

Effects of the Global Financial Crisis on Children's Outcomes in El Salvador¹

Suzanne Duryea
suzanned@iadb.org
Inter-American Development Bank

Melisa Morales
mmorales@iadb.org
Inter-American Development Bank

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Abstract

Central America has been one of the world regions hardest hit by the global financial crisis. Depressed aggregate demand in the U.S. transmitted the crisis rapidly to El Salvador where the quarterly growth rate of the index of economic activity in El Salvador turned negative for the second half of 2008. The percentage of households receiving remittances dropped from 23 percent in 2007 to 17 percent in 2008. These aggregate trends raise serious concerns about the potential impacts on multiple dimensions of children's wellbeing. This paper analyzes the short-run effects of the economic crisis on children's schooling and employment outcomes in El Salvador, exploiting repeated cross sectional samples of the annual household survey for the period 2000-2008. Although previous studies have found scant evidence that aggregate shocks in Latin America increased child labor or school drop-out rates, we find that this early phase of the financial crisis decreased school attendance for girls and boys ages 10-16 and increased child employment for boys of the same age range. Additionally the shock is found to shift attendance toward public schools. A falsification test demonstrates that a placebo, or "false crisis" defined as second semester 2007 does not have similar adverse impacts on children's outcomes as the manifested crisis.

Keywords: economic shock, school attendance, child employment

JEL Codes: O15, I21, J22

¹Corresponding author: Suzanne Duryea 1300 New York Avenue, NW, Washington, D.C. 20577. This document reflects the opinions of the authors and does not represent the opinions of the Inter-American Development Bank nor its Board of Directors. The authors wish to thank XXX for valuable insights.

1 Introduction

Central America has been one of the world regions hardest hit by the global financial crisis, reflecting the highly integrated nature of economic activity with the United States, the region's main trading partner and epicenter of the global crisis.² Depressed aggregate demand in the US transmitted the crisis rapidly to El Salvador through a decline in exports (textiles and coffee) as well as the collapse of the housing and construction industry in the US, a key source of remittance flows. The quarterly growth rate of the index of economic activity in El Salvador turned negative for both the third and fourth quarters of 2008, following growth steady rates of 5 percent for 2006 and 2007 (Central Bank 2009a) and the percentage of households reporting the receipt of remittances dropped from 23 percent in 2007 to 17 percent in 2008.

These macroeconomic trends raise serious concerns about the potential impacts on multiple dimensions of children's wellbeing. The availability of microdata covering the relevant period, albeit for a limited set of variables, permits the analysis for a small set of outcomes. This paper analyzes the short-run effects of the economic crisis on school and work outcomes in El Salvador, exploiting repeated cross sections of the annual household survey, the *Encuesta de Hogares de Propósitos Múltiples* (EHPM), for the period 2000-2008. Although previous studies have found scant evidence that prior aggregate shocks in Latin America increased child labor or school drop-out rates, and survey data is available only through the second half of 2008, the paper finds that this initial phase of the financial crisis decreased school attendance for girls and boys ages 10-16 and increased child employment for boys of the same age range. The effect of the crisis on the type of school attended is also explored.

The paper is organized as follows. Section 2 discusses the context of crisis for El Salvador, and provides some background on recent trends in children's welfare in the country. Section 3 reviews the literature with Section 4 presenting the empirical framework and results. Section 5 provides concluding remarks.

2 Context and timing of crisis for El Salvador

El Salvador is classified as a lower-middle income country by the World Bank with average per capita income for 2007 estimated at US \$3,547 in current prices (IMF WEO 2009). Annual economic growth rates have tended to be slightly higher in El Salvador over the past decade than the average for Latin America and were particularly good in 2006 and 2007 at approximately 5 percent per year. In the 15 years since ending the civil war El Salvador has made important strides in improving

²Around 50 percent of El Salvador's exports go to the United States (US Department of State, 2009).

children's living conditions. Average levels of educational attainment for the school-age population have risen steadily since the late 1990s with El Salvador improving at a faster pace than the majority of other countries in the region. A significant share of the population has emigrated to the United States for both political and economic reasons with estimates of the expatriate population ranging from one-tenth to one third of the overall population (Aycinena et al., 2010). Remittances represent an important income flow for families with approximately one-fifth of families reporting receipt income from family members living outside of El Salvador. Cox-Edwards and Ureta (2003) have found that the abundant flow of remittances has served to retain children in school and increase schooling attainment.

In the summer of 2007 higher mortgage default rates in the United States marked the collapse of the subprime mortgage market and sent home and stock prices into a precipitous decline. Leaders from the G7 group of industrialized nations warned in February 2008 that global losses from the collapse of the US sub-prime mortgage market could reach US\$400bn and by April 2008 the IMF announced that potential losses from the credit crunch could reach \$1 trillion or higher (Guillen, 2009). As access to credit dried up in the second half of 2008, the macroeconomic shock was transmitted rapidly from the US to El Salvador. Exports to the U.S. from the principal sectors of textiles and coffee fell as aggregate demand fell in the United States. Remittances to El Salvador began to fall in 2008 as the US crisis began to deepen.³ Figure 1 shows that while monthly growth rates of remittance flows had been averaging over 5 percent from through 2007 and early 2008, in July 2008 the growth of remittance flows began to decline, turning negative in four of six months of the last half of 2008 (Central Bank 2009b).⁴ Figure 2 shows that relatively healthy rates of GDP growth experienced in 2006 and 2007 began to collapse in 2008 with growth rates at less than 2 percent in the second half of 2008 (Finance Ministry of El Salvador). Moreover, the quarterly growth rate of the index of economic activity, calculated by the Central Bank, turned negative in the third and fourth quarters of 2008 as demonstrated in Figure 3.⁵

We next turn to a discussion of some of the recent trends over multiple dimensions of poverty and children's welfare and then move to an econometric analysis of the effect of the first wave of the global economic crisis on children's school attendance and employment outcomes in El Salvador. Given the timeline of the macroeconomic trends in the subsequent econometric analysis we define the *beginning of the financial crisis* as the *final half of 2008*. It is unlikely we are conflating the food price crisis that started in 2007 with the global financial crisis because domestic prices rose only slightly in El Salvador compared to other countries and over the period of

³Similar trends on remittances are found for Mexico (US Department of State, 2009).

⁴This was the first negative growth rate of remittances since January 2003 (which followed a holiday period).

⁵The index of economic activity is supplied by the Central Bank of El Salvador in order to provide the interannual path growth. The index is based on production series including eleven sectors. For details on the construction of the index, see www.bcr.gob.sv

Figure 1: Monthly Growth Rate of Remittance Flows (Annualized), 2007-2009

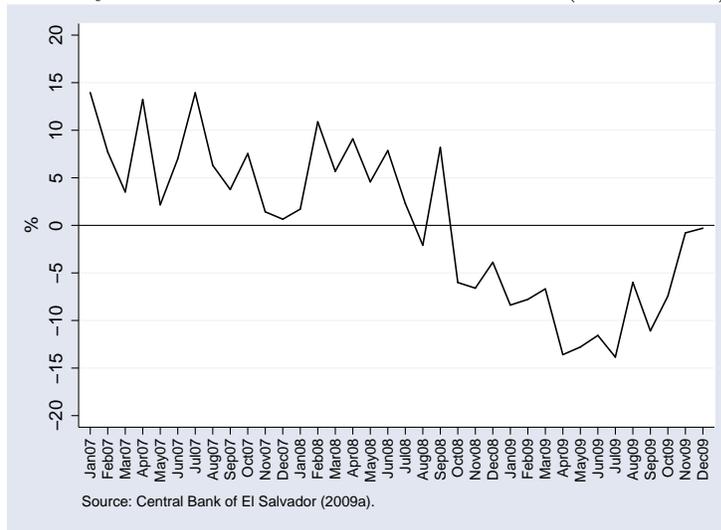


Figure 2: GDP - Quarterly Percent Change, 2006-2008

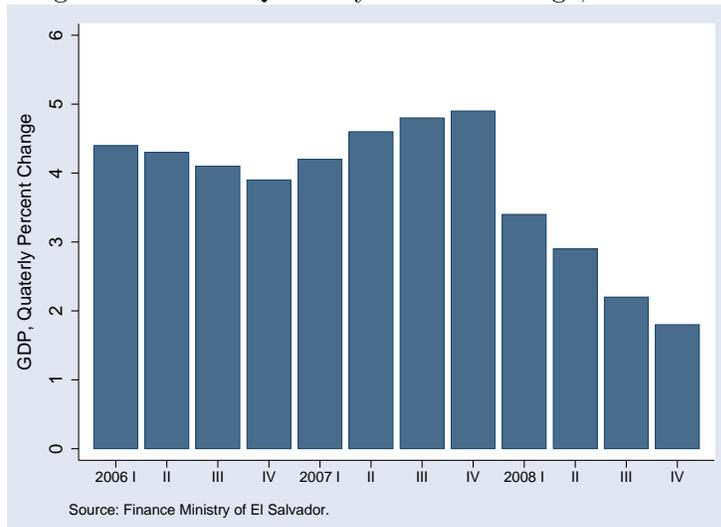
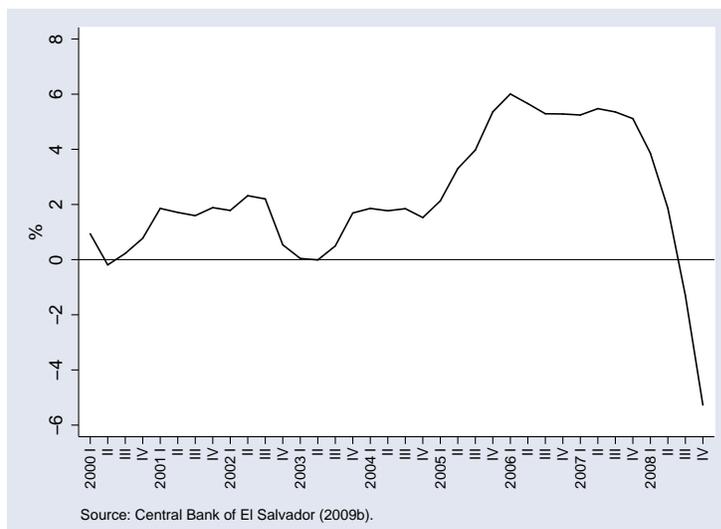


Figure 3: Quarterly Growth Rate Index of Economic Activity (Annualized), 2000-2008



July-December 2008 food prices were falling faster than non-food prices.⁶ Without question our focus on the end of 2008 provides an incomplete picture of the financial crisis that spanned over two years and does not capture the full impacts of the global crisis on the children of El Salvador; however, the severity of the initial wave warrants an analysis of the partial effects on children’s welfare.

Recent tendencies in children’s welfare

We first examine trends in multidimensional child wellbeing keeping in mind that the crisis could affect a range of important outcomes including health, education, and living conditions of the household. Our source of information throughout this paper is the national household survey, the Multipurpose Household Survey (*Encuesta de Hogares de Propósitos Múltiples, EHPM*), which is carried out by the National Statistical Institute (*Dirección Nacional de Estadística y Censos, DIGESTYC*). The survey has been consistently collected for more than 10 years and is representative nationally as well as at the level of the 14 states of the country. The survey covers a standard set of demographic, labor, and education variables but does not include anthropometric or detailed child health questions.

As a first step towards examining the children’s well-being, two multidimensional measures are presented. First, a multidimensional headcount ratio, H , was computed based on the methodology of Foster (2006) for those households in which children were present. Specifically, the multidimensional headcount was estimated using the

⁶For example food inflation did not exceed 15 percent in 2007 or 2008 compared with 30-40 percent experience by other Central American countries including Nicaragua, and Costa Rica.

five equally weighted indicators that follow.

1. Income poverty: The household income per capita is less than the national poverty line.⁷
2. Household head's education: The household head has achieved less than 9 years of schooling.
3. School attendance: The household has at least one child aged 7-16 who is not attending school.
4. Safe water: The dwelling does not have running water.
5. Dirt floor: The dwelling has dirt floor.

The indicators selected to obtain H reflect critical deprivations that compromise investments in children's long-run productivity. For example, Cattaneo et al.(2009) find that dirt floors are significantly linked to the health of young children through a higher incidence of parasitic infestations, diarrhea, and anemia, and which ultimately lowers children's cognitive performance. Likewise, access to safe water is a factor highly associated with the risk of mortality particularly among children under five years of age. In this case, H has been obtained as the fraction of the people deprived in at least 2 dimensions. The Appendix provides additional details on this section.

Table 1 presents H, the percentage of children living in multidimensionally poor households over the period 2000-2008, as well as another multidimensional measure, the adjusted headcount ratio Mo which adjusts for the average number of deprivations experienced by the poor.⁸

Table 1: Percentage of children living in households multidimensionally poor

Year	Headcount (H) and Adjusted-Headcount (Mo)					
	Ages 0-9		Ages 10-16		Ages 0-16	
	H	Mo	H	Mo	H	Mo
2000	40.6	67.1	40.1	67.4	40.4	67.2
2001	39.3	66.4	38.5	65.8	39.0	66.2
2002	37.9	63.8	37.2	63.4	37.7	63.6
2004	34.8	61.9	35.3	62.9	35.0	62.3
2005	33.9	60.1	32.6	58.8	33.4	59.5
2006	32.7	58.4	31.8	57.7	32.3	58.1
2007	32.0	57.5	31.6	57.9	31.8	57.7
2008	33.5	60.0	32.6	59.9	33.1	60.0

Source: Authors' calculations based on EHPM Survey.

⁷The official poverty line was applied as supplied by DIGESTYC. See, www.digestyc.gob.sv

⁸Mo refers to the total number of deprivations experienced by all poor households divided by the maximum number of deprivations that could possibly be experienced by all households. See the Appendix for further details.

Table 1 presents a clear deterioration in the well-being of children from 2007 to 2008 according to the first multidimensional measure. The general improvement in multidimensional poverty was reversed in 2008 with the headcount increasing by 2.5 percentage points for the full group of younger than 16 year old. While the headcount and adjusted headcount tendencies over the period are similar for the different age groups of children the remaining analysis focusing on school attendance and child labor will consider children ages 10-16 since the tradeoffs are inherently different for younger children.

Figure 4: Mean School Attendance and Employment for 10-16 Year Olds, 2005-2008, Jul-Dec

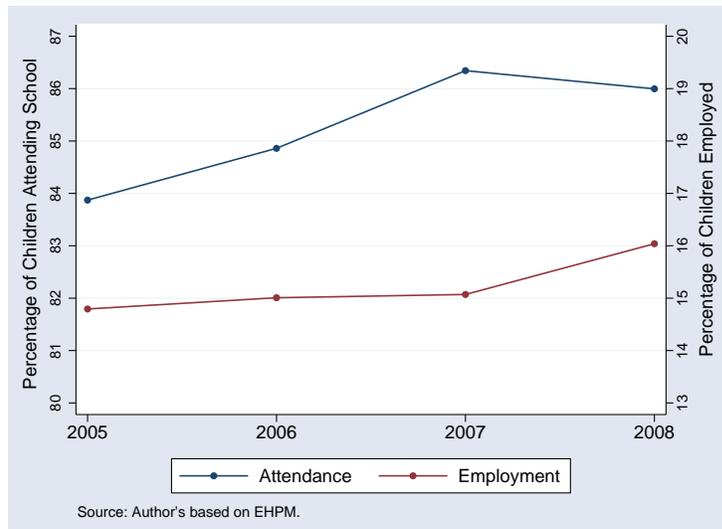


Figure 4 shows the trends in mean school attendance for the second half of the year over the period 2005-2008. We present average attendance rates for July-December to depart from seasonality concerns and to be able to compare late 2008 with the earlier years. The last half of 2008 rather abruptly ended a trend toward higher attendance rates observed from 2005 to 2007. Whereas average employment was generally flat over the period 2005 to 2007, the second part of 2008 is associated with an uptick in employment rates. While the descriptive analysis that presented is far suggestive of a possible link between the economic crisis and children's outcomes, the econometric analysis that follows will explore this more carefully.

3 Literature Review

The economic literature typically makes a clear distinction between idiosyncratic shocks and aggregate shocks since opportunities to smooth the shock are much more constrained in the face of systemically adverse experiences. Potential responses such

as borrowing from other family members or neighbors are less likely to be an option if adverse conditions are widely shared. Yang and Choi (2007) find that remittance flows increased to the Philippines when family members faced unexpected hardship from weather shocks and demonstrate that the remittances are used as a type of insurance to buffer the economic shock by families in the home country. In the case of the financial crisis that began in 2008, the collapsed job markets in the U.S. compromised this instrument more commonly available for ameliorating suffering. Friedman's 1957 permanent income hypothesis also implies that the greater the extent that a crisis is viewed as inflicting a permanent shock to income, the impacts on consumption will be larger as households adjust long-run consumption to the new permanent income (Deaton, 1992). Under this conceptual framework purely transitory shocks may also induce short-run changes in consumption if the strict assumptions of the model are not met, including perfect capital markets.

The potential transmission mechanisms from an aggregate shock to children's welfare include the effect from depressed family income but extend to other areas as well. Education for example can be viewed as a normal good with families increasing their purchases with higher income. This so-called "income effect" implies that as household income falls, expenditures on education will fall as well. Children's school attendance may decline if school fees and costs are considerable. To maintain a steady level of consumption in response to a decline in household income, children may enter the labor market or increase their working hours. However, in many crises, at the same time that total household income is falling as a result of the crisis, labor market opportunities for children are also contracting. This effect, referred to as the "substitution effect", implies that the labor supplied by children will fall as a result of the decline in aggregate demand. If shifting time towards labor activities is not viable then school attendance are less likely to be affected by the economic conditions. A relevant question with respect to children's time allocation is, therefore, whether the income effect or the substitution effect dominates.

A growing body of literature has examined the impacts of economic shocks on children's welfare with much of the literature examining the effect of shocks in developing countries. Studies for Latin American countries have generally found that the substitution effect protects school attendance in an aggregate crisis, with children attending at higher rates than previously. This has been demonstrated for the cases of Brazil and Peru during the crises of the 1980s and 1990s for primary and secondary school-aged children (Duryea and Arends-Kuenning, 2003; Schady, 2004) as well as for the Argentine macroeconomic crisis of 2001- 2002 (Lopez Boo, 2008). During the recent East Asian economic crisis of 1998-1999 low income households in Indonesia were found to protect the investments made in older children's education at the expense of investing in younger children investments, suggesting that they were unable to smooth consumption through other means (Thomas et al., 2004).

The generalized lack of increase in adolescent labor during recessions has also been

demonstrated for Brazil and Peru (Duryea and Arends-Kuenning, 2003; and Schady, 2004). However all crises are not expected nor found to be equal. By exploiting twenty years of data on economic fluctuations for Brazil Duryea and Arends-Kuenning find that the protective role of the substitution effect has been found to be much less effective in light of a deep economic crisis. This suggests that the profound crisis experienced by El Salvador may indeed have had adverse impacts on school and labor outcomes.

In considering the potential impacts on children’s education it is important to also consider how adult job loss can also introduce changes in family dynamics. The precarious economic conditions experienced by parents may expose children to psychological stress which may contribute to problems in school. Underemployed adults may inadvertently generate additional domestic demands by being in the home more hours of the day. These changes within the family may have different implications by children’s gender.

A considerable body of literature also examines the effects of aggregate shocks on other outcomes such as mortality, morbidity, and nutritional status, and generally find that aggregate shocks are associated with adverse effects (see Baird, Friedman, and Schady, 2009; Lopez-Calva and Fernandez, 2009; Ferreira and Schady 2009; Bhalotra, 2010). Schady and Smitz (2010) find that larger aggregate shocks have larger impacts on mortality. Some of the adverse effects found on child mortality and nutrition may be related to the impact of budget shortfalls on service provision during previous crises. Unfortunately the information to examine these important questions is not included in the Salvadoran household survey.

4 Empirical Framework and Results

We explore school attendance and child employment using linear probability models for a pooled sample of 10-16 year old over the period of 2000-2008. The repeated cross sections of data effectively allow us to isolate the effect of the crisis after introducing fixed effects of age, gender and states with a time trend. We focus on this age group because the tradeoffs with respect to allocating time towards school and the labor market are very different for younger children. As previously described, the beginning of the economic crisis is operationalized as the second half of 2008.

Hence for each outcome of Y_{ist} the equation estimated is as follows:

$$Y_{ist} = X_{ist}\beta + \gamma_s + \delta T_t + \theta S_{st} + \epsilon_{ist} \quad (1)$$

where Y_{ist} represents the school attendance and employment outcomes for child i in state s in time t . X_{ist} is a vector of demographic characteristics of the child including age dummies, gender, and a constant. γ_s are geographic fixed effects including 13 state dummies and a rural dummy which is interacted with the state dummies. In light of the seasonal patterns of school attendance and child employment, to capture time (T) we control for the month of the interview in addition to the linear annual trend. The parameter of interest θ , captures the effect of the shock, S_{st} , which is a dummy variable. Given that the economic shock is not expected to vary at the individual level but rather to cause heteroskedasticity at the state level, the linear probability models are corrected using Huber White robust standard errors. The shock is interacted with the child’s gender to examine gender specific effects. The final term, ϵ_{ist} , is the disturbance term. Basic summary statistics for the explanatory and dependent variables are shown in Table 2, with the regression results shown in Tables 3-6.

Table 2: Summary Statistics

Children aged 10-16 (N=102,986)			
Variable	Mean	s.d.	
Age	12.9	2.0	
Child is boy	50.8	50.0	
Child attends school	84.7	36.0	
Child works	13.0	33.6	
Child only attends school	77.5	41.8	
Child only works	5.7	23.1	
Child works and attends school	7.3	26.0	
Neither works nor attends school	9.6	29.4	
Child attends public school	81.7	38.7	
Some member of his/her family lives abroad	20.0	40.0	
Child receives remittances	17.8	38.2	
Maximum years of schooling of household members	8.1	4.8	

Source: Authors’ calculations based on EHPM Survey.

The linear probability models in Table 3 show that a strong significant relationship is found regarding school attendance and children’s age, with 16 year olds almost 30 percentage point less likely to be attending school than 10 year olds, the omitted age dummy.⁹ There is no significant difference in school attendance by gender but a small significant trend in school attendance is found over time. In contrast

⁹The precise question in the household survey is “Estudia actualmente o asiste a un centro maternal? (Are you currently attending school or a daycare?). The authors’ operationalization of school attendance considers only attendance of primary or secondary schools as answered in the subsequent question.

to the findings in much of the previous literature the economic shock resulted in a reduction in school attendance by approximately 2.5 percentage points. The shock was not found to have a significantly different effect on school attendance by gender.

Table 3: Linear Probability Models of Attendance for Children Ages 10-16

	Attendance		Attendance	
	Coeff.	Std. Err.	Coeff.	Std. Err.
<i>male</i>	0.005	0.00969	0.006	0.00967
<i>shock</i>	-0.026**	0.00974	-0.018	0.01083
<i>male*shock</i>			-0.007	0.00863
<i>age 11</i>	-0.007**	0.00296	-0.007**	0.00296
<i>age 12</i>	-0.028**	0.00535	-0.028***	0.00536
<i>age 13</i>	-0.073***	0.01013	-0.073***	0.01013
<i>age 14</i>	-0.130***	0.01715	-0.130***	0.01716
<i>age 15</i>	-0.210***	0.02093	-0.210***	0.02094
<i>age 16</i>	-0.288***	0.02463	-0.288***	0.02464
<i>year</i>	0.007***	0.001130	0.007***	0.00130
<i>February</i>	0.022***	0.00543	0.022***	0.00543
<i>March</i>	0.024**	0.00883	0.024**	0.00883
<i>April</i>	0.021	0.01287	0.021	0.01286
<i>May</i>	0.014	0.00709	0.014	0.00709
<i>June</i>	0.005	0.01292	0.005	0.01292
<i>July</i>	0.029***	0.00690	0.029***	0.00689
<i>August</i>	0.014	0.00867	0.014	0.00867
<i>September</i>	0.007	0.00957	0.007	0.00957
<i>October</i>	-0.003	0.00903	-0.003	0.00903
<i>November</i>	-0.005	0.00926	-0.005	0.00927
<i>December</i>	0.001	0.01485	0.001	0.01485
<i>rural</i>	-0.100***	0.00040	-0.100	0.00040
<i>state dummies</i>	yes		yes	
<i>rural*state dummies</i>	yes		yes	
<i>constant</i>	-12.322***	2.61004	-12.322	2.61022
<i>Observations</i>	102,986		102,986	
<i>R²</i>	0.11		0.11	

Notes : *Significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Linear Probability Models of Employment for Children Ages 10-16

	Employment		Employment	
	Coeff.	Std. Err.	Coeff.	Std. Err.
<i>male</i>	0.121***	0.02067	0.118***	0.02048
<i>shock</i>	0.018**	0.00619	-0.008	0.00854
<i>male*shock</i>			0.051***	0.01281
<i>age 11</i>	0.022***	0.00521	0.022***	0.00524
<i>age 12</i>	0.056***	0.00612	0.056***	0.00614
<i>age 13</i>	0.091***	0.00985	0.091***	0.00986
<i>age 14</i>	0.139***	0.01491	0.139***	0.01493
<i>age 15</i>	0.175***	0.01320	0.175***	0.01321
<i>age 16</i>	0.216***	0.01813	0.216***	0.01816
<i>year</i>	0.002**	0.00076	0.002**	0.00076
<i>February</i>	-0.016**	0.00565	-0.016**	0.00564
<i>March</i>	-0.035***	0.00647	-0.035***	0.00646
<i>April</i>	-0.016**	0.00701	-0.016**	0.00701
<i>May</i>	-0.006	0.00797	-0.006	0.00797
<i>June</i>	0.014*	0.00783	0.014*	0.00783
<i>July</i>	0.008	0.01078	0.008	0.01085
<i>August</i>	0.008	0.01245	0.008	0.01244
<i>September</i>	0.022**	0.00941	0.022**	0.00936
<i>October</i>	0.012	0.00933	0.012	0.00932
<i>November</i>	0.043***	0.00999	0.043***	0.00999
<i>December</i>	0.067***	0.01270	0.067***	0.01275
<i>rural</i>	0.031***	0.00028	0.031***	0.00028
<i>state dummies</i>	yes		yes	
<i>rural*state dummies</i>	yes		yes	
<i>constant</i>	-4.655***	1.54259	-4.657***	1.54349
<i>Observations</i>	102,986		102,986	
<i>R²</i>	0.102		0.102	

Notes : *Significant at 10%; ** significant at 5%; *** significant at 1%

Table 4 shows the same econometric specifications with child employment as the dependent variable. Children are considered to be employed if they responded positively to the question of having a job or contributing to the economic activity of the family in the reference week of the survey. For the outcome of employment the child's age also plays a significant role with 16 year olds 22 percentage points more likely to be employed than 10 years olds, the omitted category. Gender is also significant with males 11 percentage points more likely to participate than females. As in the case of attendance there is a significant seasonality displayed in the data as well as a small positive trend over time. The first regression demonstrates that the economic shock is associated with a significant increase in child employment, of

approximately 2 percentage points. The second regression which interacts gender with the shock demonstrates that the effect is significantly stronger for males and not significant for females. As a robustness check we define the second half of 2007 as the “falsified” shock year and run the same set of regressions in Table 6. Unlike the results in Tables 3 and 4 the effect of the “falsified” shock does not have adverse effect on attendance or employment, providing further evidence that the end of 2008 was a particularly critical period for children’s welfare.

In Table 5 we also explore with the same specification whether the probability of attending private school was affected by the economic crisis. As previously seen in Table 2, approximately 18 percentage of children 10-16 attend private school in El Salvador with direct costs of education generally higher than found in public schools. Given that the crisis is being measured at the end of the school year (end of 2008), the potential impact for shifting attendance is expected to be lower than if we were measuring across the start of a new school year. Nonetheless, shifting attendance to public school within a school year may be associated with attempts to reduce expenditures on schooling. Several reports have noted that this response by families may place greater burden on public sector at precisely the same time the public sector is experiencing fiscal stress (Duryea et al., 2009).

Table 5 presents the results of the analysis. The economic shock at the last half of 2008 is associated with a 5 percentage point increase in the probability of attending public school, among children attending school. While there is an overall shift in attendance toward public schools, there is no evidence that this pattern varies by gender. As in the case of the previous regressions, when a falsification test is attempted with the period of the crisis falsely defined to be the last half of 2007, there is no evidence that this “placebo” has an effect on where students attend school.

Table 5: Linear Probability Models of Probability of Attending Public School Among Children Ages 10-16 Attending School

	Share Public		Share Public	
	Coeff.	Std. Err.	Coeff.	Std. Err.
<i>male</i>	0.005	0.00290	0.005	0.00326
<i>shock</i>	0.049***	0.01186	0.054***	0.01201
<i>male*shock</i>			-0.010	0.00875
<i>age 11</i>	-0.00046	0.00376	0.000	0.00377
<i>age 12</i>	0.003	0.00401	0.003	0.00401
<i>age 13</i>	0.007*	0.00370	0.007*	0.00370
<i>age 14</i>	-0.005	0.00448	-0.005	0.00448
<i>age 15</i>	-0.014*	0.00722	-0.014*	0.00722
<i>age 16</i>	-0.043***	0.00939	-0.043***	0.00937
<i>year</i>	0.001	0.00157	0.001	0.00157
<i>February</i>	0.006	0.01461	0.006	0.01460
<i>March</i>	0.008	0.01340	0.008	0.01340
<i>April</i>	-0.001	0.01226	-0.001	0.01226
<i>May</i>	0.004	0.01212	0.004	0.01211
<i>June</i>	0.003	0.00829	0.003	0.00828
<i>July</i>	-0.007	0.00837	-0.007	0.00837
<i>August</i>	-0.008	0.01147	-0.008	0.01146
<i>September</i>	0.004	0.00925	0.004	0.00923
<i>October</i>	0.002	0.00934	0.002	0.00934
<i>November</i>	0.017	0.01201	0.017	0.01200
<i>December</i>	0.013	0.01093	0.013	0.01093
<i>rural</i>	0.117***	0.00051	0.117***	0.00050
<i>state dummies</i>	yes		yes	
<i>rural*state dummies</i>	yes		yes	
<i>constant</i>	-0.425	3.14611	-0.425	3.14603
<i>Observations</i>	86,070		86,070	
<i>R²</i>	0.115		0.115	

Notes : *Significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Linear Probability Models of Attendance, Employment and Public Education for Children Ages 10-16 (falsification test)

	Attendance		Employment		Public Education	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
<i>male</i>	0.006	0.00969	0.121***	0.02069	0.005	0.00294
<i>placebo shock</i>	0.003	0.00509	-0.005	0.006500	-0.016	0.00565
<i>age 11</i>	-0.007**	0.00296	0.022***	0.00521	4.39	0.00379
<i>age 12</i>	-0.028***	0.00535	0.056***	0.00614	0.003	0.00402
<i>age 13</i>	-0.073***	0.01012	0.091***	0.00985	0.007*	0.00374
<i>age 14</i>	-0.130***	0.01715	0.139***	0.01492	-0.004	0.00446
<i>age 15</i>	-0.210***	0.02093	0.175***	0.01320	-0.014*	0.00724
<i>age 16</i>	-0.288***	0.02462	0.216***	0.01812	-0.043***	0.00943
<i>year</i>	0.006***	0.00118	0.003***	0.00063	0.003**	0.00133
<i>February</i>	0.022***	0.00542	-0.016**	0.00563	0.005	0.01459
<i>March</i>	0.024**	0.00884	-0.035***	0.00647	0.008	0.01339
<i>April</i>	0.021	0.01300	-0.016**	0.00706	0.000	0.01221
<i>May</i>	0.013*	0.00716	-0.006	0.00791	0.005	0.01217
<i>June</i>	0.005	0.01302	0.014*	0.00779	0.004	0.00821
<i>July</i>	0.026***	0.008	0.00761	0.01013	0.002	0.01015
<i>August</i>	0.011	0.00929	0.011	0.01179	0.000	0.01161
<i>September</i>	0.004	0.01074	0.025**	0.00866	0.013	0.00971
<i>October</i>	-0.007	0.00914	0.015	0.00858	0.010	0.00890
<i>November</i>	-0.008	0.00967	0.045	0.00944	0.024*	0.01311
<i>December</i>	-0.002	0.01563	0.070***	0.01239	0.022*	0.01232
<i>rural</i>	-0.099	0.00032	0.031***	0.00030	0.116***	0.00060
<i>state dummies</i>	yes		yes		yes	
<i>state dummies*rural</i>	yes		yes		yes	
<i>constant</i>	-10.628***	2.36269	-6.256***	1.26128	-4.994*	2.67573
<i>Observations</i>	102,986					102,986
<i>R²</i>	0.138					0.109

Source : *Significant at 10%; ** significant at 5%; *** significant at 1%

Concluding Remarks

The analysis suggests that the initial wave of the global economic crisis spared no time in taking a toll on children in El Salvador, despite previous empirical analysis that suggested school attendance would likely be protected. Among children between the ages of 10 to 16, school attendance fell by 2.5 percentage points with the onset of the crisis in the second semester of 2008. The probability of working also increased for boys with the crisis and the probability of attending public school

increased for both male and female students. Policymakers should be concerned about these results since there is abundant evidence of asymmetries in educational attainment. In other words, children who leave school are much less likely to return to their education when conditions improve, implying that the global crisis can potentially leave a generation of youth in El Salvador with permanently lower levels of education. This somewhat exceptional response in El Salvador may also be reflecting the breadth and depth of the 2008-2009 global economic crisis. In other words families have interpreted the economic downturn as a permanent shock to family income, operating in large part through large declines in remittances.

The analysis contained in the paper obviously presents an incomplete picture of the full impact on children's welfare of a financial crisis that spanned over the two years. As additional data becomes available it will be important to further explore the transmission channels of the crisis on a more full set of welfare outcomes such that policies can be better designed to protect children in the next aggregate crisis.

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Appendix. Multidimensional Measures

The multidimensional poverty measures have been estimated following basically a two step process. First, by an identification method described below we identified who is poor by considering a range of deprivations they suffer. Second, we relied on an aggregation method to generate a set of poverty measures based on traditional FGT measures.¹⁰

1 Identification

The identification method identifies who is poor using two cutoffs. The first cut-off indicates if an individual is deprived in each dimension under study. In our analysis we have considered 5 deprivations. As first deprivation, we analyzed the household income poverty taking as deprived the household whose income per capita was less than the national poverty line that, as mentioned before, was supplied by DIGESTYC. Besides, one additional deprivation arises if the household head has achieved less than 9 years of schooling. The years of schooling were selected taking into account that the General Basic Education in El Salvador lasts 9 years and that a potential cut off of 5 years seemed too low. A third deprivation was considered if a given household there were children in school-age not currently attending to school. Additionally, deprived households were those without access to safe water that is highly related to risk of mortality especially among children under five years of age, and those with dirt floor.

The second cutoff is a threshold of the number of dimensions in which a household should be deprived to be identified as multidimensional poor. In this paper we identify a household as multidimensional poor if it is deprived in at least two dimensions and equal weights among dimensions were used since no consensus exists on the most satisfactory weight structure.

2 Aggregation

The aggregation method determines the proportion of households (where children are present) who are poor and the average number of deprivations that poor households experience. The first measure is the Multidimensional Headcount ratio (H) that provides the percentage of households that are multidimensionally poor, in other words, those deprived in 2 or more dimensions. On the other hand, the adjusted headcount ratio (M_0) is the total number of deprivations experienced by all poor households divided by the maximum number of deprivations that could possibly be experienced by all households. It can also be expressed as a product between the percentage of multidimensional poor (H) and the average deprivation share across

¹⁰See, for example, Alkire and Foster (2007) and Foster (2006) for details, advantages and limitations of multidimensional poverty measures. See also Foster et al. (1984).

the poor (called later A).

The set up consist of an achievement matrix with size $N \times D$ where $n(n = 1, 2, \dots, N)$ is the number of observations (households) and $d(d = 1, 2, \dots, D)$ is the number of dimensions. Each element of this matrix, x_{nd} , indicates the achievement of n_{th} household on d_{th} dimension. The cutoff vector Z is a $1 \times D$ vector where z_d is the within dimension cut-off level for dimension d , which identifies poor households (those with $x_{nd} < z_d$) from non-poor (with $x_{nd} \geq z_d$).

A dicotomised deprivation matrix g^0 can be obtained by using the binary values 1 (if $x_{nd} < z_d$) and 0 ($x_{nd} \geq z_d$). Therefore, we can define a normalized gap matrix, g^1 , where the deprivation-matrix elements of the poor would take values such as $\frac{(z_d - x_{nd})}{z_d}$ if $x_{nd} < z_d$ and zero otherwise.

The total number of deprivations experienced by n_{th} household would be: $c_n = \sum_{d=1}^D g_{nd}^0$. Consequently, a household is identified as multidimensional poor if $c_n \geq k$, where k represents the second cutoff.

Formally, the headcount ratio H is as follows:

$$H = \frac{1}{N} \sum_{n=1}^N \left[\sum_{d=1}^D g_{nd}(k) \right]^0 = \frac{q_k}{N}$$

, where $g_{nd}(k)$ is the censored poverty gap of household n in dimension d , such that $g_{nd}(k) = \frac{z_d - x_{nd}}{z_d}$ if $x_{nd} < z_d$ and $c_n \geq k$; $g_{nd}(k) = 0$ otherwise.

H is the number of household deprived in k or more dimensions (q_k) over the total household population n . In other words, q_k is then the number of households in the set Z_k identified using the dual cutoff method.

Alkire and Foster (2007) propose a headcount adjusted by the average number of deprivations experienced by the poor by defining a censored vector of deprivation. Hence, $c_n(k) = c_n$ if $c_n \geq k$, or else, $c_n(k) = 0$. As $0 \leq c_n \leq D$, $\frac{c_n(k)}{D}$ is the individual deprivation share whereas the deprivation average among the poor (A) is:

$$A = \frac{1}{q_k D} \sum_{n=1}^N c_n(k)$$

Therefore, $M_0 = H \times A = \frac{1}{ND} \sum_{n=1}^N c_n(k)$ where A provides the fraction of possible dimensions D in which the average multidimensionally poor household is deprived.