.0393***	-0.0398***
	(0.00964)	(0.0137)	(0.00866)	(0.0112)	(0.00893)	(0.0126)
Quintile 4	0.0767***	0.107***	0.0872***	0.115***	-0.103***	-0.0765***
	(0.00976)	(0.0137)	(0.00879)	(0.0113)	(0.0100)	(0.0136)
Quintile 5	0.156***	0.172***	0.171***	0.194***	-0.300***	-0.288***
	(0.00981)	(0.0143)	(0.00888)	(0.0117)	(0.0121)	(0.0173)
White	0.0780***	0.0813***	0.0835***	0.0886***	-0.0569***	-0.0712***
	(0.0181)	(0.0252)	(0.0160)	(0.0201)	(0.0183)	(0.0248)
Mestizo	0.100***	0.0915***	0.111***	0.108***	-0.00163	-0.0125
	(0.0131)	(0.0176)	(0.0115)	(0.0142)	(0.0116)	(0.0145)
Afro-Ecuadorian	0.0504**	0.0358	0.0626***	0.0591***	0.0135	0.0172
	(0.0197)	(0.0261)	(0.0177)	(0.0218)	(0.0189)	(0.0234)
Other ethnicity	0.105	0.159	0.0989	0.187*	0.0239	0.0370
	(0.0787)	(0.104)	(0.0763)	(0.0959)	(0.0688)	(0.0774)
Age dummies	YES	YES	YES	YES	YES	YES
Province dummies	YES	YES	YES	YES	YES	YES
Female*fals. shock		0.00784		0.00747		-0.000937
		(0.0119)		(0.0109)		(0.0127)
Rural*fals. shock		0.0149		0.0191		-0.0322**
		(0.0136)		(0.0124)		(0.0135)
Q2*fals. shock		-0.0605***		-0.0569***		-0.00929
		(0.0187)		(0.0170)		(0.0165)
Q3*fals. shock		-0.0286		-0.0404**		0.000304
		(0.0191)		(0.0174)		(0.0177)
Q4*fals. shock		-0.0606***		-0.0711***		-0.0541***
		(0.0192)		(0.0177)		(0.0199)
Q5*fals. shock		-0.0327*		-0.0569***		-0.0228
		(0.0191)		(0.0174)		(0.0239)
White*fals. shock		-0.00451		-0.0118		0.0282
		(0.0349)		(0.0316)		(0.0354)
Mestizo*fals. shock		0.0183		0.00649		0.0221
		(0.0248)		(0.0226)		(0.0216)
Afro*fals. shock		0.0279		0.00755		-0.00493
		(0.0344)		(0.0314)		(0.0312)
Other*fals. shock		-0.0895		-0.163		-0.0308
		(0.155)		(0.148)		(0.137)
Year	0.0226***	0.0226***	0.0212***	0.0211***	0.00316	0.00314
	(0.00595)	(0.00595)	(0.00378)	(0.00378)	(0.00635)	(0.00636)
Constant	0.681***	0.676***	0.632***	0.622***	0.811***	0.806***
	(0.0223)	(0.0262)	(0.0197)	(0.0220)	(0.0231)	(0.0253)
Observations	20,736	20,736	26,201	26,201	14,775	14,775
R-squared	0.108	0.109	0.116	0.117	0.108	0.109

* Statistical significance at 10% level;** Statistical significance at 5% level; *** Statistical significance at 5% level

Source: Author´s analysis based on data from ENEMDU 2004/2005-2010

4.3.3 Results for remittances

The linear probability models in Table 16 and Table 17 show that the reduction in remittances over the period 2007-2010 does not affect school enrollment and attendance neither for children aged 5-14 nor for children aged 15-17. However, we do see a small but significant effect on shifts from private to public schools for younger children, and no effect for older children. For example, a US$ 14 reduction in monthly remittances over the period of 2007-2010 leads to a 0.6% increase in public school enrollment. These results suggest that even though the reduction of remittances over 2007-2010 does not result in decreases in school enrollment and school attendance, it does have a small effect on the quality of the education younger children receive.

One plausible explanation to understand why the shift towards public schools happens for younger children and not for older children, could be one similar to the one giving by Thomas et al. (2004:82) in his study about the effects of the Indonesian crisis of 1998 on school enrollment: “First, the returns to primary schooling are very low …, but the returns to secondary schooling are much higher. Given that, at the time of the crisis, households had already invested in the schooling of older children, it would have been prudent to continue to protect education-related expenditures for those children and keep them in school. It makes good sense to allocate resources towards maintaining the education of older children, even at the cost of the schooling of younger children”.

Similar to the findings of the LPM using the pooled sample, the results of the fixed-effect models using panel data presented in Table 18, show no effect of the drastic decrease in remittances between first quarter of 2008 and first quarter of 2009 on school attendance. These results provide further evidence that the reduction in remittances did not affect school attendance during the hardest time of the crisis.

Table 16: Linear probability models of remittances for children aged 5-14 (pooled sample)

	Enrollment	Attendance	Enrollment in Public Schools
	Coefficient (Std. Err.)	Coefficient (Std. Err.)	Coefficient (Std. Err.)
	(2)	(1)	(3)
Remittances per capita	0.000024	0.0000326	0.000410***
	(0.000112)	(0.000112)	(0.000153)
Age	0.115***	0.116***	0.0157***
	(0.00280)	(0.00280)	(0.00362)
Age squared	-0.00635***	-0.00641***	-0.000606***
	(0.000146)	(0.000146)	(0.000187)
Female	0.00342**	0.00372**	-0.00139
	(0.00171)	(0.00171)	(0.00255)
Area	-0.00676***	-0.00660***	0.0624***
	(0.00241)	(0.00242)	(0.00341)
Female head of household	0.0108***	0.0121***	0.00537
	(0.00346)	(0.00349)	(0.00525)
Household size	-0.00426***	-0.00414***	0.00855***
	(0.000487)	(0.000486)	(0.000552)
Telephone	0.0190***	0.0193***	-0.0987***
	(0.00177)	(0.00175)	(0.00431)
2008	0.0124***	0.0136***	0.0119**
	(0.00305)	(0.00308)	(0.00501)
2009	0.0241***	0.0262***	0.0356***
	(0.00354)	(0.00357)	(0.00573)
2010	0.0301***	0.0333***	0.0439***
	(0.00353)	(0.00353)	(0.00573)
Head of household marital status dummies	YES	YES	YES
Head of household education dummies	YES	YES	YES
Household ownership dummies	YES	YES	YES
Household type of floor dummies	YES	YES	YES
Household type of access to water dummies	YES	YES	YES
Household type of electricity dummies	YES	YES	YES
Household type of toilet dummies	YES	YES	YES
Constant	0.468***	0.460***	0.610***
	(0.0164)	(0.0165)	(0.0224)
Observations	69,118	69,118	65,114
R-squared	0.080	0.082	0.180

* Statistical significance at 10% level;** Statistical significance at 5% level; *** Statistical significance at 5% level

Source: Author´s analysis based on data from ENEMDU 2007-2010

Table 17: Linear probability models of remittances for children aged 15-17 (pooled sample)

	Enrollment	Attendance	Enrollment in Public Schools
	Coefficient (Std. Err.) (2)	Coefficient (Std. Err.) (1)	Coefficient (Std. Err.) (3)
Remittances per capita	0.000255	0.000136	-0.000331
	(0.000332)	(0.000334)	(0.000372)
Age	0.341*	0.333*	0.0655
	(0.183)	(0.183)	(0.203)
Age squared	-0.0126**	-0.0123**	-0.00243
	(0.00573)	(0.00574)	(0.00636)
Female	0.0112**	0.0132**	0.0183***
	(0.00545)	(0.00546)	(0.00597)
Area	-0.0250***	-0.0249***	0.0187**
	(0.00803)	(0.00804)	(0.00785)
Female head of household	0.0218**	0.0178*	-0.0261**
	(0.0103)	(0.0104)	(0.0114)
Household size	-0.0166***	-0.0163***	0.00994***
	(0.00145)	(0.00145)	(0.00143)
Telephone	0.0832***	0.0840***	-0.0709***
	(0.00652)	(0.00651)	(0.00816)
2008	0.0269**	0.0283***	0.0144
	(0.0108)	(0.0108)	(0.0126)
2009	0.0526***	0.0578***	0.0283**
	(0.0119)	(0.0120)	(0.0141)
2010	0.0772***	0.0858***	0.0396***
	(0.0120)	(0.0120)	(0.0142)
Head of household marital status dummies	YES	YES	YES
Head of household education dummies	YES	YES	YES
Household ownership dummies	YES	YES	YES
Household type of floor dummies	YES	YES	YES
Household type of access to water dummies	YES	YES	YES
Household type of electricity dummies	YES	YES	YES
Household type of toilet dummies	YES	YES	YES
Constant	-1.515	-1.448	0.202
	(1.461)	(1.461)	(1.619)
Observations	21,505	21,505	16,024
R-squared	0.163	0.164	0.116

* Statistical significance at 10% level;** Statistical significance at 5% level; *** Statistical significance at 5% level

Source: Author´s analysis based on data from ENEMDU 2007-2010

Table 18: Linear probability fixed-effect models of remittances for children aged 10-17 (panel data)

	Children aged 10-14		Children aged 15-17	
	Attendance		Attendance	
	Coefficient	(Std. Err.)	Coefficient	(Std. Err.)
	(1)		(2)	
Remittances per capita	0.00134		-0.00223	
	(0.00142)		(0.00242)	
Age	0.0117		0.434	
	(0.0575)		(0.424)	
Age squared	-0.000390		-0.0128	
	(0.00237)		(0.0133)	
Female head of household	-0.00687		-0.114	
	(0.00550)		(0.119)	
2009	-0.00555		-0.0627**	
	(0.00988)		(0.0282)	
Head of household marital status dummies	YES		YES	
Head of household education dummies	YES		YES	
Constant	0.810**		-2.523	
	(0.353)		(0.3382)	
Observations	2,932		1,948	
Number of id	1,667		1,32	
R-squared	0.007		0.056	

* Statistical significance at 10% level;** Statistical significance at 5% level; *** Statistical significance at 5% level

Source: Author´s analysis based on data from ENEMDU panel March 2008- March 2009

Chapter 5

Conclusions

This paper examined the effect of the global financial crisis of 2008-2009 on child schooling in Ecuador. Our analysis suggests that the global crisis did not affect children´s education. School enrollment and attendance were very stable during the time of the crisis for both children aged 5-14 and children aged 15-17.This concurs with most of the literature about aggregate economic shocks on schooling outcomes in Latin-America, which show that school enrollment and attendance remain constant and in some cases even increase in the face of adverse economic shocks. Although we do not find an effect of the global crisis on school enrollment and attendance, we do observe shifts in the type of school in which children enroll, with an increase of 1,6 and 2,8 percentage points in the probability of being enrolled in a public school for younger and older children, respectively.

To enhance the analysis, we analyze one the main transmission mechanism of the crisis for Ecuador, which is, remittances. We explored the effect of a reduction in remittances on school enrollment, attendance and shifts in the type of school. As expected and consistent with the previous results, we find that the reduction in remittances did not result in decreases in school enrolment and attendance. Nevertheless, the reduction in remittances is associated with shifts from private to public schools for younger children but not older children. It seems that households sought to protect investments in the quality of education of older children at the expense of the quality of education of younger children.

The positive scenario for most schooling outcomes in Ecuador despite the crisis suggests that, Ecuadorian households have become more resilient and are better able to withstand economic shocks now as compared to previous crises. This may be due to the learning process about how to deal with adverse economic shocks based on their experience of the crisis in 1999-2000. As previously seen in the literature review, Ecuadorian households adapted to the crisis of 1999, mainly by changing their consumption patterns and delaying payments. These coping strategies used by households during the crisis of 1999 may have been used as well during this recent crisis. Also, the positive scenario for children´s education in Ecuador may be related to the fact that this global crisis hit the Ecuadorian economy in better economic conditions than previous crisis and that the government undertook counter-cyclical economic policies during 2009 and 2010. Furthermore, the positive response of Ecuadorian households to the crisis might have been reinforced by the increases in education benefits that became stronger in 2008 and 2009.

The results of this analysis may be of interest to policy-makers since there is substantial evidence which shows that in middle-income countries in Latin-America, education outcomes tend to be stable and in some cases even increase in the face of adverse economic shocks; while health outcomes tend to worsen[36]. Consequently, it could be suggested that during crises, more efforts should be directed to protect children´s health in Ecuador. Furthermore, since we observe that the crisis is associated with shifts towards public schools, policy makers might be more concerned with policies to improve the quality of public education, giving the increasing number of students in public schools because of the crisis, rather than focusing on policies targeted to increase school enrollment and attendance.

The analysis in this paper presents only a partial picture of the impact of the global crisis on child well-being in Ecuador. It is possible that the effects of the crisis are still to be felt

[36] Several studies show the adverse economic shocks have negative impact on children´s health, including Maluccio (2005) in Nicaragua, Paxon and Schady (2005) in Peru, and Cutler et al. (2002) in Mexico.

during 2012 and beyond. Thus, it would be important to explore further the effect of the crisis over an extended period, and analyze the other main transmission channel through which the crisis manifests itself, that is exports, as well as, the role of education policies besides the BDH, so that public interventions can be better designed to protect children in the event of future aggregate economic shocks.

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Annex I

State Budget and Education Public Expenditure

Year	General State Budget, *Presupuesto General del Estado* (PGE)	Growth Rate of PGE	Public Education Expenditure	Growth Rate of Public Education Expenditure
2000	3.373		268	
2001	5.489	62,7%	471	75,8%
2002	5.505	0,3%	663	40,7%
2003	6.162	11,9%	539	-18,7%
2004	8.157	32,4%	854	58,5%
2005	8.942	9,6%	938	9,8%
2006	10.705	19,7%	1.084	15,6%
2007	11.597	8,3%	1.345	24,1%
2008	16.697	44,0%	1.752	30,3%
2009	18.834	12,8%	1.891	8,0%
2010	20.894	10,9%	2.009	6,2%
2011	24.749	18,4%	2.493	24,1%

Annex II

Government´s Income Sources

Year	Oil income	Growth rate of Oil income	Non-oil Income	Growth Rate Non-oil Income	Total Income	Growth Rate of Total Income
2001	1.460		2.516		4.126	
2002	1.352	-7,4%	3.497	39,0%	4.955	20,1%
2003	1.393	3,0%	4.781	36,7%	6.361	28,4%
2004	1.664	19,4%	5.156	7,8%	6.910	8,6%
2005	2.115	27,2%	5.825	13,0%	8.177	18,3%
2006	2.212	4,5%	6.871	18,0%	9.146	11,9%
2007	3.235	46,3%	8.333	21,3%	11.263	23,1%
2008	3.318	2,6%	9.558	14,7%	13.451	19,4%
2009	8.675	161,5%	11.996	25,5%	21.628	60,8%
2010	5.212	-39,9%	12.373	3,1%	18.378	-15,0%
2011	7.845	50,5%	13.994	13,1%	23.186	26,2%