Transitory Shocks, Permanent Effects: Impact of the Economic Crisis on the Well-Being of Households in Latin America and the Caribbean

Almudena Fernandez
Luis F. Lopez-Calva
Regional Bureau for Latin America and the Caribbean, UNDP

Abstract

Aggregate macroeconomic shocks have a direct impact on the welfare of households. The global crisis of 2008/2009 will be no exception, and the magnitude of these impacts will depend on the vulnerability of households, the length of the crisis, the pace of the recovery and the social protection programs in place at the country level. This paper, based on the results of the project The Effects of the Economic Crisis on Household’s Well-being in Latin America and the Caribbean, aims to measure the impact of the global recession on the well-being of households. The paper presents empirical analysis that explores the relationship between macroeconomic crises, defined as aggregate negative shocks, and social indicators at the household levels. Specifically, it focuses on the impact of economic crises on child and maternal health, education and poverty in Argentina, Brazil, Jamaica, Mexico and Peru. The project finds that in all of the five countries studied, economic downturns have a negative impact on child mortality or child health. For those countries in which the effects of the crises on child poverty are examined, there is strong evidence that recessions are associated with increases in child and overall poverty. In every case, however, child poverty increases at higher rates than overall poverty. Results on education indicators are ambiguous, suggesting that a substitution effect might be stronger in the case of schooling than an income effect. Given these results the paper concludes that policies that protect the income of poor households and that maintain (or expand) at least basic health services during economic downturns are of critical importance.

1 Based on the UNDP/RBLAC Project on The Effects of the Economic Crises on Household’s Well-Being in Latin America and the Caribbean. Empirical research for country case studies was conducted by Guillermo Cruces and Pablo Gluzmann (CEDLAS) for Argentina; André Portela Souza and Sergio Pinheiro Firpo (Escala de Economía de São Paulo) for Brazil; Namsuk Kim (UNDP/ODS) and Marta Serra-Garcia (Tilburg University) for Jamaica; Eva Olimpia Arceo-Gómez (El Colegio de Mexico) for Mexico; and Martín Valdivia and Jorge Agüero (GRADE) for Peru.

2 The opinions expressed in this document are those of the authors, and do not necessarily represent the views of the United Nations Development Programme, or those of the Regional Bureau for Latin America and the Caribbean.
I. Introduction

In the absence of insurance and social protection schemes, aggregate and idiosyncratic shocks may have permanent effects on the well-being of households. The evidence in the literature shows that this may be especially the case for the most vulnerable within the household, including children, elderly and people with disabilities. In this paper the focus is on aggregate shocks due to macroeconomic downturns.\(^3\)

The effects on children are of particular interest. Several studies on early childhood development indicate that adverse events during the first years of a child’s life translate directly into less desirable adult outcomes in terms of well-being. According to Schady (2006), a poor early childhood development can have long lasting effects in school attainment, employment, wages, and incidence of criminality. Thus, economic crises, or short-term economic downturns, can have lasting consequences for human development and perpetuate the intergenerational transmission of poverty.

In the past few decades the Latin American and Caribbean (LAC) region has made great strides in poverty reduction and social protection. Countries in the region have implemented large-scale social programs, mainly through conditional cash transfers (CCT) that covered about 95 million beneficiaries in 2009. These programs, accompanied by sustained economic growth, have contributed to significant reductions in poverty levels and inequality, improvements in children health and education and sustained progress toward the achievement of the Millennium Development Goals (MDGs).

However, in spite of the decreasing trend, inequality and poverty remain very high in the region and are likely to show reversals due to the current economic crisis. Moreover, advances in social indicators are recent and not consolidated. Many households, and children within them, remain vulnerable to long-term effects in their well-being due to this transitory shock.

The main objective of the project *The Effects of the Economic Crisis on Household’s Well-being in Latin America and the Caribbean* is to understand, through empirical analysis, the main sources of household’s vulnerability in lieu of the economic crisis and to provide specific policy advice for an integrated social protection policy to prevent that transitory poverty evolves into structural deprivation due to the absence of well designed policy instruments. This paper will focus particularly on the effects of economic crises on the well-being of children.

II. Conceptual Framework

\(^3\) For a similar discussion looking at the effects of extreme natural events see Lopez-Calva and Ortiz-Juarez (2008).
Using and asset-based approach to poverty, the main concern about the effects of transitory shocks on long-term household’s well-being is the extent to which they result on reversals on the accumulation of income-generating assets. As described by Attanasio, and Szekely (1999), household income is a function of the stock of income-generating assets (A) owned by each individual (i) in the household, the rate at which these are used (R), their market value (W) and transfers (T), such as benefits from CCTs or remittances. Household income, thus, can be expressed in the following terms:

\[ y = \sum_i^m \sum_j^k A_{ij} R_{ij} W_j + \sum_i^n T_i \]  

(1)

Income-generating assets A can be human capital, such as education and skills, physical capital, such as property or financial assets, or social capital, referring to norms and networks that enable collective action.

The extent to which crises have effects on household well-being, thus, depends on the extent to which they have negative impacts on the stocks of assets held by the individuals in the households, their ability to use the or their value. Economic crises tend to decrease the stock of income-generating assets held by individuals in the household as these forgo assets to smooth consumption. For example, individuals might use savings or sell physical capital for immediate consumption, relinquishing the income these could generate in the future. Crises can also have an effect on the rate at which assets are used; unemployment, for example, results in an under usage of human capital, or lower demand for certain goods results in the under usage physical productive assets such as machinery or land. Finally, aggregate shocks can affect the market value of assets, as wages decrease, for example. Thus, economic crises, even when transitory, can have long-term effects on household’s asset accumulation.

Moreover, recessions can also have an impact in the accumulation of income-generating assets of future generations. As households forgo part of their stock of income-generating assets, they tend to also forgo the accrual of income-generating assets, such as education or nutrition. For instance, a temporary shock could induce a household to reduce the dietary intake of a child, or to withdraw their kids from school to provide additional income. The effects of these short-term decisions have long-lasting impacts in the cognitive development of children, and decision taken during a transitory shock, can perpetuate asset-poverty in future generations.

Policy responses to crises often focus on preventing or compensating for, a reduction in income-generating assets by increasing transfers (T). These are important because the presence of an additional income can deter asset reduction decisions that have long term effects. Thus, a transfer, even if temporary, can prevent transitory poverty from becoming long-term poverty.

The literature suggests that there are at least three effects to be considered when looking the impact of aggregate shocks on household well-being (Ferreira and Schady 2008). Income and substitution effects are particularly important when exploring education and health outcomes given that although the cost of the services might increase relatively to the household’s income
during recessions, the opportunity cost of sending a child to school or of dedicating more time to health inducing behaviors, decreases if the crisis results in increase in unemployment. Which of these two effects dominates will determine the extent of impact of the crisis on the household’s well-being. Another important factor is that the impacts of macroeconomic shocks on household well-being can be both long and short-term. Households might try to smooth their consumption by altering their labor supply, for example sending children to work as opposed to going to school, or taking extra labor shifts when available. This can, however, represents a trade-off between present consumption and human capital accumulation which determines future consumption. Whether this trade-off is temporary or permanent depends on a number of households and institutional factors. Finally, it is important to note that household effects will be heterogeneous according to household characteristics. The extent to which an income effect dominates on a substitution effect will depend on the household’s income and access to credit; poorer households have a higher marginal utility of current consumption, and fewer options for consumption smoothing, thus income effects are more likely to be dominant.

The literature suggests that there are at least three effects to be considered when looking the impact of aggregate shocks on household well-being (Ferreira and Schady 2008). Income and substitution effects are particularly important when exploring education and health outcomes given that although the cost of the services might increase relatively to the household’s income during recessions, the opportunity cost of sending a child to school or of dedicating more time to health inducing behaviors, decreases if the crisis results in increase in unemployment. Which of these two effects dominates will determine the extent of impact of the crisis on the household’s well-being. Another important factor is that the impacts of macroeconomic shocks on household well-being can be both long and short-term. Households might try to smooth their consumption by altering their labor supply, for example sending children to work as opposed to going to school, or taking extra labor shifts when available. This can, however, represents a trade-off between present consumption and human capital accumulation which determines future consumption. Whether this trade-off is temporary or permanent depends on a number of households and institutional factors. Finally, it is important to note that household effects will be heterogeneous according to household characteristics. The extent to which an income effect dominates on a substitution effect will depend on the household’s income and access to credit; poorer households have a higher marginal utility of current consumption, and fewer options for consumption smoothing, thus income effects are more likely to be dominant.

III. The Methodology

The empirical analysis for the project on The Effects if the Economic Crisis on Household’s Well-being in Latin America and the Caribbean was conducted using data from past crises, and various methodologies including a difference-in-difference approach, fixed effects models, and an instrumental variables, depending on the availability of data at the country level and the peculiarities of each country’s past crises episodes. For identification purposes the event
“economic crisis” is defined as an aggregate negative economic shock on the economy, characterized by a sharp decline of the GDP per capita of a country. The dimensions of children’s wellbeing examined are those related to child health, educational, and poverty outcomes and also depend on the availability of data at the country level.

a. Difference-in-Difference

One of the methodologies used in the country case studies, particularly the case of Brazil and Peru, was a differences-in-difference approach that captures overall impacts of economic crises on the variables of interest using the following regression:

\[ Y_{it} = \alpha + \beta T_i + \gamma D_t + \delta T_i \cdot D_t + \theta X_{it} + \varepsilon_{it} \]  \hspace{1cm} (2)

where \( T_i \) is a group indicator variable that equals one if individual \( i \) was affected by the crisis, \( D_t \) is an indicator variable that equals one for all time periods after the crises episode, \( X_{it} \) is a vector of control variables and \( \varepsilon_{it} \) is unobserved random variables associated with household outcomes. The parameter of interest is \( \delta \), which captures the effect of the crisis on the household well-being outcome of the treatment group. The “treated group” is defined as a group that is believed to be differently affected by the period of crisis (i.e. attended school during crises, was born during crisis, etc.). The counterfactual is defined as the outcome of interest for cohorts born immediately before and after the treatment cohort.

In the case of Brazil, to separate the time and cohort effects, an extension of equation (1) was used as in Mckenzie (2003). The model takes the differences in an outcome of interest between two time periods to eliminate the cohort effects. If outcome \( Y(c_j, a_j, t) \) is expressed as the sum of a cohort effect (\( \alpha_{c_j} \)), an age effect (\( \beta_{a_j} \)), a time effect (\( \gamma_t \)), and an error component (\( \varepsilon_{c_j,a_j,t} \)), such that:

\[ Y(c_j, a_j, t) = \alpha_{c_j} + \beta_{a_j} + \gamma_t + \varepsilon_{c_j,a_j,t} \]  \hspace{1cm} (3)

And the crisis episode happens in time \( t=1 \), then, differencing equation (2) for cohort \( c_0 \) between years \( t = 0 \) and \( t = 1 \) eliminates the \( c_0 \) cohort effect to give:

\[ \Delta Y(c_0, a_j, t) = (\beta_{a_1} - \beta_{a_0}) + (\gamma_1 - \gamma_0) + \Delta \varepsilon_{c_0,a_j,t}. \]  \hspace{1cm} (4)

And differencing equation (2) for cohort \( c_1 \) between years \( t = 1 \) and \( t = 2 \) eliminates the \( c_1 \) cohort effect to give

\[ \Delta Y(c_1, a_j, t) = (\beta_{a_2} - \beta_{a_1}) + (\gamma_2 - \gamma_1) + \Delta \varepsilon_{c_1,a_j,t}. \]  \hspace{1cm} (5)

Differencing equations (3) and (4) eliminates the age effects to give

\[ \Delta \Delta Y(c_j, a_j, t) = (\gamma_2 - \gamma_1) - (\gamma_1 - \gamma_0) + \Delta \Delta \varepsilon_{c_1,a_j,t}. \]  \hspace{1cm} (6)
The crisis effect is then given by the component \((\gamma_2 - \gamma_1) - (\gamma'_1 - \gamma'_0)\). It is the difference-in-difference of the time effects, once the cohort and age effects are netted out. The underlying assumption is that the changes in the age effects are constant across the years.

b. Fixed effect models

Another methodology used by a few of the country case studies, namely Argentina, Brazil, Jamaica and Mexico, was a fixed effect models to measure effects of changes in GDP (or its growth rate) on the outcome of interest exploring GDP variation across states or regions within a given country and over time. The specification is as follows:

\[
Y_{ijt} = \beta_0 + \beta_1 GDP_{jt} + \theta X_{ijt} + \eta_j + \phi_t + \epsilon_{ijt}
\]  

where \(Y_{ijt}\) is the outcome of interest of individual \(i\), region \(j\), year \(t\). \(X\) is a vector of control variables, \(\eta_j\) is the region fixed effect, \(\phi_t\) is the year fixed effect, and \(\epsilon_{ijt}\) is the error term. The parameter of interest is \(\beta_1\), which captures the effect GDP on \(Y\).

c. Instrumental Variables

In the fixed effect models, however, there is a potential identification problem if \(Y\) and GDP are jointly determined. To avoid endogeneity, an instrumental variable approach was used when instruments where available such that exogenous variation in GDP is introduced with no direct effect on \(Y\). This approach is particularly relevant in more specialized economies, such as Mexico and Jamaica as is specified later in the paper, given good instruments are available.

IV. The Evidence

a. Argentina

A high level of debt has positioned Argentina in a particularly vulnerable situation in lieu of the current global economic downturn. Official statistics portray only a mild economic contraction for 2009, however, there is growing skepticism over the reliability of official data, and private surveys point towards an economic contraction of close to 3 percent of GDP.

Argentina has a long history of sharp macroeconomic crisis followed by periods of strong growth. The 2001-2002 crisis, the country’s deepest recession in recent years, was characterized by a fall of 17 percent of per capita GDP and an increase in unemployment in the levels of 19 percent. This resulted in an increase of the official poverty rate from 38.3 percent in October 2001 to 53 percent in 2002 and it took the country over four years to return to pre-crisis poverty levels (Gasparini and Cruces, 2008).

The empirical analysis aims to estimate the likely effects of the ongoing global economic crisis on outcomes related to the well being of children in Argentina. In order to do this the analysis focuses on the impacts of the 1995 financial crises, the 1999 slump after the devaluation of the
Brazilian Peso and the aforementioned 2001-2002 crises, on the outcomes of interest. The following graph shows the evolution of GDP in Argentina since 1993.

Figure 1. Evolution of GDP in Argentina

Source: Cruces and Glüzmann 2009

The data for the analysis is drawn from a various sources. For poverty and educational outcomes, the estimates come from the Encuesta Permanente de Hogares (EPH), a periodic household survey conducted by the Instituto Nacional de Estadísticas y Censos (INDEC) in Argentina. Per capita GDP is constructed using regional GDP time-series from provincial statistic offices and compiled by the Argentine office of ECLAC. An important limitation is the lack of reliable updated data. There are no household surveys since mid-2007, and GDP growth figures are suspected to be unreliable since 2006.

A regression model with fixed effects at the provincial level and weighted by provincial population for each outcome of interest is used as specified below. This model exploits time and regional variability from a panel of GDP and outcomes at the province (25) level to identify the relevant elasticities.

\[ Y_{jt} - Y_{jt-1} = \alpha + \beta (log GDP p c_{jt} - log GDP p c_{jt-1}) + \theta^{X_{jt}} + \sigma^{F_{j}} + \epsilon_{jt} \]  

where \( Y_{jt} \) denotes the outcome of interest for province \( j \) in time \( t \); \( X_{jt} \) is a series of covariates for each province; and \( F_{j} \) is a series of regional fixed effects. \( \beta \) is the parameter of interest which estimates the semi-elasticity of selected outcomes with respect to per capita GDP. The model is also calculated differentiating between growth periods and recession periods in order to observe the asymmetry of the impacts on outcomes of interests during times of growth and of contraction.
The results of the empirical analysis suggest that there is a strong relationship between the evolution of GDP in Argentina and poverty and health indicators for children. The results for education outcomes, however, are ambiguous.

A strongly significant negative relationship between the evolution of per capita GDP and both overall and children poverty is suggested by the results of the analysis. A 1 percent change in per capita GDP is associated with a change in child poverty of about -0.66 percentage points and with a change in overall poverty of -0.47 percentage points, using a 2.50 USD poverty line. When differentiation between times of growth and contraction is introduced, the effects of changes in GDP on child poverty are lower in times of growth (-0.54) and larger in times of recession (-0.76). The same is true for overall poverty; growth decreases overall poverty by 0.40 percentage points, while recession increases overall poverty by 0.56 percentage points.

Results also show a significant and negative relationship between the evolution of per capita GDP and health outcomes. A change of one percent in per capita GDP is negatively associated with a change in maternal mortality of -0.003 deaths for 1,000 live births and with a change in child mortality of -0.041 cases for 1,000 live births. When differentiation between growth and contraction periods is introduced, results show that while growth significantly reduces maternal mortality by 0.008 per 1,000 live births, recession is not significantly associated with an increase in maternal mortality. The opposite is true for child mortality, growth does not significantly reduce child mortality, but recession can increase it by 0.011 deaths by 1,000 live births. The results for education indicators, however, are not significant at any of the education levels explored.

In order to provide an estimate of the effects of the current economic recession on children well-being indicators, the results from the above regression are extrapolated. Two alternative scenarios are considered for this exercise: a contraction in 2009 of 1 percent of per capita GDP or a reduction of 5 percent. These scenarios represent an upper and lower bound given that current growth forecasts by independent surveyors for 2009 are around -2.9 percent and that the official forecast is about -0.5 percent. Forecasts suggest that children poverty, using a 2.50 USD poverty line, could increase by 0.7 percentage points and 3.5 percentage points according to each scenario in 2009. This could represent in the optimistic scenario, an additional 252 thousand people below a 2.50 USD poverty line, and in the pessimistic scenario this forecasts represents a staggering additional 1.2 million people below the poverty line.

Results from empirical analysis strongly suggest that the current economic crisis will have important impacts on the well-being of children in Argentina, mainly on child poverty and mortality. Of particular importance is the fact that results suggest that child poverty increases at higher rates during recessions than those at which it falls in time of growth. Similarly, while child mortality increases during recessions, it does not decrease significantly in times of growth. This implies that even if Argentina’s economy grows in 2010 and the recession is over, it will
take many years of sustained growth for the country to return to pre-crisis levels of child well-being.

b. Mexico

Mexico’s downturn due to the global economic crisis seems to be the deepest among the economies in the region. A number of factors have contributed to this steep economic decline including, among others, Mexico’s strong commercial relations with the US, a deterioration of its terms of trade particularly due to a decline in oil prices, and a steep decline in incoming tourism and remittances.

Mexico, like most of the region, has been hit by a number of crises, both internal and external, in the past couple of decades. These crises have had important social impacts in the Mexican population which our empirical analysis will explore. However, over the last decade there has been significant growth in social protection programs, particularly conditional cash transfer programs. Although starting out on a modest scale, by 2002 the *Oportunidades* program was reaching over 25 million people and is now the centerpiece of the country’s poverty reduction strategy. The presence of *Oportunidades* is likely to mitigate the effects of the current crisis on social outcomes, although the extent is unknown.

The empirical analysis focuses on the impact of economic crisis on child and maternal mortality in Mexico. The existing literature about the effects of business cycles on mortality indicators offers contradicting hypothesis. Cutler et al. (2002) conclude that mortality rates follow countercyclical patterns in Mexico, especially infants and the elderly. Gonzales and Quast (2009), inversely conclude that mortality rates in Mexico are procyclical.

The data used for the empirical analysis comes from administrative death records from vital statistics, which contains information about deaths that occurred from 1985 to 2007 in the following age groups: neonatal (one month or less), infants (a year or less), and children (5 years or less). It also includes information about child deaths due to nutritional deficiencies, and maternal deaths. Due to data availability the analysis focuses on two crises: the 1995 Peso Crisis triggered by the devaluation of the Mexican Peso; and the financial crisis of 2000. Figure 2 below shows the evolution of GDP in Mexico.

Figure 2. Evolution of GDP in Mexico
The analysis uses a fixed effects model of the following form to estimate the effect of economic crises on mortality.

$$Y_{jmt}^k = \alpha^k + \beta^k \log(GDP_{jt}) + \delta^j + \delta^k_m + \theta t + \epsilon^k_t$$  \hspace{1cm} (9)

where $Y_{jt}$ is the mortality rate for group $k$ in state $j$ during month $m$ in year $t$; $GDP_{jt}$ is state $j$’s GDP in year $t$; $\delta^j$ is the state’s fixed effect; $\delta^k_m$ is a month’s fixed effect in order to control for seasonality; and $t$ controls for the annual trend. The parameter of interest is $\beta^k$.

In order to overcome the possibility of obtaining a biased effect of GDP on health due to omitted variables and potential endogeneity between GDP and the error term, two set of instrumental variables are used. One is the share of manufacturing on the state’s GDP in 1985 and the second is the distance of the state’s capital to the closest US port of entry. Both of these instruments are interacted with period dummies, and data shows that those states which had a large share of manufacturing in 1985 or where closer to US port of entry have higher GDPs in the periods of interest. Also, a first stage regression shows that those states farther away from the US experienced a smaller decrease in economic activity during the 1995 and 2000 crisis as compared to the states closer to the border.

The results on the analysis suggest that overall mortality has a countercyclical behavior. Interestingly, the coefficients from the two different sets of instrumental variables are quantitatively different, though they always have the same sign. The share of manufacturing in 85 almost consistently produces higher coefficients than the distance to closest US port.

Results suggest that child mortality is negatively related to GDP growth. A one percent decrease in GDP is associated with between 0.03 and 0.11 additional neonatal female deaths and between 0.04 and 0.16 neonatal male deaths per thousand live births, depending on the instrument used.
The effect on infant mortality rates (up to a year of age) seem to be even higher, with a one percent decrease in GDP inducing between 0.07 and 0.21 additional female and between 0.09 and 0.28 additional male death per thousand live births. Child mortality (up to five years of age) seems to be less affected; a reduction in GDP is associated with an increase of about 0.014 female and 0.03 male deaths per hundred thousand in the population.

The effects of economic downturns on child mortality rates due to nutrition are significant and positive, but very small. The effect on maternal mortality is only significant when the share of manufacturing in 85 is used as an instrument for GDP and are also very small.

c. Jamaica

Jamaica, like most of the Caribbean countries, is feeling the brunt of the global economic crisis mostly through downturns in tourism, remittances and weakened access to credit markets. However, a decrease in oil and food prices has countered some of the negative effects by improving the country’s terms of trade. Already in 2008 Jamaica exhibited a contraction of its economy and according to ECLAC the contraction in 2009 will be of the magnitude of 3 percent of GDP.

Jamaica has exhibited weak and unstable economic growth since the beginning of the 1990s, interrupted by an inflation crisis in 1991-1992, when inflation reached levels of around 50 percent, and later by a deep financial crisis in 1995-1997, which resulted in government debt of about 150 percent of GDP by 2002. Figure 3 shows the evolution of GDP in Jamaica in the past few decades. Unfortunately there are no previous studies of the extent to which aggregates shocks affect health and education outcomes for children in Jamaica.

Figure 3. Evolution of GDP in Jamaica

Source: Kim and Serra 2009

The empirical analysis in Jamaica focuses on the effect of business cycles on enrollment and attendance at the primary and secondary school levels, and on immunization rates (for measles...

The analysis uses a panel regression with fixed effects in the following form:

$$\Delta Outcome_{jt} = \beta_0 + \beta_1 \Delta y_{jt} + \beta_2 \Delta HHSIZE_{jt} + \beta_3 \Delta HHAGE_{jt} + \beta_4 \Delta HHMARRIED_{jt} + \beta_5 \Delta HHED_{jt} + \beta_6 \Delta PUBLIC_{jt} + \Delta \varepsilon_{jt}$$  \hspace{1cm} (10)

where $Outcome_{jt}$ is the outcome of interest in region (or parish) $j$ at time $t$, $y_{jt}$ is GDP and $\beta_1$ is the parameter of interest.

In order to overcome potential endogeneity of income and child outcomes, the analysis uses the price variation of four main export commodities (sugar, banana, bauxite and alumina) as an exogenous instrument for GDP growth. The analysis conducts the Hansen J-test and the Stock and Yogo (2002) weak instruments test, both of which indicate that the instruments are valid. The regression is also performed using lagged growth rates (growth rate of previous period) in order to measure if the crisis has delayed effects on children well-being.

When looking at the results for education indicators, it is important to take into account that Jamaica achieved full enrollment in primary school in 2007. Enrollment to secondary school is also high, particularly for the first three years, grades 7-9, and reaches levels of 98 percent in 2007. Enrollment in higher secondary school, grades 10-11, is around 93.5%. Enrollment at every level has been consistently high for the past ten years.

The results suggest mixed effects of economic downturns on schooling, depending on the different levels. Results for primary school enrollment are significant only when lagged growth rates are used. A 1 percent decrease in GDP is associated with a 0.26 percentage points decrease in primary school enrollment in subsequent periods. However, enrollment to secondary school seems to be inversely and significantly affected by economic downturns. When the growth rate change in the previous period is negative, then enrollment to secondary school increases. A one percent decrease in GDP growth is associated with a 0.42 percentage point increase in secondary school enrollment. When GDP is instrumented this effect is no longer significant. The effect of GDP growth on enrollment at higher secondary levels (grades 10-11) is not significantly different from zero.

Although results suggest that GDP growth has mixed effects on enrollment depending on the school grades, lower growth rates are strongly associated with higher school attendance. Results suggest attendance in primary school increases when growth rates decrease in previous period. In short, the regression analysis reveals heterogeneous impacts of growth fluctuations on education indicators. Slow growth seems to lower primary enrollment rate with time lag in but at the same time increase secondary school enrollment rates. Attendance is strongly and negatively affected by the business cycle.
When looking at health indicators we see that the impact of growth on immunization is mixed. Measles immunization and body mass index do not seem to be affected by growth rates. Growth rates seem to have a negative impact on the share of children that receive the BG Immunization. A one percent increase in per capita GDP growth rate is associated with a decrease of 0.98 percentage points in the share of children immunized. The lagged growth rate, however, has a positive impact on the immunization. A one percent decrease in previous period GDP per capita growth, decreases immunization by 0.55 percentage points. Both effects disappear when GDP is instrumented. Child diarrhea is likely to be positively associated only by lagged growth rates when growth is instrumented by commodity prices. A one percent decrease of GDP per capita growth in previous period is associated with a 1.24 percentage point decrease in child diarrhea. Illness rates seem to be weakly affected by growth. When instrumented, a one percent decrease in per capita GDP growth rates is associated with a 1.51 percentage point increase in illness rates. Lagged growth rates, however, seem to be positively associated with illness rates. A one percent decrease on GDP growth in previous period is associated with a 0.41 decrease in illness in subsequent period.

d. Brazil

Brazil, the largest economy in Latin America, was strongly hit by the economic crises through the first few months of 2009 but by the second quarter it seemed to be staging a recovery. Overall the country has resisted the crisis better than other countries in the region, but prospects are still gloomy and GDP is expected to be flat in 2009.

Brazil has exhibited strong economic growth in the past 10 years, but not without a number of crises episodes. Figure 4 shows the evolution of GDP in Brazil. The empirical analysis explores the 1987-1991 crises only. The main reason for this is that there is enough data from before and after the crisis to compare cohorts that were born or attended school during the crisis with those that were born or attended school before or after the crisis.

Figure 4. Evolution of GDP in Brazil

Source: Portela-Souza and Pinheiro 2009
The empirical analysis focuses on estimating the impact of a crisis on school attendance, school delay, poverty and mortality. There is little existing literature about these topics in Brazil. Duryea and Arends-Kuenning (2003) study the effects of macroeconomic crises (namely that of 1981-1983 and that of 1990-1992) on education indicators in urban Brazil. They find no evidence in the aggregate data that school enrollment changes significantly during crises periods. However, when they exploit variation across states, by exploring state-level labor market conditions, they find that an increase in unskilled wages is associated with decreases in the probability that a child is in school.

The data sets used for the empirical analysis come from the Brazilian Household Survey calculated annually by the Brazilian Bureau of Statistics, and from the Demographic and Health Survey (DHS).

A combination of methodologies was used in this analysis including a difference-in-difference approach with cohort regressions to measure impacts in education and health and a fixed-effects regression to measure impacts in poverty. The specification of the difference-in-difference model is as follows:

\[
Y_{it} = \alpha + \beta T_i + \gamma D_t + \delta T_i \times D_t + \theta' X_{it} + \epsilon_{it}
\]  

(11)

Where \( Y \) is the household wellbeing indicator of interest; \( D_t \) is one for years 1991-1996 and zero for years before 1991; \( T_i \) is 1 if individual \( i \) was affected by the period of crisis; \( X_{it} \) is a vector of control variables; and \( \delta \) captures the effect of the crisis on the group that is believed to be affected by the crisis.

Results for education outcomes in Brazil indicate that economic downturns are strongly associated with an increase in the likeliness of school delays but are ambiguous about the effects on school attendance.

Results suggest that males (from 7-14 years of age) that attended school during a crisis episode are likely to have a 9 percent higher school delay than males that attended school before/after the crisis. For females, chances of school delay are 6.9 percent higher for girls (7-14 years of age) that attended school during a crisis, than for those that attended before/after crisis. When controlling for cohort effects, the results are more dramatic. A boy that entered the crisis at 7 years of age is likely to have a 21.7 percent higher school delay than a 7 year old boy who attended school before/after the crisis. For boys that entered the crisis when 10 years old there seems to be no effect. Similarly, girls who were 7 years old when the crisis begun are 20.3 percentage points more likely to be delayed in school by at least one year than girls who attended school before/after crisis.

The results for school attendance are not as clear. When the difference-in-difference approach is used, school attendance increase for boys and girls between 7 and 14 years of age that attended school during a crisis compared to those who attended school before/after crisis. However,
cohort effects regression suggest that school attendance decreases for kids who attended school during crisis.

Results for health indicators suggest that children (up to one year of age) born during a crisis have 7.9 percentage points higher mortality rates than children born before/after the crisis.

When exploring the effects of economic downturns on poverty, the Brazilian case study uses a fixed effect model as specified in the methodology section. Results suggest that a one percent decrease in per capita GDP is associated with a 0.113 percentage point increase in poverty and a 0.218 increase in poverty of children less than 6 years of age.

e. Peru

Peru is one of the few countries where GDP is expected to continue growing in 2009, but at much slower rates than in the past few years. For the past 6 years, Peru grew at rates above 6 percent, reaching almost 10 percent growth in 2008. Forecast for 2009 are around 1.4 percent GDP growth.

Like other countries in the region, Peru has suffered various and deep crises in the past few decades. Since 1980 there are four clear crises episodes on which this analysis will focus: 1982-1983 caused by a combination of domestic, external and climatic shocks; 1988-1992 characterized by hyperinflation that reached levels of 2000 percent for the year in 1988; 1998-1999 a less dramatic crisis cause mainly by external factors; and 2001 an external and short crisis. Figure 5 summarizes the evolution of GDP in Peru.

Figure 5. Annualized per capita GDP growth rate (%) in Peru

![GDP growth rate in Peru](image.png)

Source: Aguero and Valdivia 2009

A few studies have focused on the impact of the 1988-1992 crisis in Peru. Most notably, Paxson and Schady (2005) analyze the impact of this profound crisis on child mortality. They find an
increase of about 2.5 percentage points in infant mortality rates for children born during the
crisis, which meant 17,000 additional deaths induced by the crisis.

Our case study for Peru focuses on the effects of the above mentioned crises on children
education and health indicators. The empirical analysis uses data from the Peruvian
Demographic and Health Survey (DHS) for 1988-2004 and beyond, which contains information
about birth history as well as health of mother and child and other socioeconomic variables.

The analysis uses a difference-in-difference approach to capture mothers’ observed and
unobserved characteristics by comparing mortality rates within siblings born before/after a crisis
with those born during crisis years. The specified model is as follows:

\[ y_{int} = \alpha + \beta g(GDP_{int}) + f(t) + \theta z_{int} + \eta_m + \varepsilon_{int} \]  \hspace{1cm} (12)

Where \( y_{int} \) is equal to one if child \( i \), born to mother \( m \), died during the first 12 months of his/her
life. \( G \) is equal to 1 if born during a crisis and zero otherwise. \( \eta_m \) captures mother fixed effects.
The parameter of interest is \( \beta \). Linear, quadratic and logarithmic trends are considered.

Results suggest that economic crises are strongly related with increases in child mortality in
Peru. The results imply an elasticity of mortality of -0.30 for children from 0 to 12 months and -
0.28 for children from 0 to 1 month. Effects vary by mother's education. The elasticities are
much higher (in absolute value) for children born to low-educated women, reaching -0.51 for
children 0 to 12 months of age and -0.49 for children 0-1 month of age.

The same model was used to calculate the effects of crises on mother prenatal care which is
usually used as a good proxy for maternal mortality. In this regression \( y_{int} \) is equal to 1 if the
mother of child \( i \) born to mother \( m \) at time \( t \) attended at least one prenatal visit. Results
significantly suggest that economic growth is positively related to the incidence of prenatal care.
The implied elasticity of income on prenatal care is 0.11. As expected, it is much larger for low-
educated women (.17) compared to high-educated counterparts (.08).

A key issue to consider in order to extrapolate predictions for the current crises is that today
women have more access to education in Peru. For each education level it is likely that more
“knowledge” about good practices is available. Thus, past measures might be an upper bound for
forecasting the impacts of the global economic crises on child health indicators.

II. Conclusions

The evidence indicates that economic downturns have significant impacts of children’s well-
being. In all of the five countries studied, economic downturns have a negative impact on child
mortality or child health. For those countries in which the effects of the crises on poverty are
examined, there is also strong evidence that recessions are associated with increases in child and
overall poverty. Results on education however, are ambiguous. Some evidence suggests that
greater school delays are associated with recession, but attendance in some cases seems to
increase in times of crisis. This evidence suggest that household cope with decreasing income by substituting health services and, although less clearly, delaying education, for immediate consumption.

To prevent that this coping mechanisms become long-term effects, policies that protect the income of poor households and that maintain (or expand) at least basic health and education services during economic downturns are of critical importance. Pro-poor crises management needs to implement integrated social protection policy to prevent that an episode of transitory poverty, like the current economic downturn, evolve into structural deprivation due to the absence of well designed policy instruments.
References


Kim, Namsuk and Marta Serra-Garcia (2009). “Economic Crisis, Health and Education in Jamaica”. Background paper of the RBLAC project on The Effects of the Economic Crisis on Household’s Well-being in Latin America and the Caribbean.


<table>
<thead>
<tr>
<th>Country</th>
<th>Crisis Years</th>
<th>Outcome of interest</th>
<th>Data</th>
<th>Indicator</th>
<th>Age Groups</th>
<th>Definition</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>1995; 1998; 2001-2002</td>
<td>Education</td>
<td>Encuesta Permanente de Hogares (EPH)</td>
<td>School attendance</td>
<td>6-12; 13-17</td>
<td>Attendance rate for individuals in age group</td>
<td>Fixed effects model differentiated between growth and recession periods.</td>
</tr>
<tr>
<td>Argentina</td>
<td>1995; 1998; 2001-2002</td>
<td>Health</td>
<td>EPH</td>
<td>Child mortality</td>
<td>0-12 months</td>
<td>Child deaths for each 1,000 live births</td>
<td>Difference in difference &amp; Cohort Regression</td>
</tr>
<tr>
<td>Brazil</td>
<td>1987-1991</td>
<td>Education</td>
<td>Brazilian Household Survey (PNAD)</td>
<td>School delay</td>
<td>7 - 14</td>
<td>Child is at least one year delayed</td>
<td>Difference in difference &amp; Cohort Regression</td>
</tr>
<tr>
<td>Brazil</td>
<td>1987-1991</td>
<td>Health</td>
<td>DHS</td>
<td>Child mortality</td>
<td>0-12 months</td>
<td>Child deaths per 1,000 live births</td>
<td>Difference in difference &amp; Cohort Regression</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1991-1992; 1995-1997</td>
<td>Health</td>
<td>Jamaican Survey of living conditions 1989-2007</td>
<td>School attendance</td>
<td>Primary; secondary 7-9 &amp; 10-11</td>
<td>Number of days the child was sent to school in the last week divided by five</td>
<td>Panel regression and instrumental variables</td>
</tr>
<tr>
<td>Mexico</td>
<td>1995; 2000</td>
<td>Health</td>
<td></td>
<td>Child mortality</td>
<td>0-1 month; 0-12 month; 0-5 years</td>
<td>Deaths per thousand live births.</td>
<td>Fixed effects controlling for annual trends and using instrumental variables</td>
</tr>
<tr>
<td>Mexico</td>
<td>1995; 2000</td>
<td>Health</td>
<td></td>
<td>Maternal mortality</td>
<td></td>
<td>Deaths per thousand live births.</td>
<td>Fixed effects controlling for annual trends and using instrumental variables</td>
</tr>
<tr>
<td>Country</td>
<td>Indicators</td>
<td>Findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
<td>----------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Argentina</strong></td>
<td>School attendance 6-12</td>
<td>Results are not significantly different from zero, but suggest that an increase in per capita GDP is associated with increases in school attendance while a decrease in GDP is associated with reductions in school attendance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>School attendance 13-17</td>
<td>Results are not significantly different from zero, but suggest that an increase in per capita GDP is associated with decreases in school attendance while a decrease in GDP is associated with an increase in school attendance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>School delay 6-12</td>
<td>A one percent increase in per capita GDP is significantly associated with a reduction in school delays of 0.018 percentage points while a decrease in GDP is associated, though not significantly, with an increase in school delays.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>School delay 13-17</td>
<td>Results are not significantly different from zero, but suggest that increases in per capita GDP are associated with a reduction in school delays, while a decrease in GDP is associated with an increase in school delays.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Years of schooling</td>
<td>A one percent increase in per capita GDP is significantly associated with an increase in years of education by 1.6455 years while a one percent decrease in GDP is significantly associated with a decrease in years of schooling by 0.85 years.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maternal mortality</td>
<td>Without differentiation between periods of growth and recession, a one percent change in per capita GDP is associated with a change of -0.33 deaths per 10,000 live births. When differentiates, a one percent increase in per capita GDP is significantly associated with a reduction in maternal mortality by 0.8 deaths per 10,000 live births, while a one percent decrease in GDP is not significantly associated with an increase in maternal mortality.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Children mortality</td>
<td>Without differentiation between periods of growth and recession, a one percent change in per capita GDP is associated with a change of -0.41 deaths per 10,000 live births. When differentiates, a one percent decrease in GDP is significantly associated with an increase in child mortality by 1.1 deaths per 10,000 live births while a one percent increase in per capita GDP is not significantly associated with a reduction in child mortality.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Child poverty</td>
<td>Without differentiation between periods of growth and recession, a one percent change in per capita GDP is associated with a change in child poverty of -0.42 percentage points. When differentiated, a one percent decrease in GDP is significantly associated with an increase in child poverty by 0.44 percentage points while a one percent increase in per capita GDP is significantly associated with a reduction in child poverty by 0.40 percentage points.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total poverty</td>
<td>Without differentiation between periods of growth and recession, a one percent change in per capita GDP is associated with a change in poverty of -0.24 percentage points. Poverty seems to behave symmetrically in times of growth and recession.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Brazil</strong></td>
<td>School delay 7-14</td>
<td>Boys between 7-14 years of age that attended school during a crisis episode are 9 percentage points more likely to be delayed in school by at least one year than those that attended school before/after crisis. Girls between 7-14 years of age that attended school during a crisis episode are 6.9 percentage points more likely to be delayed in school by at least one year than those that attended school before/after crisis.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>School delay 7-13</td>
<td>Boys between 7-13 years of age that attended school during a crisis episode are 6.2 percentage points more likely to be delayed in school by at least one year than those that attended school before/after crisis. Girls between 7-13 years of age that attended school during a crisis episode are 4.8 percentage points more likely to be delayed in school by at least one year than those that attended school before/after crisis.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>School delay 7-12</td>
<td>Boys between 7-12 years of age that attended school during a crisis episode are 3.2 percentage points more likely to be delayed in school by at least one year than those that attended school before/after crisis. Girls between 7-12 years of age that attended school during a crisis episode are 2.4 percentage points more likely to be delayed in school by at least one year than those that attended school before/after crisis.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>School delay 7-11</td>
<td>Boys between 7-11 years of age that attended school during a crisis episode are 1.7 percentage points more likely to be delayed in school by at least one year than those that attended school before/after crisis. Girls between 7-11 years of age that attended school during a crisis episode are 1.3 percentage points more likely to be delayed in school by at least one year than those that attended school before/after crisis.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### School delay 7-10
Boys between 7-10 years of age that attended school during a crisis episode are 1.8 percentage points more likely to be delayed in school by at least one year than those that attended school before/after crisis.
Girls between 7-10 years of age that attended school during a crisis episode are 1.5 percentage points more likely to be delayed in school by at least one year than those that attended school before/after crisis.

### School delay 7
Boys who were 7 years old when the crisis begun are 21.7 percentage points more likely to be delayed in school by at least one year than children who attended school before/after crisis.
Girls who were 7 years old when the crisis begun are 20.3 percentage points more likely to be delayed in school by at least one year than children who attended school before/after crisis.

### School enrollment 7-14
Boys between 7-14 years of age that attended school during a crisis episode are 11.5 percentage points more likely to be enrolled in school than those that attended school before/after crisis.
Girls between 7-14 years of age that attended school during a crisis episode are 11.4 percentage points more likely to be enrolled in school than those that attended school before/after crisis.

### School enrollment 7-13
Boys between 7-13 years of age that attended school during a crisis episode are 6.3 percentage points more likely to be enrolled in school than those that attended school before/after crisis.
Girls between 7-13 years of age that attended school during a crisis episode are 6.8 percentage points more likely to be enrolled in school than those that attended school before/after crisis.

### School enrollment 7-12
Boys between 7-12 years of age that attended school during a crisis episode are 3.8 percentage points more likely to be enrolled in school than those that attended school before/after crisis.
Girls between 7-12 years of age that attended school during a crisis episode are 4.5 percentage points more likely to be enrolled in school than those that attended school before/after crisis.

### School enrollment 7-11
Boys between 7-11 years of age that attended school during a crisis episode are 3.2 percentage points more likely to be enrolled in school than those that attended school before/after crisis.
Girls between 7-11 years of age that attended school during a crisis episode are 3.7 percentage points more likely to be enrolled in school than those that attended school before/after crisis.

### School enrollment 7-10
Boys who were 7 years old when the crisis begun are 14.9 percentage points less likely to be enrolled in school than children who attended school before/after crisis.
Girls who were 7 years old when the crisis begun are 15.1 percentage points less likely to be enrolled in school than children who attended school before/after crisis.

### Child mortality 0-12 months
Children 0 to 12 months old born during a crisis episode have 7.9 percentage points higher mortality rates, than those born before/after a crisis.

### Child poverty 0-6

### Child poverty 6-12

### Total poverty
A one percent decrease in GDP increase poverty by -.113 percentage points.

### Jamaica School enrollment Primary
Results suggest that primary enrollment rates increase with economic downturns, although not significantly. However, we find a small but significant positive effect of lagged growth rate (growth rate in previous period) on enrollment to primary school. When using a simple panel fixed effect regression, a one percentage point decrease in per capita growth rate in previous period is associated with a .17 percentage point decrease in primary enrollment in the current period. When using commodity prices as instruments for growth, the change in school enrollment is 0.26 percentage points.

### School enrollment
The results for the effect of economic growth on secondary enrollment (7-9) are ambiguous and not significant. However, we find a negative
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary (7-9)</td>
<td>The effect of lagged growth rates on secondary school enrollment when using the simple panel regression. A one percentage point decrease in GDP growth per capita is associated with a 0.42 percentage point increase in secondary enrollment. Results for the IV estimations are not significant.</td>
</tr>
<tr>
<td>School enrollment Secondary (10-11)</td>
<td>Results for secondary enrollment (10-11) are not statistically significant and ambiguous.</td>
</tr>
<tr>
<td>School attendance Primary</td>
<td>A one percentage point decrease in GDP per capita growth rate is strongly associated with a 1.45 percentage point increase in primary school attendance, although results are not significant when growth rates are instrumented. A one percentage point decrease in GDP per capita growth rate in previous period, is significantly associated with a 1.4 (panel regression) or a 1.66 (IV) decrease in primary school attendance in subsequent period.</td>
</tr>
<tr>
<td>School attendance (7-9)</td>
<td>The effects of economic downturns are higher for higher grades. A one percentage point decrease in GDP per capita growth rate is strongly associated with a 1.48 percentage point increase in primary school attendance, although results are not significant when growth rates are instrumented. A one percentage point decrease in GDP per capita growth rate in previous period, is significantly associated with a 1.44 (panel regression) or a 1.83 (IV) decrease in primary school attendance in subsequent period.</td>
</tr>
<tr>
<td>School attendance (10-11)</td>
<td>The effects of economic downturns are higher for higher grades. A one percentage point decrease in GDP per capita growth rate is strongly associated with a 1.93 percentage point increase in primary school attendance, although results are not significant when growth rates are instrumented. A one percentage point decrease in GDP per capita growth rate in previous period, is significantly associated with a 1.77 (panel regression) or a 2.32 (IV) decrease in primary school attendance in subsequent period.</td>
</tr>
<tr>
<td>Measles immunization</td>
<td>Results suggest that measles immunization is not affected by growth rates.</td>
</tr>
<tr>
<td>BCG immunization</td>
<td>Growth rate in current period has negative impact on the share of children that receive the BMI Immunization. A one percent increase in per capita GDP growth rate is associated with a decrease of 0.98 percentage points in the share of children immunized. The lagged growth rate, however, has a positive impact on the immunization. A one percentage point increase in previous period GDP per capita growth, increases immunization by .55 percentage points.</td>
</tr>
<tr>
<td>BMI</td>
<td>No evidence was found that BMI was affected by growth rates.</td>
</tr>
<tr>
<td>Child diarrhea</td>
<td>Child diarrhea is likely to be affected only by lagged growth rates when growth is instrumented by commodity prices. A one percentage point decrease of GDP per capita growth in previous period is associated with a 1.24 percentage point decrease in child diarrhea.</td>
</tr>
<tr>
<td>Illness rate</td>
<td>Illness rates are weakly affected by growth. A one percentage point change in per capita GDP growth rates is negatively associated with a 1.51 change in illness rates. This is only significant when growth rates are instrumented. Lagged growth rates are positively associated with illness rates.</td>
</tr>
<tr>
<td>Peru</td>
<td>The results imply an elasticity of mortality for children between 0 and 12 months of age of -0.30.</td>
</tr>
<tr>
<td>Infant mortality 0-12 months</td>
<td>The results imply an elasticity of mortality for children between 0 and 6 months of age of -0.30.</td>
</tr>
<tr>
<td>Infant mortality 0-1 months</td>
<td>The results imply an elasticity of mortality for children between 0 and 1 month of age of -0.28.</td>
</tr>
<tr>
<td>Height-for-age z-score</td>
<td>The results imply an elasticity for HAZ of 0.99.</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>The results imply elasticity for malnutrition of -0.98.</td>
</tr>
<tr>
<td>Maternal mortality</td>
<td>The implied elasticity of maternal mortality of 0.11.</td>
</tr>
<tr>
<td>Mexico</td>
<td>A one percent decrease in GDP is significantly associated with an increase of between 0.34 and 1.07 (depending on the instrument used) female neonatal deaths and between 0.42 and 1.56 male neonatal death per total number of live births.</td>
</tr>
<tr>
<td>Child mortality 0 to 1 month</td>
<td>For children up to one year of age, a one percent decrease in GDP is significantly associated with an increase of between 0.72 and 2.11 (depending on the instrument used) female deaths and between 0.96 and 2.8 male neonatal death per total live births.</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Child mortality 0 to 5 years</td>
<td>For children up to five years of age, a one percent decrease in GDP is significantly associated with an increase of between 0.14 and 0.14 (depending on the instrument used) female deaths and between 0.24 and 0.3 male death per total live births.</td>
</tr>
<tr>
<td>Malnutrition 0 to 5 years</td>
<td>For children up to 5 years of age, a one percent decrease in GDP is significantly associated with an increase of between 0.04 and 0.07 (depending on the instrument used) female deaths due to deficient nutrition and between 0.05 and 0.08 male death due to deficient nutrition per hundred thousand live births.</td>
</tr>
<tr>
<td>Maternal mortality</td>
<td>Results for effects of the business cycle on maternal mortality are only robust when using share of manufacturing in 1985 as an instrument for GDP. A one percent decrease in GDP is significantly associated with an increase of 0.05 maternal deaths per total live births.</td>
</tr>
</tbody>
</table>