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Reducing Poverty in Latin America and the Caribbean

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Reducing Poverty in Latin America and the Caribbean

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Report for the Copenhagen Consensus Center and the Inter-American Development Bank

Reducing Poverty in Latin America and the Caribbean*

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1. Introduction

Poverty still is one of the central problems in Latin America and the Caribbean. As measured by international poverty lines, approximately one out of every five people in the region is poor. Consequently, the elimination of poverty continues to be one of the main challenges facing the region and remains at the top of its policy agenda.

Clearly, one way to reduce absolute poverty is by stimulating economic growth. In reality, it is unlikely that poverty can be reduced by any significant degree without persistent economic growth. Ultimately, an economy that grows on a sustained basis is an economy in which wages will be rising, thereby lifting households out of poverty. In Latin America, Chile is an impressive success story in terms of poverty reduction. Between 1987 and 1998, real per capita income increased at an annual rate of 5.7% while the poverty rate dropped by 60%.

Even though growth is fundamental in the battle against poverty, it is unlikely to be enough, even when growth is very rapid. This is especially true in the presence of high levels of inequality such as those existing in Latin America (Besley and Burgess, 2003). Cost-effective redistribution is also needed to succeed in eliminating poverty.

The standard framework within which economists and policy-makers have traditionally thought about redistribution is that of an equity/efficiency trade-off in which society's redistributive goals must be weighed against the supply-side distortions that taxes and transfers create in the economy. However, recognition that the earning capabilities of households are not fixed, but can instead be altered by investments, and taking into account the role of missing and imperfect markets, the importance of this trade-off fades. Indeed, in many cases, redistribution is actually found to be efficient (Mookherjee, 2006).

Poverty is an intrinsically dynamic phenomenon. Poor people are locked into a low-level asset (or capability) trap that results in their exclusion from participating in social and economic affairs on an equal footing with the rest of society. Hence, poverty reduction efforts, in the long run, must seek to provide incentives that will encourage the poor to acquire capabilities and assets that will enable poor households to escape poverty in the future.

Thus, at the micro level, we favor interventions that, via redistribution, increase the current consumption of the poor, alleviating poverty. In fact, redistribution is a critical component of an effective welfare state that is missed in LAC. We also favor interventions that also cause investments in human capital that in the future would help poor households to pull out of the

actual asset trap they are immersed. These interventions, by improving the current and future consumption of the poorest members of society, will also reduce inequality in the region.

2. Poverty in Latin America and the Caribbean

Although many authors have expressed serious doubts about whether there is some degree of discontinuity in the distribution of welfare, with poverty on one side and an absence of poverty on the other (see Deaton, 1997), the poverty count is clearly a useful statistic, and it is difficult to imagine engaging in discussions about poverty without it.

In Table I, we summarize the most recent international comparisons of absolute poverty conducted by Chen and Ravallion (2007). The World Bank currently defines the extremely poor population as being composed of those individuals who are living on no more than US$1.08 per person per day, as measured by the 1993 purchasing power parity (PPP) exchange rate. This poverty line is based on a deliberately conservative definition of poverty and is on a par with the poverty lines typical of low-income countries (World Bank, 1990; Ravallion et al., 1991). Alternatively, Chen and Ravallion (2007) also calculate poverty rates by region using a US$2.15 poverty line. This latter poverty line provides a more meaningful measure of poverty in middle-income countries and, as such, is better suited to Latin America and the Caribbean (LAC).

Although these international poverty lines have been criticized by many, their simplicity and the lack of a better alternative have made them the standard for international poverty comparisons. Nevertheless, before we move on to analyze the data presented in Table I, it must be noted that PPP exchange rates, although an essential means of harmonizing poverty lines across countries and time, are an infrequently updated tool that is an unsuitable yardstick for gauging the consumption levels of the extremely poor (see Deaton, 2006). Additionally, because prices are higher in urban than in rural areas, adjustments in these lines are desirable.[1] Unfortunately, not all countries have the necessary microdata on household expenditure or consumption. Household income is used when data on consumption are not available, but this is clearly a poorer measurement of welfare at the individual level (see Deaton and Zaidi, 2002) and makes the discernment of cross-section contrasts more difficult. Finally, and inevitably, there are differences across surveys in terms of the way in which income and consumption are captured.

Bearing these caveats in mind, the reader will see that, as shown in Table I, extreme poverty, when aggregated across regions, declined dramatically between 1991 and 2004. The

[1] Indeed, Chen and Ravallion (2007) also present poverty rates for rural and urban areas separately using a sub-sample of countries for which this division is possible.

overall poverty count, in the aggregate, is heavily influenced by what has happened in India and China, where very strong growth has led to a large drop in the share of the population living in extreme poverty. Even so, almost one out of every five people in the developing world is extremely poor.

There was also a large drop in the poverty rate during the same period, although the decline was proportionally smaller than the decrease in the extreme poverty rate. This, to some extent, reflects the fact that many of the people who succeeded in lifting themselves out of extreme poverty have not yet managed to raise their income levels above the poverty line.

Table I: POVERTY AROUND THE WORLD (%)

Region	**Extreme Poverty Rates (US$1.08 per day)**		**Poverty Rates (US$2.15 per day)**	
	1981	**2004**	**1981**	**2004**
Latin America and the Caribbean	10.77	8.64	28.45	22.17
Total	**40.14**	**18.09**	**66.96**	**47.55**
East Asia and the Pacific	57.73	9.05	84.80	36.58
Eastern Europe and Central Asia	0.70	0.94	4.60	9.79
Middle East and North Africa	5.08	1.47	29.16	19.70
South Asia	51.75	34.33	88.53	77.12
Sub-Saharan Africa	42.26	41.10	74.52	71.97

Sources: Chen and Ravallion (2007).

These data appear to indicate that extreme poverty is not that widespread in LAC but that poverty still is. Poverty did not decrease a great deal in LAC during this period, although it did remain on a downward trend (particularly as measured by the poverty rate). Additionally, LAC displays historically high levels of income inequality. In fact, at least since the 1960s, inequality in the LAC countries has been higher than in any other region of the world. With the exception of countries in Sub-Saharan Africa, the differences in terms of the Gini coefficient of inequality between LAC and other regions are large (see, among others, Gasparini, 2004).

In Table II we present the latest available estimates of LAC poverty rates, by country. On average, these statistics are quite similar to those presented in Table I. Clearly, poverty rates are much higher in rural areas than in urban ones. The extreme poverty rate for rural areas is approximately three times higher than the corresponding urban rate, while the rural poverty rate is slightly greater than two and half times the urban rate. Nonetheless, the number of poor people is more or less evenly distributed between rural and urban areas, since the ratio of

urban to rural population in LAC (slightly above 3:1) offsets these differences in poverty rates. As in all other regions, poverty tends to be concentrated among young people. The average poverty rate for children under 6 years of age in the region as a whole is about 1.9 higher than the rate for adults.

Table II: POVERTY RATES IN LATIN AMERICA (%)

		International Extreme Poverty Line			International Poverty Line		
Country	**Survey Year**	Urban	Rural	National	Urban	Rural	National
Argentina[a]	2005	3.9	n.a.	3.9	11.6	n.a.	11.6
Bolivia	2002	7.7	51.6	23.7	26.2	72.6	43.1
Brazil	2004	5.9	12.2	6.9	14.8	31.9	17.7
Chile	2003	1.4	1.7	1.4	4.7	8.00	5.1
Colombia	2004	12.5	21.2	14.8	20.9	40.8	26.2
Costa Rica	2004	2.5	5.6	3.8	5.5	12.6	8.5
Dominican Republican	2005	1.6	3.4	2.2	9.2	13.7	10.8
Ecuador	2003	9.1	20.2	12.9	25.5	47.6	33.1
El Salvador	2004	8.3	28.3	16.3	26.4	56.9	38.7
Guatemala	2004	8.0	16.8	12.8	23.1	44.7	34.9
Honduras	2005	7.0	35.1	19.8	21.2	59.6	38.7
Mexico	2004	3.5	17.3	6.7	11.7	36.8	17.5
Nicaragua	2001	10.7	27.6	17.6	35.7	59.9	45.6
Panama	2004	2.2	12.6	6.1	6.2	32.2	15.8
Paraguay	2004	4.0	18.4	10.2	14.8	40.6	26.0
Peru	2003	3.5	20.9	9.7	13.9	59.8	30.3
Uruguay[a]	2005	0.6	n.a.	0.6	6.0	n.a.	6.00
Venezuela[a]	2004	16.2	n.a.	16.2	38.7	n.a.	38.7
Average		**6.2**	**17.5**	**8.6**	**16.1**	**39.2**	**21.1**

Source: The statistics shown in this table were obtained by processing microdata from household surveys and constitute part of the Socio-Economic Database for Latin American and the Caribbean (SEDLAC) developed by the Center for Distributive, Labor and Social Research (CEDLAS).
Notes: Poverty rates are estimated using a constructed homogenous per capita household income that varies across countries and includes all the typical sources of current income (see www.depeco.economo.unlp.edu.ar/cedlas/sedlac). It is well known that household consumption is a better proxy for well-being than household income. However, only a few countries in LAC routinely conduct national household surveys that collect information on expenditures. Household income has been adjusted by imputing implicit rents from homeownership and by area (rural/urban) of residence (see Gasparini, 2007). See also Gasparini (2007) for a discussion of the treatment of missing incomes.
a) We use the urban rates to approximate the national rates. In the case of Argentina and Uruguay, most of the population resides in urban areas.

Poverty is also concentrated among the indigenous population. For 15 countries for which data on ethnicity are available, the ratio of the poverty rates for Caucasians and non-Caucasians is, on average (unweighted across countries), 2.4 (see Buso et al., 2005). This should not be surprising, since a majority of the indigenous people in LAC still live in rural areas (Buso et al., 2005).

2.1. Education and Fertility

Education is the most important dimension of human capital and, hence, plays a salient role in the determination of income. In Table III we present the average years of schooling for both the adult population at large and individuals at the lower limit of that age group (i.e., 25-year-olds). The statistics are then further divided into the poor and non-poor populations (using the US$2.15 poverty line as the discriminator).

Education levels in LAC are still low. The adult population at large has completed an average of only 7.9 years of schooling, which is roughly equivalent to a complete primary school education. Young cohorts have completed more years of schooling and, at the margin, have finished an estimated 9.1 years of instruction, which is still well below the 12 years of schooling needed to acquire a secondary education. Among the poor, school attainment is substantially lower: the overall population has had only 4.8 years of schooling, while 25-year-olds have completed 6.1 years of education.

The proportion of people who have a secondary or higher education is also low. At the margin, it is estimated to be 44%. However, among the poor, only 16% of the young population has at least completed secondary school. Indeed, education has lagged behind international standards in LAC ever since its countries won their independence (see Mariscal and Sokoloff, 2000).

In addition, there still are large racial differences in educational attainment through the region. In contrast, with respect to gender women have made significant advances relative to men. Among younger cohorts in most countries, women are at an educational advantage, at least with respect to years of education attained (see Duryea et al., 2007).

A related issue is child labor. Unfortunately, in some countries (mainly in rural areas), a large percentage of children still work. On average, 10% of children between 10 and 14 years of age work in LAC and, in rural areas, the rate rises to 23%.

Fertility is strongly related to education and child labor. It tends to be higher among poor households within a society and, across countries, households with higher average fertility rates tend to have lower average incomes. In the aftermath of World War II, age-specific mortality rates declined, and population growth consequently increased in most low-income countries. The continuing decline in infant and child mortality in the 1960s caused the proportion of children in these low-income populations to increase. After a half-century, the empirical record shows that birth rates have declined rapidly in most parts of the low-income world since the

1960s, with the number of children born per woman falling by at least half in most countries (see Figure I). LAC, in particular, has witnessed an impressive drop in fertility rates since that decade and now has one of the lowest fertility rates of all developing regions. Fertility still varies substantially across countries, however, as well as within countries by education and income levels.

Table III: POVERTY AND EDUCATION

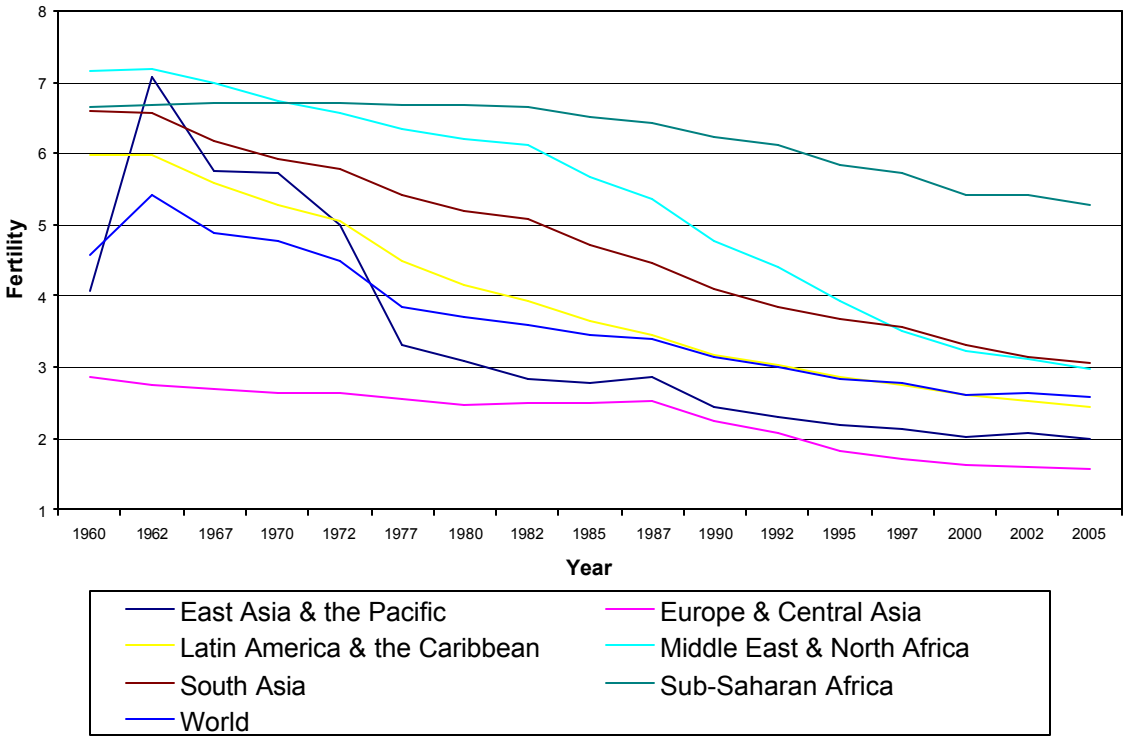
	25 years						25-59 years					
	Average Years of Schooling			At Least Complete Secondary Sch ool (%)			Average Years of Schooling			At Least Complete Secondary School (%)		
Country	Poor	Non-Poor	All	Poor	Non-Poor.	All	Poor	Non-Poor	All	Poor	Non-Poor	All
Argentina	9.0	11.7	11.4	26	63	59	7.6	10.8	10.5	15	52	49
Bolivia	5.9	10.7	9.1	17	57	44	4.7	9.2	7.5	9	41	29
Brazil	5.3	8.9	8.4	14	51	45	4.0	7.5	7.1	9	37	33
Chile	9.0	12.4	12.3	22	73	71	8.2	10.9	10.8	22	54	53
Colombia	7.7	9.7	9.4	41	59	56	5.8	8.4	7.8	23	44	39
Costa Rica	6.1	9.3	9.2	18	40	39	5.5	8.4	8.2	9	34	32
Dominican Republic	8.8	9.9	9.8	32	48	46	5.4	8.4	8.1	11	32	30
Ecuador	7.2	10.3	9.5	19	50	42	6.2	9.6	8.6	15	44	36
El Salvador	5.9	9.8	8.6	18	50	40	4.2	8.2	6.9	10	36	28
Guatemala	3.3	6.6	5.8	6	29	24	2.2	5.4	4.5	2	22	16
Honduras	4.3	7.6	6.5	3	19	14	3.4	7.4	6.0	3	24	17
Mexico	6.1	10.2	9.8	12	37	35	4.9	8.8	8.3	6	31	27
Nicaragua	4.9	7.5	6.5	9	29	22	3.6	6.7	5.5	6	24	17
Panama	6.0	11.0	10.2	12	57	50	5.6	10.2	9.7	11	48	44
Paraguay	6.3	10.0	9.2	15	43	38	4.9	8.1	7.5	5	29	24
Peru	6.2	10.7	9.7	22	72	62	4.5	9.5	8.3	14	60	49
Uruguay	7.2	11.0	10.8	4 [a]	45	43	6.8	10.1	9.9	3 [a]	40	38
Venezuela	8.0	10.5	9.7	12	32	25	6.7	9.5	8.6	7	25	20
Average	**6.1**	**9.7**	**9.1**	**16**	**49**	**44**	**4.8**	**8.4**	**7.9**	**10**	**37**	**33**

Source: The statistics shown in this table were obtained by processing microdata from household surveys and constitute part of the Socio-Economic Database for Latin American and the Caribbean (SEDLAC) developed by the Center for Distributive, Labor and Social Research (CEDLAS)

Note: Survey years are the same as those shown in Table I.

a) Sample sizes are very small and we should not give much confidence to these point estimates.

Figure I: FERTILITY LEVELS BY REGION



Source: *World Development Indicators*, World Bank.

2.2. Child Health

Health is another important dimension of human capital. Infant and child mortality indicators have evolved satisfactorily in LAC since the 1960s. Even in the 1980s there was a large drop in both rates. Not only did average mortality rates decline, but the variance across countries was substantially reduced as well. For example, between 1960 and 2005, the infant mortality rate decreased by 77%, on average, while the standard deviation of the rates across countries declined by 71%. Notwithstanding, the actual levels are still high and should be reduced further.

Let us now consider the nutritional situation in LAC. Undernutrition and micronutrient deficiencies contribute substantially to the global burden of disease. Undernutrition and infectious diseases exist in a threatening synergy. They further exacerbate poverty through lost wages, increased health costs and –most insidiously- impaired intellectual development that can significantly reduce the future earning potential of the poor.

Nutrients provided by food combine with other factors, including the health of each person, to produce each individual's nutritional status. Many poor nutritional outcomes begin in utero. A number of maternal factors have been shown to be significant determinants of intrauterine growth retardation (IUGR). IUGR is measured as the prevalence of newborns falling below the 10th percentile for weight, taking their gestational age into account. Since gestational age is rarely known, IUGR is often proxied by low birth weight (LBW) (the percentage of newborns who weigh less than 2,500 grams). Column (1) in Table V indicates that the situation in LAC is far from satisfactory since, although the prevalence of LBW infants is substantially below the average for developing countries, it is still 10%.

Table IV: INFANT AND CHILD MORTALITY RATES (°/₀₀)

	Under-5 mortality rate					Infant mortality rate				
Country	1960	1980	1990	2000	2005	1960	1980	1990	2000	2005
Argentina	73	41	29	19	18	61	36	26	17	15
Bolivia	255	175	125	84	65	152	115	89	63	52
Brazil	177	86	60	39	33	115	67	50	35	31
Chile	155	45	21	11	10	118	35	18	10	8
Colombia	122	51	35	26	21	77	37	26	20	17
Costa Rica	123	31	18	14	12	87	26	16	13	11
Dominican Republic	149	92	65	40	31	102	71	50	33	26
Ecuador	178	98	57	32	25	107	64	43	27	22
El Salvador	191	118	60	35	27	129	84	47	29	23
Honduras	204	103	59	43	40	137	75	44	33	31
Jamaica	74	34	20	20	20	56	28	17	17	17
Mexico	134	74	46	30	27	94	56	37	25	22
Nicaragua	193	113	68	43	37	130	82	52	34	30
Panama	88	46	34	26	24	58	34	27	20	19
Paraguay	94	61	41	27	23	68	46	33	23	20
Peru	239	121	78	41	27	160	86	58	33	23
Uruguay	55	42	23	15	15	47	37	21	14	14
Venezuela	79	46	33	25	21	59	37	27	21	18
Unweighted Average	**144**	**77**	**48**	**32**	**26**	**98**	**56**	**38**	**26**	**22**

Source: UNICEF web page: http://www.unicef.org

The nutritional status of children is often characterized by comparing the weights or heights at a specific age and sex with the distribution of observed weights or heights in a reference population of presumed healthy children of the same age and sex. Three indicators are widely used: standardized weight-for-age, standardized height-for-age and standardize weight-for-height. The first indicator captures the current nutritional status of the children,

while the other two reflect their chronic nutritional status. Columns (2), (3) and (4) in Table V show these statistics. On average, LAC is also doing substantially better in terms of these statistics than the rest of the developing world. Still, there are signs of nutritional problems in these statistics. The percentage of underweight children still is 5%. Fishman et al. (2004) report a prevalence of underweight for LAC of 6%, which compares with a prevalence of just 2% in high-income countries. When including in the category of underweight those children with *z-scores* below one standard deviation (instead of 2 SD), LAC prevalence rate goes up to 29% while in high-income countries it rises to 16%. Using data from ECLAC (2005), where the prevalence of underweight for LAC is estimated at 7.5%, we also see substantial differences across countries. The range of underweight rates varies from 0.8% in Chile to 24.2% in Guatemala (see Figure II). Additionally, the region still has a significant share of stunted children (11.8%). Again, there are substantial differences across countries. The range of prevalence rates for stunted children varies from 1.5% in Chile to 46.4% in Guatemala (see Figure III).

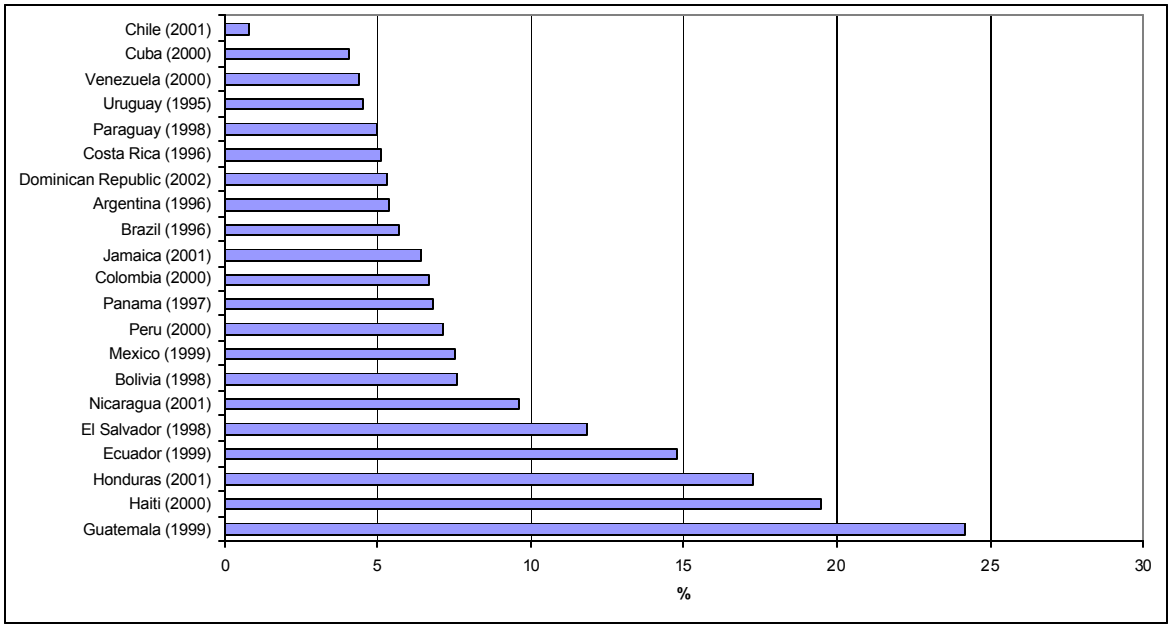
Table V: NUTRITION INDICATORS, 2005 (%)

Region	Prevalence of LBW infants by region	Estimated prevalence of underweight children aged 0-4 years	Estimated prevalence of stunted children aged 0-4 years	Estimated prevalence of wasted children aged 0-4 years
	(1)	(2)	(3)	(4)
Latin America & the Caribbean	10	5	11.8	1.5
Developing countries	17	22.7	26.5	8.3
Africa	15	24.5	34.5	9.5
Asia	19	24.8	25.7	8.9

Source: UN (2005).

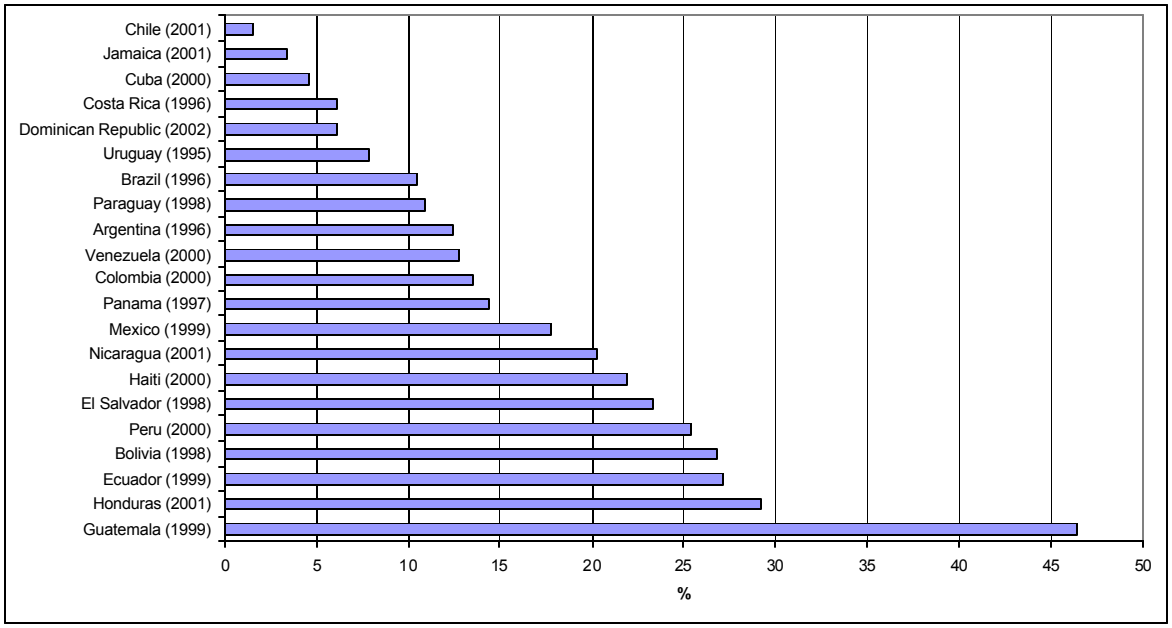
Note: (1) Under 2,500 grams.
(2) "Underweight" is defined as z < 2 standard deviations of the weight-for-age median value of the NCHS/WHO international reference data. For further details, see Annex 4 of UN (2005).
(3) "Stunted" is defined as z < 2 standard deviations of the height-for-age median value of the NCHS/WHO international reference data. For further details, see Annex 4 of UN (2005).
(4) "Wasted" is defined as z < 2 standard deviations of the weight-for-height median value of the NCHS/WHO international reference data. For further details, see Annex 4 of UN (2005).

FIGURE II: DISTRIBUTION OF UNDERWEIGHT PREVALENCE BY COUNTRY



Source: ECLAC (2005).

FIGURE III: DISTRIBUTION OF THE PREVALENCE OF STUNTED CHILDREN BY COUNTRY



Source: ECLAC (2005).

Finally, Table VI presents prevalence rates of Vitamin A deficiency, Anemia (Iron deficiency) and Zinc deficiency. Vitamin A deficiency is a common cause of preventable blindness and a risk factor for increased severity of infectious disease and mortality. Iron deficiency is the main cause of anemia. Anemia is one of the world's most widespread health problems, especially among children. In particular, iron deficiency anemia leads to weakness, poor physical growth, and a compromised immune system and is also though to impair cognitive performance and delay psychomotor development. Zinc is vital to protein synthesis, cellular growth and cellular differentiations. Its deficiency in children is also responsible for deficient growth and development. LAC performs relatively worse in terms of these indicators than in terms of the anthropometric indicators presented in Table V. The prevalence of iron deficiency anemia and zinc deficiency are both particularly high.

Table VI: PREVALENCE OF SELECTED NUTRITIONAL DEFICIENCIES IN CHILDREN 0-4 (%)

Region	Vitamin A Deficiency (1)	Iron Deficiency Anemia (2)	Zinc Deficiency (3)
Latin America & the Caribbean	15	46	33
East Asia and the Pacific	11	40	7
Eastern Europe and Central Asia	1	22	10
Middle East and North Africa	18	63	46
South Asia	40	76	79
Sub-Saharan Africa	32	60	50
High-Income Countries	0	7	5

Source: Caulfield et al. (2006).

3. Reducing Poverty in LAC

Economic growth appears to be, *a priori*, a powerful instrument for reducing absolute poverty. Bourguinong and Morrison (2002) show that the world extreme poverty rate decreased from 84% to 24% between 1820 and 1992. In the long run, wages are cointegrated with labor productivity and will therefore tend to rise as an economy grows.

In Latin America, Chile is an impressive success story in terms of poverty reduction. Between 1987 and 1998, real per capita income increased at an annual rate of 5.7%, while the poverty rate dropped by 60%. Regressing poverty on per capita gross national income and the Gini coefficient of income inequality, the World Bank (2001) reports the per capita income elasticity of poverty for Chile during this period at 1.26. This suggests just how powerful economic growth can be in reducing poverty.

However, growth is not always so effective in reducing poverty, at least in the short and medium terms. In the U.S., poverty plummeted between 1959 and 1962, which was a period of rapid economic growth. It has remained relatively stable since then, however, even though the U.S. economy has continued to grow and has in fact expanded quite swiftly from the late 1980s on. This change in trend is mainly accounted for by the increase in income inequality that has taken place during this latter period.

As is well known, a change in the distribution of income can be decomposed into two effects. First, there is the effect of a proportional change in all incomes that leaves the distribution of relative income unchanged (i.e., growth effect). Second, there is the effect of a change in the distribution of relative incomes, which, by definition, is independent of the mean (i.e., distributional effect) (see Datt and Ravallion, 1992). Kraay (2006) provides the most up-to-date exploration of these issues. Using a dataset comprising 85 countries for which there are at least two estimates for extreme poverty rates at different points in time (mainly in the 1990s), he finds that most of the variation in poverty levels is due to growth in average incomes. In contrast, changes in relative incomes account for only 30% of the variance in the headcount measure of poverty in the short run and only 3% in long run.

Wodon (2000) presents estimates based on a panel data model of the change in the logarithm of poverty as compared to the change in the logarithm of per capita income and the change in the logarithm for the Gini coefficient using data for 12 countries in LAC for which he has 6 observations from the mid-1980s to the mid-1990s. He reports elasticities for both an extreme poverty measure and a poverty measure but uses regional poverty lines instead of the

international poverty lines employed in this paper. He finds a per capita income elasticity of poverty equal to –1.27 (-0.93 for extreme poverty) and an inequality elasticity of poverty equal to 1.46 (0.74 for extreme poverty). All these elasticities are statistically different from zero at conventional levels of statistical significance.[2]

Based on these estimates and noting that the annualized per capita growth rate of Latin America between 1990 and 2005 was around 1.7%, growth alone would reduce poverty by 20% in 10 years. In order to halve poverty in 10 years, *ceteris paribus*, per capita growth would need to accelerate to at least 3.5% per year, which is not only well above the region's historical average for the last 40 years, but is also higher than the levels achieved during the last decade. Of course, these numbers should be interpreted cautiously, since the estimated elasticities may be biased by the occurrence of omitted variables and measurement error in the regressors. However, we believe they are still suggestive of the important role that economic growth should play in poverty-reduction strategies in LAC. Additionally, they underscore the importance of finding ways to increase long-run growth in order to reduce poverty. Indeed, we believe that it is possible for LAC to grow at around 4% per capita over the next decade if the reform process initiated 20 years ago is invigorated and enhanced instead of depleted.

The main sources of economic growth are the accumulation of human and physical capital and productivity gains. The latter is driven primarily by the rate of technological innovation in the form of new products, new processes, and new ways of organizing production, all of which involve risky experimentation and learning. The recent history of LAC has clearly not been conducive to growth. The region still exhibits a highly unreliable business environment, which discourages investment and innovation.

To accelerate economic growth, it is of key importance for the region to create an environment that reduces the distortions between the private and social returns to investments, thereby allowing entrepreneurs to appropriate a significant portion of the revenues generated by their investments and innovative projects.

A vast amount of evidence for developing countries suggests that growth accelerations are feasible with minimal institutional changes (see Hausmann et al., 2004; and Rodrik, 2005). However, in order to achieve and maintain sustained growth and convergence toward the

[2] Gasparini et al. (2006) also present estimates of the per capita income elasticity of poverty for 18 countries in LAC for a period starting in the late 1980s and ending in the early 2000s. They report this elasticity to be around 1.5.

income levels of developed countries, an institutional scheme needs to be devised that provides investment and innovation incentives for a broad segment of the population rather than only for elite groups (see, among others, Acemoglu et al., 2005).

Adaptive, as well as allocative, efficiency influences economic performance. Successful economic systems have evolved flexible institutional structures that can survive the shocks and changes that are an intrinsic part of the process of economic development. But these systems are the product of a long gestation period, rather than being the outcome of an overnight transformation (see North, 1990).

Macroeconomic stability also tends to foster long-term productivity growth, as it reduces interest rates and therefore increases the present (discounted) value of rents for successful innovators (see Aghion et al., 2004a).

Markets in Latin America are not that competitive. This is the result of a long history of trade protection, regulations benefiting incumbents and critical factor-market failures. Then again, fiercer competition among incumbent firms and/or a higher entry threat would also tend to encourage innovations by incumbent firms aimed at escaping competition or blocking entry by potential rivals (see Aghion et al., 2004b).

Having an effective education system is also a fundamental factor in speeding up economic growth in the region. Benhabib and Spiegel (1994) and Krueger and Lindhal (2001) show that a larger stock of human capital increases innovation and promotes the adoption and imitation of technological advances, which in turn fosters economic growth.

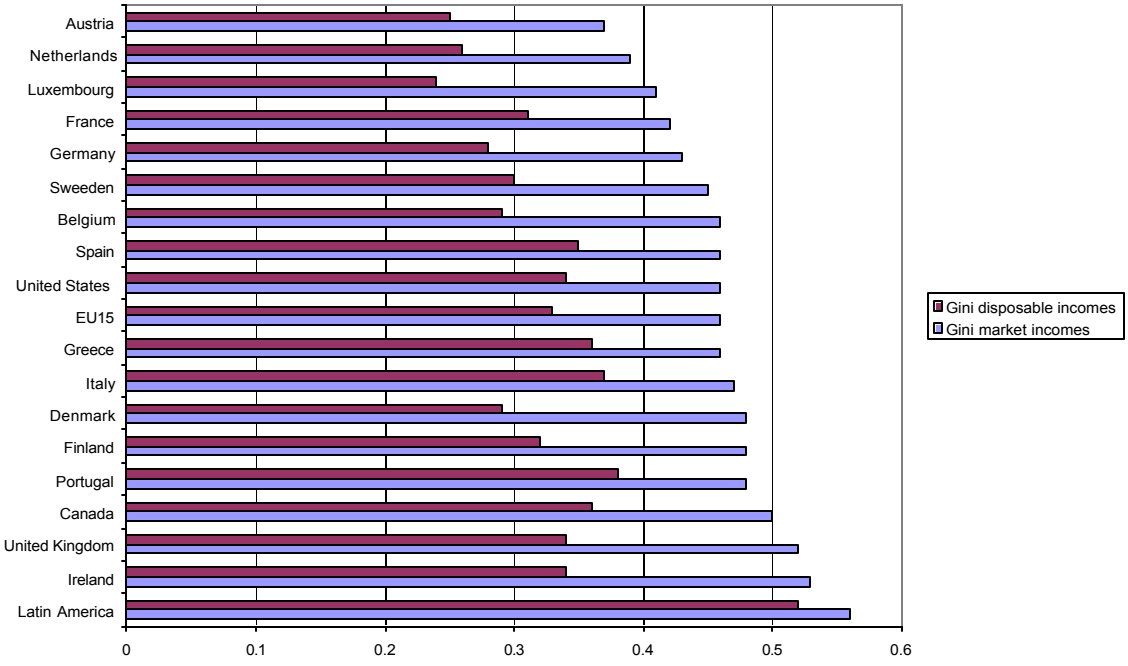
Finally, there are significant market imperfections in low-income environments that hinder investment and innovation in non-traditional activities. These imperfections may be typified as being the result of the existence of non-pecuniary and market-size externalities. Removing these distortions may require the crowding in of private investment through subsidies (see Rodrik, 2005). This, in turn, calls for competent and non-corrupt governments, but unfortunately only a few countries in the region have made progress toward this goal.

Inequality, per se, may also be detrimental for economic growth. When markets are missing or imperfect, the distribution of wealth and power affects the allocation of investment opportunities and thus detracts from the economy's efficiency (see, among others, Galor and Zeira, 1993; Banerjee and Newman, 1993; and Aghion and Bolton, 1997). Additionally, high levels of economic and political inequality tend to give rise to economic and political institutions that systematically favor the interests of the most influential groups (see Acemoglu

et al., 2005; and Acemoglu et al., 2007). This in turn can lead to inefficient economic outcomes (see, among others, Alesina and Rodrik, 1994).

Clearly, there are grounds for arguing that the high levels of inequality prevalent in LAC generate an excess burden of poverty over and above what would be expected given the region's level of development. Taking the inequality elasticity of poverty estimated by Wodon (2000), we see that reducing inequality is another powerful strategy for reducing poverty in LAC. Taken at face value, the estimate of 1.46 implies that a reduction in inequality of 20% would induce a 30% drop in the poverty rate. This seems, admittedly, very difficult to achieve in the short run in view of the region's history of high and stable levels of inequality. However, there is no reason to think that it should not be a medium term objective. One striking feature in Latin America is how little redistribution is carried out. Comparing income inequality between members of the Organisation for Economic Co-operation and Development (OECD) and LAC countries, Perry et al. (2006) show that roughly half of all sharp income inequalities stem from differences in returns to factors of production, while the other half are the result of the more progressive taxation and transfer systems in existence in the OECD area (see Figure IV).

Figure IV: GINI COEFFICIENTS FOR MARKET AND DISPOSABLE INCOMES



Source: Perry et al. (2006).

A recent review of quantitative studies of tax incidence in developing countries finds that taxes generally have little redistributive effect in Latin America, largely because most of the countries rely heavily on indirect taxes (Chu, Davoodi and Gupta, 2000). Indeed, Engel, Galetovic and Raddatz (1998) find Chile's tax system to be slightly regressive despite the fact that it is the most effective system of taxation in Latin America, collects the most from personal income taxes, and has the highest marginal rates.

Revenues from personal income taxes are low in LAC, even when compared with receipts in countries with similar income levels (see Coady, Ferreira, Perry and Woodon, 2004). This suggests that there is scope for increasing such revenues in order to improve the after-tax distribution of income. Property taxes are also currently underutilized and could be used to increase redistribution in the region (see Coady, Ferreira, Perry and Woodon, 2004). Nevertheless, the potential for achieving greater redistribution only via taxation is to some extent limited in developing countries by the fact that their tax systems rely heavily on indirect taxes (Burgess and Stern, 1993).

An effective tax system is an instrument of power. Building such an organization is a long-term investment that will provide a greater measure of control over resources for a long time to come. High-income groups in unequal societies may well see this potential power as a threat. Elites often refuse to support the creation of practical revenue-raising machinery that could fall under the control of other groups in the future because they fear that it could be turned into an instrument for use by a "predatory State" (see Heymann et al., 1991).

Additionally, in most developing countries, and certainly in LAC, the poor operate primarily in the informal economy and are therefore beyond the reach of conventional tax and transfer mechanisms.[3] Not only that, but a broad range of labor-market policies dealing with such matters as minimum wages and wage subsidies for unskilled workers, although used in developed countries to affect the income levels of the working poor, are unlikely to be effective in most of the countries in LAC. This fact represents a constraint for any strategy aimed at reducing poverty and inequality.

[3] In LAC, approximately 50% of all salaried employees work informally. Galiani and Weinschelbaum (2007) report the following stylized facts for LAC: (1) small firms tend to operate informally while large firms tend to operate formally; (2) unskilled workers tend to be informal while skilled ones generally have formal-sector jobs; and (3) *ceteris paribus*, secondary workers are less likely to operate formally than primary workers.

Given the high levels of inequality prevalent in LAC and the deficient capacity that exists for redistribution through conventional tax and transfer mechanisms, a package of cost-effective policies targeting poor households is needed to build up the present and future income generation capacity of the poor. These interventions need to be directed toward remedying the shortage of appropriate (legal, financial, human, physical and social) assets that results in the exclusion of the poor from productive participation in formal-sector economic activity, which in turn leads to the perpetuation of poverty and inequality within and across generations. Our focus will be on well-defined intervention programs that are accepted to be effective in affecting the earnings and well being of the poor. We will abstract from discussing general economy-wide interventions. In particular, we will abstract from discussing labor market reforms, and more generally, reforms to the welfare systems in LAC, even though such interventions could play an important role in reducing poverty (see Galiani, 2007a).

4. Cost-Effective Interventions

In this section we will present a set of redistributive interventions that have proven to be cost-effective in reducing poverty and inequality in LAC. These interventions are targeted (or can be targeted) to the poor and have been found to generate present and future benefits which, properly discounted, are worth the cost of the intervention. The interventions evaluated from this perspective are mainly directed at enhancing the human capital of the poor early in life. In other words, they seek to foster the accumulation of human capital among poor children by improving education, health and nutritional conditions in poor households.

A frequent, often justified, criticism of cost-effectiveness analyses is that they address only one of many criteria that could be used to evaluate interventions. Asking policy makers to take a binary choice between interventions may be misleading. Instead, cost-effectiveness plays the more useful function of informing tradeoffs that policy makers are forced to make when investing in a portfolio of interventions.

Additionally, cost-effectiveness analysis is certainly not an exact science. As such, all the benefit-cost ratio estimates presented in this section should be regarded simply as first-order approximations to the true cost-effectiveness of the relevant interventions. In the absence of long-term impact evaluations, all long-run estimates of benefits are projections that have been arrived at by compounding parameter estimates from different evaluations. In order to minimize the buildup of uncertainties, we restrict the analysis to the direct benefits for treated individuals. We also assume the earnings generating process to be stationary. Thus, interventions that affect the stock of human capital of the poor would likely end up being more cost-effective that we estimate under this assumption. Additionally, not all benefits and costs are easily incorporated into the analysis. This tends to have a more significant effect in terms of the indirect benefits of such interventions, but it is also a factor in the case of direct benefits whose future expected market value is very difficult to assess.

Moreover, as in any econometric project, there are questions of internal and external validity. Regarding the first issue, we only report benefit-cost ratios for interventions for which we could obtain parameter estimates from experimental or quasi-experimental designs. In relation to the second issue, we have made an effort to rely only on evaluations conducted in LAC. However, in the case of nutrition interventions, we also relied on estimates for other regions. Therefore, these estimates should be taken even more cautiously than all the other estimates we presented in this section. Finally, throughout the analysis presented in this

section, we have assumed that there are no significant externalities or general equilibrium effects; accordingly, this analysis is valid only to the extent that this assumption is plausible.

In LAC, there is an inexcusable lack of long-term experimental evidence upon which to base advice for policy-makers as to the best way to put taxpayers' money to use. Clearly, given this level of under-investment in knowledge, more well-designed evaluations are needed as inputs for poverty-reduction efforts in the region. In the case of the conditional cash transfer programs discussed below, we have already accumulated a great deal of knowledge, and the need of further evaluations (with the exception, perhaps, of assessments of some long-term impacts) is therefore less pressing. Well-designed evaluations will be essential, however, for the implementation of a wide array of other types of policy interventions. However, we should not only devote more resources to obtain more accurate impact evaluations of programs and policies but we also need to assign substantially more effort to gathering precise information on the cost function of these programs and interventions. Surprisingly, there is better information on program impact than on costs structures.

All interventions considered here can be effectively targeted to the poor. The available evidence suggests that, among other program design considerations, the use of targeting methods to identify the poor is associated with greater anti-poverty impacts. Using a sample of 122 intervention programs in 48 countries, Coady, Grosh and Hoddinott (2004) analyze the targeting performance of different methods, defining targeting performance as the proportion of transfers accruing to the target poor population. Although various considerations prevent them from establishing a strict ranking, they find that some targeting procedures, such as means or geographic targeting, are systematically associated with better targeting performance, while proxy-means testing and demographic targeting to children yield good but highly variable results (see also De Watcher and Galiani, 2006). Another result found by these authors is that, in general, the use of more than one targeting method is associated with better targeting performance (each additional method is associated with an increase in targeting performance of about 15%).

Most economists would highlight the primacy of human capital in the battle against poverty. This belief stems both from the fundamental role human capital plays in income generation and from the many other ways in which human capital is thought to promote and sustain development.

A compelling economic case for public investments early in individuals' life cycles has been made by a number of authors. Carneiro and Heckman (2003) argue for early child development (ECD) investments on two grounds. First, all else being equal, returns to investments in early childhood will be higher than returns to investments made later in life simply because beneficiaries have a longer time to reap the rewards from these investments. Second, investments in human capital have dynamic complementarities, so learning begets learning. Carneiro and Heckman argue that, at least for the U.S., at current levels of investment, returns to investments in early childhood are high, whereas returns to investments in the old are low. Heckman and Masterov (2007) summarize the most recent evidence supporting this view (see also Schady (2006) for a review of ECD interventions in LAC).

Currie (2001) makes a number of complementary arguments for ECD investments. She contends that it may be more effective for a government concerned with equity to equalize initial endowments through ECD programs than to compensate for differences in outcomes later in life—both because ECD investments may be more cost-effective and because they avoid many of the moral hazard problems inherent in programs that seek to equalize outcomes in adulthood. She also asserts that there may be a variety of market failures, including liquidity constraints, information failures and externalities, all of which lead to under-investment in early childhood.

Huggett et al. (2007) explores this issue within a model that features idiosyncratic shocks to human capital, estimated directly from the relevant data, as well as heterogeneity in levels of ability to learn, initial human capital and initial wealth, all chosen to match observed properties of earnings dynamics by cohorts. They find that, as of age 20, differences in initial conditions account for more of the variation in lifetime earnings and lifetime wealth. Among initial conditions, differences in human capital are substantially more influential than variations in learning ability or initial wealth.

4.1. Nutrition Interventions[4]

Many nutritional outcomes are the consequence of cumulative life-cycle processes. There is evidence indicating that growth lost in early years is never (or only partially) recovered later in life (Martorell et al., 1994). Indeed, the nutritional status of adults reflects, to a substantial degree, their nutritional experience since conception.

Moreover, severe malnutrition in early childhood often leads to deficits in cognitive development (Grantham-McGregor, Fernald and Sethuraman, 1999a; and Pollitt, 1990). Micronutrient deficiencies, particularly of iodine and iron, are strongly implicated in impaired cognitive development. A meta-analysis indicates that the IQs of individuals with an iodine deficiency were, on average, 13.5 points lower than those of comparison groups (Grantham-McGregor, Fernald and Sethuraman, 1999b).

Behrman, et al. (2003) investigate the impact of community-level experimental nutritional interventions in rural Guatemala on a number of aspects of education, using the INCAP longitudinal dataset dating back to the initial intervention in 1969-1977 (when the subjects were 0-15 years of age) by comparing their results with the most recent information collected in 2002-2003 (when the subjects were 25-40 years of age). They find that being exposed to a randomly available nutritional supplement when 6-24 months of age had significantly positive and fairly substantial effects on the probability of attending school and of passing the first grade, the grade attained by age 13 (through a combination of increasing the probability of ever enrolling, reducing the age of enrolling, increasing the grade completion rate per year in schooling, and reducing the drop-out rate), completed schooling attainment, adult achievement test scores and adult Raven's test scores.

One significant cost of malnutrition is higher mortality (see, among others, Ashworth, 1998). Experimental evidence on the use of micronutrient supplements provides unambiguous evidence regarding the relationship between mortality and vitamin intakes in many environments, including ones that exhibit few clinical symptoms of deficiencies. The potential to reduce child deaths by distributing vitamin A on a semi-annual basis is dramatic; meta-analysis of field trials indicates that the provision of vitamin A can reduce overall child mortality by 25-35% (Beaton et al., 1993).

[4] Estimates in this section are based on Behrman et al. (2004a).

Iron deficiency is another important nutritional problem, as over a fifth of maternal deaths are associated with anemia (Brabin, Hakimi and Pelletier, 2001; and Ross and Thomas, 1996). Anemia is also among the most widespread health problems for children in developing countries. As we have seen in Section 2.2, among children, the prevalence of iron deficiency anemia is still extremely high in LAC. Iron deficiency anemia leads to weakness, poor physical growth, and a compromised immune system and is also though to impair cognitive performance and delay psychomotor development. Deficient growth development ultimate impinges in the formation of human capital of children and in their productivity as workers.

There is, indeed, evidence of direct links between nutrition and productivity. Behrman (1993), Behrman and Deolalikar (1988), Deolalikar (1988), Foster and Rosenzweig (1993), Schultz (1997), Strauss and Thomas (1998) and Thomas and Strauss (1997) all find that, after controlling for a variety of characteristics, lower adult height (a consequence, in part, of poor nutrition in childhood) is associated with reduced earnings as an adult. Thomas and Strauss (1997) estimate the direct impact of adult height on wages in urban areas of Brazil. While the elasticity varies somewhat according to gender and other specifications, for both men and women who work in the market sector, a 1% increase in height leads to a 2-2.4% increase in wages or earnings.

Multiple strategies exist for preventing malnutrition in young children in the short and long term. Caufield et al. (2006) and Behrman et al. (2004a) present recent surveys on interventions that, properly targeted, appear to be cost-effective. Behrman et al. (2004a) focus on: (a) reducing the prevalence of LBW, (b) infant and child nutrition and exclusive breastfeeding promotion, and (c) reducing the prevalence of iron-deficiency anaemia and vitamin A, iodine and zinc deficiencies.

A cost-effective opportunity for LAC is directed toward improving the nutrition of infants and young children through, for example, breastfeeding promotion and improved knowledge about the timing and composition of weaning foods. Horton et al. (1996) have calculated the effect of breastfeeding promotion in hospital settings in Latin America. This study provides an estimate of the costs of this intervention. On the benefit side, however, the study accounts only for the benefits per death averted and the benefits for reduced cost of child illness. Productivity gains from reduced stunting and increased ability are not accounted for. Behrman et al. (2004) calculate that, if the proportional value of these other gains relative to measured mortality and infant/child illness gains are the same as those they estimated for interventions

directed toward reducing LBW, then, discounting future benefits at 5% per year yields a benefit-cost ratio equal to 4.8, while, with a discount rate of 3%, it equals 7.35.

Reducing the prevalence of iron deficiency anaemia and vitamin A, iodine and zinc deficiencies are also cost-effective interventions that could have positive impacts in LAC. There is evidence that suggests that socially profitable interventions can be implemented to reduce micronutrient deficiencies, although this evidence is limited to areas in which the prevalence of such deficiencies is high (see Behrman et al., 2004a). This point is important since it implies that we cannot easily extrapolate these estimates to places where the prevalence of these nutritional deficiencies is low.[5] Thus, the proper target of these interventions is very important in order to obtain the most out of them.

Approaches for reducing micronutrient deficiencies are classified as either supplementation or food-based programs. The latter are further divided into fortification of foods commonly consumed and encouragement of increased consumption of micronutrient-rich foods through either social marketing or horticulture or both.

Berhman et al. (2004) discusses several studies evaluating interventions aimed at reducing micronutrients deficiencies. Since outcomes are so sensitive to intervention details and population conditions, benefit-cost ratios vary widely between and within interventions. Based on these authors' findings, we show the range of such variations in the following table:

Table VII: BENEFIT-COST RATIOS FOR REDUCING MICRONUTRIENT DEFICIENCIES

	Discount Rate (%)	
Intervention	3	5
Iodine (per woman of child-bearing age)	15	520
Vitamin A (preschool children under age 6)	4.3	43
Iron (per capita)	176	200
Iron (pregnant women)	6.1	14

Source: Behrman et al. (2004)

[5] Needless is to say that this does not mean that these interventions are not also cost-effective in low prevalence environments.

4.2. Conditional Cash Transfers

Conditional cash transfers (CCT) have been extensively adopted in the last decade in developing countries. These programs are aimed at dealing simultaneously with current and permanent poverty reduction. They provide cash transfers to finance current consumption subject to the "attainment" of certain conditions that foster human capital investments. They are referred to as "conditional" because transfers are conditional upon certain behaviors (such as school enrollment of children, or regular use of primary health services, especially by pre-school children and by pregnant women and nursing mothers).

In this section, we present benefit-cost ratio estimates for a pioneering conditional cash transfer program being implemented in Mexico, the *Programa Nacional de Educación, Salud y Alimentación* [National Education, Health and Nutritional Program] (PROGRESA), renamed *Oportunidades* in 2002. Before presenting these estimates, we will discuss the evidence on the effects that this kind of intervention has had in four countries in Latin America between 1997 and 2003; in each of these cases, the evaluation of the program was based on an experimental design.

In addition to PROGRESA, we present results regarding the *Programa de Asignación Familiar* [Family Allowance Program] (PRAF) in Honduras,[6] *Red de Protección Social* [Social Safety Net] (RPS) in Nicaragua[7] and *Bono de Desarrollo Humano* [Human Development Bond] (BDH) in Ecuador.[8] All of these programs cover mostly rural households but there is a great deal of variation in program size. PROGRESA is a national program, covering 20% of the Mexican population as of 2002, and delivers monthly transfers that represent, on average, 20% of beneficiaries' total household expenditures and 25% of household consumption. PRAF covers one-sixth of the Honduran population and delivers transfers that are much smaller than the Mexican program's, representing just 10% of household consumption. RPS is a pilot program and therefore has a more limited coverage (21,619 families as of 2005), although it delivers cash transfers that are similar to PROGRESA's (20% of household consumption). Finally BDH is also a national program that was designed to cover the poorest 40% of households;

[6] PRAF was actually established in 1991 but started as a CCT program in 1998. Most studies refer to the second phase of the program as PRAF II.
[7] The RPS started as a pilot program that was designed to last three years.
[8] The BDS is slightly different from the other programs, since, although it was designed as a CCT program, the conditions were never enforced or monitored.

due to budget restrictions, however, the program's expansion has been gradual. Monthly transfers account for approximately 7% of pre-transfer household expenditures.

With the exception of BDH, the programs have relied on randomization applied at the community level rather than at the household level, primarily due to the broader geographic coverage of some benefits and to the difficulties that could arise to implement the program when control and treatment households reside in the same communities.

All of the programs share a common view as regards their poverty alleviation strategies, which take an integrated approach focusing on various dimensions of human capital, including education, health care and nutritional status. Education grants are targeted to children between 6 and 13 years of age who attend primary school. PROGRESA also includes older children (until the age of 18) enrolled in secondary school.[9] Health-care services and nutritional supplements are generally targeted to pregnant women, nursing mothers and children under 5. PROGRESA also provides for annual health check-ups for the other household members. Fixed family-level transfers are also delivered, and health and nutritional education components are usually included. Besides demand-side interventions, most of the programs involve some supply-side interventions in anticipation of demand increases brought about by the programs.

CCT programs are found to have significant positive impacts on a wide range of outcomes such as consumption, education, health, nutrition, and labor participation. We summarize them in Table VIII.

[Insert Table VIII here]

As regards to household consumption, CCT beneficiaries seem not only to increase the levels but also to improve the quality of food consumed. There is evidence of higher caloric acquisition levels and better dietary diversity among program participants. On a longer-term basis, in Mexico it was found that program participation might have increased permanent household consumption. The positive effect on savings as well as the increased participation on microenterprise activities and investments in agricultural production activities is expected to have long-lasting effects on treated households.

[9] In 2001 the program extended the transfers to cover upper secondary school grades, and introduced households located in marginal urban areas in 2002.

A large number of measures were used to evaluate the impact of CCT programs on education. They included: enrollment rates, attendance rates, progression or continuation rates, drop-out rates and achievement. Results in general are encouraging, although not in all of the dimensions considered. Most of the programs have had positive effects on enrollment rates, drop-out rates and progression rates; results for attendance rates are mixed, and there is barely any evidence of positive impacts on achievement. Impacts on enrollment rates are generally larger on those groups who have lower base-line enrollment rates: transition grade from primary to secondary school, girls, or poorer households. The evidence of PROGRESA suggests that the greatest and more permanent impact on enrollment rates is generated by children who were already enrolled in school (continuation rates), rather than by those who were out of school (return rates).

In Mexico, medium-term impacts after five and a half years of exposure to the program are also available.[10] The relevant studies report reductions in the "age at starting school", improvements in "grade progression on time" and grades of school completed. It is worth mentioning that these effects are found not only in children who benefit from school transfers, but also in children who benefit only from the infant nutritional supplement and health check-ups, or even just from health check-ups. Although limited, this can be taken as preliminary evidence of synergies between health and school components of the program.

Overall, there is evidence of improvement in the use of preventive health care services, such as more frequent health check-ups, nutritional or growth-monitoring visits and pre-natal care visits. In Mexico, children's health status improves, as measured by the reduction in illness rates and mortality rates, as well as does adult health status, measured by fewer days of difficulty with daily activities, days of incapacitation or days in bed due to illness and the ability to walk more kilometers without getting tired.

Nutritional supplements seem to have significant effects, even though some evidence indicates that, in many cases, they were not fully consumed or not received regularly. The programs seem successful in reducing the probability of stunting among beneficiaries and two of them show improvements in motor skills. Some positive effects are also found on emotional problems, cognitive and behavioral development measures, and hemoglobin levels, although the evidence is not that conclusive.

[10] These impacts no longer rely on the experimental design of the program, since by the time they were measured, the original control households had been included in the program.

There is no evidence that programs affect labor-market participation among adults. There is no evidence of significant changes in fertility rates, which in turn suggests that there has been no change in demographic incentives. There does not seem to be any crowding-out effects of PROGRESA transfers over private inter-household transfers either. Finally, there is some evidence of positive effects on empowerment among Mexican beneficiary women and on the recognition of woman's responsibilities by men and the community in general.

4.2.1. Comparing Benefit and Costs

The main cost of the program is the cash transferred to households. There are also costs associated with the selection of localities, identification of beneficiary families, certification of fulfillment of co-responsibility actions, delivery of cash transfers and servicing. In addition, there are private costs that are borne by beneficiary households in terms of money and reduced leisure. We will treat these private costs as negative benefits to maintain the idea that the benefit-cost ratio estimates the return to one dollar invested in the project by the government. Of course, treating some costs as negative benefits does not affect other profitability indicators, such as the net present value. The benefits of the program are better nutrition and health status and higher current consumption for targeted households, as well as better levels of school achievement for school-age children. For the purposes of this exercise, our analysis of the PROGRESA program focuses on a group of 100 households that are assumed to be exposed to the program for two years. All monetary flows are deflated to 1996 Mexican pesos.

4.2.2.Costs of the project

Skoufias (2005) estimated that, on average, a household received 197 pesos (as of November 1998) per month during the period from November 1998 to October 1999. Deflated to 1996 pesos and multiplied by 100 households, this amounts to a total monthly transfer of 13,311 pesos. Coady (2000) estimates that the sum of all other costs associated with the program and borne by the government represent between 8.9 and 9.5% of the total transfers. Thus, we estimate the monthly operational costs of the project analyzed as 1,231pesos. Monthly costs to be paid by the government then add up to 14,542 pesos.

The private costs (or negative private benefits) were estimated by Coady (2000) to be around 2.44% of the total transfers: 325 pesos per month. He focused exclusively on the financial cost of traveling to comply with health requirements, attend school and collect the

cash transfers. Parker and Skoufias (2000) found some evidence that adults' leisure time was reduced, particularly in the case of men aged 18–24. However, the effects they identified for other age intervals were not statistically significant. To evaluate the program, we averaged this effect out to a reduction of 0.075 hours per day for adults. Schultz (2000) reports that the monthly wage for an average worker in urban areas is 1,300 pesos of 1996. We therefore priced the reduction of each leisure hour at 1,300/(8x20)=8.12 pesos. Using demographic data from Berhman and Todd (1999) and Teruel and Davis (2000), we estimated the total reduction in leisure time per month for our group of 100 households represents 5457 pesos per month. Then, total monthly private costs are thus estimated to be 5,782 pesos.

4.2.3.Benefits of the Project

Beneficiary households are found to have increased current consumption as a result of their participation in the program. Hoddinott, Skoufias and Washburn (2000) estimate that, on average, a household increased its monthly consumption by 151 pesos at November 1998 prices. Deflated to 1996 pesos and multiplied by 100 households, this amounts to a level of monthly consumption equivalent to 10,203 pesos.

One of the major benefits of the program is an improvement in the educational outcomes of children. Behrman, Sengupta and Todd (2001) analyze the long-term effect of PROGRESA on education by simulating the outcome for a child belonging to a treated household and comparing it with the outcome for a child in an untreated household. To do so, they constructed transition matrices for each age for treated and non-treated children using data from baseline household surveys administered in October 1997 and March 1998 and from two follow-up surveys administered at approximately one-year intervals.

We assume that there are 22 states: "enrolled at grade *j*" for *j=1..11*, and "dropped out at grade *k*" for *k=0..10*. Let $A^a_{T=0}\left(A^a_{T=1}\right)$ be the 22x22 transition matrix of untreated (treated) individuals at age *a*, and let $f^i_{T=t}$ be the 22x1 vector indicating the distribution of educational status among individuals aged *i* after receiving treatment *t*. Finally, f^6 is the 22x1 vector of initial conditions (at age 6). Based on Table A.4 in Behrman, Sengupta and Todd (2001), we set initial conditions: 70% of individuals aged 6 attend first grade, 20% attend second grade and 10% are not enrolled.

Note that the long-run outcome for a treated individual would be:

$$f_{T=1}^{15} = \left(\prod_{a=6}^{14} A_{T=1}^{a} \right) f^{6}$$

while the outcome for an untreated individual is:

$$f_{T=0}^{15} = \left(\prod_{a=6}^{14} A_{T=0}^{a} \right) f^{6}$$

Remember that we want to evaluate the effects of a two-year project. Therefore, our analysis is different from that of Behrman, Sengupta and Todd (2001), since we are not interested in the effect of the program on one representative child who received treatment from age 6 to age 15; instead, we are interested in the project's effect on a population of 100 households that comprise several cohorts of students. The outcome of an individual aged *s* at the beginning of the program will therefore be computed as:

$$f_{T=1,s}^{15} = A_{T=0}^{14} \ldots A_{T=0}^{s+2} A_{T=1}^{s+1} A_{T=1}^{s} A_{T=0}^{s-1} \ldots A_{T=0}^{6} f^{6} \text{ for } 5 \le s \le 14.$$

In other words, we will apply a treatment transition matrix for two consecutive periods starting at period *s*. For untreated individuals, the outcome will always be $f_{T=0}^{15}$. To perform our calculation, we used the distribution of years of education at age 15 for each cohort.

We assume that wages are determined by the following Mincer equation:

$$\ln(w_i) = a + b_1 \exp_i + b_2 \exp_i^2 + g_1 pri + g_2 \sec$$

where *pri* is the number of primary years of education, *sec* is the number of secondary years of education and exp stands for experience. Rewriting this expression we have:

$$w_i \cong e^{a} \left[e(1+b_1)\right]^{(\exp)} \left[e(1+b_2)\right]^{(\exp^2)} \left[e(1+g_1)\right]^{pri} \left[e(1+g_2)\right]^{sex}$$

Let $S_i = \left[e(1+g_1)\right]^{pri_i} \left[e(1+g_2)\right]^{\sec_i}$. Legovini et al. (1991) estimates an earnings equation for Mexico and finds that $g_1 = 0.05$ and $g_2 = 0.12$; therefore, we can construct the profile S(*e*), where *e* is the number of years of education. For each cohort we can calculate the distribution of years of education, and thus, the expected S.

$$S^j = E(S(e)) = S(e) p^j(e)$$

where $p^j(e)$ is the distribution of *e* in cohort j. Then, S^j is the average income of cohort j in terms of the income of an uneducated worker with the same level of experience.

The following table shows the expected S for each cohort and the difference between it and the expected S without the program:

Age at Program Start	Normalized Income	Difference Attributable to the Program
4	1.5833	0.0000
5	1.5838	0.0005
6	1.5863	0.0030
7	1.5888	0.0055
8	1.5923	0.0090
9	1.5914	0.0081
10	1.6159	0.0326
11	1.6329	0.0496
12	1.6374	0.0541
13	1.6167	0.0334
14	1.5862	0.0029
15	1.5833	0.0000

In Legovini et al. (2001), the coefficients of experience and squared experience are $b_1 = 0.064$ and $b_2 = -0.001$. Moreover, the constant term is $a = 5.404$. Thus, we estimated the monthly wages of an uneducated worker at exp(5.404)=222 pesos (1994 prices). In terms of 1996 pesos, this figure becomes 403 pesos. We built the flow of cohort income over time assuming that individuals work from age 18 to 65.

The flow of benefits for each cohort is calculated as the difference between the flows of income in each counterfactual situation. The total benefits of the program are calculated as the weighted sum across cohorts of the present values of each cohort-specific flow of benefits. Weights are based on the expected number of individuals in that cohort in our 100 households.

In addition, several authors find that beneficiary households improved their health status. Needless is to say, assigning a price to outcomes such as reduced mortality rates is quite controversial. The only aim of our calculations is to provide some general idea of the order of magnitude of these health effects.

Beneficiaries of the program experienced improvements in their health status during their exposure to the program. Gertler (2000) shows that there is a reduction in the illness rate of about 11% (from 0.40 to 0.353 at ages 0-2 and from 0.28 to 0.248 at ages 3-5). For adults, the number of days of incapacity is also reduced. Finally, Barhman (2005) finds that the infant

mortality rate is reduced from 0.018 to 0.016. We will quantify these effects using two different approaches: firstly, we will take advantage of information regarding the alternative cost of saving a life according to Summers (1992); secondly, we will quantify those effects in terms of disability-adjusted life years (DALYs). Afterward, we will show our results under two alternative DALY values: 1,000 and 5,000 dollars (average exchange rate in 1996: 7.61 pesos per dollar).

Summers (1992) suggests that World Bank estimates of the cost of saving a life through measles immunization were on the order of US$ 800 per life saved in the early 1990s. Berhman et al. (2004a) state that adjusting this cost for inflation in the next decade and for the distortion costs of raising these revenues, the alternative resource cost of saving an infant's life is estimated at about US$1,250.

Based on the demographic data, we estimate that there were 33.56 total live births in the 100 households during the two years of the program. In treated households, we would expect 0.016x33.56=0.537 infant deaths, while in untreated households deaths would total 0.018x33.56=0.604. The program effect is a reduction of 0.067 infant deaths, that is, a benefit of 638.52 1996 Mexican pesos or a yearly benefit of 0.067 DALY for a lifetime (assumed to be 99 years).

Gertler (2000) shows that there is a reduction in the illness rate of about 11%. The illness rate is defined as the probability that a mother reports that her child experienced an illness in the four weeks prior to the survey. The reduction in the probability of illness is 0.047 in children aged 0-2 and 0.032 in children aged 3-5. Using our demographic data, we estimate the number of children aged 0-2 at 52 and the number of children aged 3-5 at 59 (in 100 households of 6 members). Therefore, the program results in a reduction of 4.33 monthly illness episodes. We assume that each illness episode lasts for a complete month (1/12 years) and that the disability weighting is 0.5. Thus, the effect of the program is a monthly benefit of 0.18 DALY for two years. Alternatively, we assume that each illness episode is valuated as a hundredth of the value of a life. In that case, the program's effect is estimated in 414 Mexican pesos per month for the two years that the program lasts.

As Gertler (2000) shows, there is no significant effect on the number of days of incapacity or of difficulty for people aged 6–17 years old. For people aged 18-50 and 51+ the results were the following:

Age	Reductions in		
	Days in Bed	Days of Incapacity	Days of Difficulty
18-50	0.010	0.034	0.055
51 and older	0.243	0.330	0.360

"One day in bed" implies one "day of incapacity" and one "day of difficulty". Similarly, one "day of incapacity" implies one "day of difficulty", but the reverse is not true. We can alter this table so that the figure for "days of difficulty" will signify "days during which the individual had difficulty but was not incapacitated or in bed" and the figure for "days of incapacity" will mean "days that the individual was incapacitated but not in bed". Moreover, using our demographic data we calculate the effect on 100 households. We assume that a day in bed has a disability index of 1, a day of incapacity 0.8 and a day of difficulty 0.4. Finally, we calculate the benefits of the program as a flow of monthly DALY for two years. If we want to avoid using DALYs in our estimation, we could valuate each incapacity day as a lost working day. If the average worker earns a monthly salary of 1,300 Mexican pesos, a day is worth a twentieth of that figure, or 65 Mexican pesos. In this case we did not place a price on days of difficulty.

	Reductions in		
	Days in Bed	Days of Incapacity	Days of Difficulty
18-50	0.010	0.024	0.021
51 and older	0.243	0.087	0.030
In 100 households			
Days, 18-50	1.99	4.78	4.18
Days, 51+	24.18	8.66	2.98
Disability Index			
DI	1	0.8	0.4
Monthly DALY			0.11

Improvements in health status also represent long-run investments. Behrman and Hoddinott (2000) and Gertler (2004) find that children aged 12-36 who receive treatment are, on average, one centimeter taller than those in the control group. We consider height as a proxy of health capital. The returns to this capital are hard to compute, however. Strauss and Thomas (1997) find that a 1% increase in height leads to 2.4% increase in lifetime earnings. Their estimation is based on survey data from men and women in Brazil. They state that "height is a cumulative measure reflecting both investments in nutrition during one's life

(mostly as a child) and also, possibly, non-health human capital investments". We followed the approach taken by Behrman and Hoddinott (2000) to look at two scenarios: one under the assumption that the percentage change in adult height is equal to the change estimated for children; and the other under the assumption that the percentage change in adult height equals half of the estimated change for children (1 cm represents an increase of 1.2% (the mean height in the sample was about 84 cm for children aged 1–3 years old). Therefore, using the results of Strauss and Thomas (1997), we calculated the benefits of the program as a 2.86% increase in monthly wages in the first scenario and 1.43% in the second. Using our estimation of a monthly income of 1,300 pesos (1996), the benefits of the program will be a monthly flow of 37.19 pesos per individual starting 17 years after the program began and lasting for 47 years (65-18). Using our demographic data, we estimated the monthly effect for our targeted population of 100 households at 1,222.60 (611.29 in the second scenario).

Finally, comparing benefits and costs, we estimated the following net present values (NPVs) and benefit-cost ratios:

Table IX: Program's NPV

Program's NPV	Discount Rate		
	3%	6%	8%
Not Using DALYs	$ 757,133.43	$ 250,878.41	$ 102,724.23
DALY Low (US$ 1000)	$ 754,959.70	$ 241,602.41	$ 91,693.82
DALY High (US$ 5000)	$ 1,026,998.64	$ 477,143.13	$ 315,044.02

Table X: Program's B/C

Program's B/C	Discount Rate		
	3%	6%	8%
Not Using DALYs	3.24	1.76	1.32
DALY Low (US$ 1000)	3.23	1.74	1.28
DALY High (US$ 5000)	4.03	2.45	1.98

We conducted a series of robustness checks. Each robustness check departs from the estimates in Table X using DALY Low estimates. First, we ignore all the health effects incorporated in the analysis in Table X. Second, we do not subtract the costs of the reduction in leisure costs incurred by beneficiary households. Third, we assume a homogeneous 10%

wage differential for extra year of schooling. Finally, we assume a homogeneous 5% wage differential for extra year of schooling.

Table XI: Program's B/C
Robustness Checks

Program's B/C	Discount Rate	
	3%	6%
No health effects [1]	3.09	1.74
No leisure costs	3.61	2.11
Average return to education 10%	2.46	1.36
Average return to education 5%	1.80	1.04

Notes: [1] We only consider as benefits the impact of PROGRESA on education and consumption and not on health as benefits. We reduce the costs in 20% since the government would not invest in health services and the households would not suffer costs in order to satisfy the health requirements of the program.

4.3. Early Child Development

Early Childhood Development (ECD) projects are interventions that aim to improve the physical, intellectual and social development of children early in their life, generally from ages 0 to 6. There is a wide range of interventions that belong to this category, some work directly with children, for instance growth monitoring, day care services, preschool activities, or improved hygiene or health services; other work with parents to improve their parenting skills through home visits by trained professionals and parental training and education related to best childrearing practices. Interventions may also include the provision of training services to teachers and caregivers, and the strengthening of institutional and community resources and capacities.

There are a great variety of program designs, divided primarily between formal versus non-formal services. The former type corresponds to center-based programs, generally quite structured and controlled by professionals. Examples are daycare centers and preschools. The other kind of program is more flexible in format, is conducted primarily by paraprofessionals and mothers, is usually home-based, and significantly less expensive to administer. Some examples are home-based daycare programs, community kindergarten, or even lessons delivered over the radio.

It is well documented by medical and educational research that the brain is almost entirely developed by the time a child enters school, and it is estimated that half of all intellectual development potential is established by the age of four. Poor nutrition during this age is related to delays in physical and motor development, impaired intellectual ability, concentration problems and poor social skills (Martorell 1997). Probably most important, is the fact that certain deficits can never be recovered later in life, so poorly developed children will never attain their full potential, helping to reproduce the well-known intergeneration cycle of poverty.

Engle et al. (2007) provide an extensive survey on the results of ECD interventions. They assess programs aiming at reducing iodine and iron deficiencies and child stimulation combined with nutrition and health programmes. They find positive effects on child development measures and that, in general, providing services directly to children is more effective than only providing information to parents; moreover they note that: "*The most effective child development … are targeted toward younger and disadvantaged children, are of longer duration, higher*

quality, higher intensity and are integrated with family support health, nutrition, or educational systems and services".

ECD programs were found to have positive impacts on a great variety of outcomes, and some of participants are old enough to offer the possibility to estimate long-term impacts, although most of them are conducted in the United States. Three well known projects that use randomized evaluations are the Perry Preschool Project, Carolina Abecedarian Project and the Early Training Program. Participation in the first program mentioned increases the years of schooling: participants have 11.9 years of schooling as opposed to 11 years for the control group, and also increases high-school graduation rates from 45 percent to 66 percent (Schweinhart et al 1993). There is also evidence of better performance on different tests at different ages. As regards to impacts on adult life, at the age of 40 it was found that program participants had median earnings more than one-third higher than non-participants, were more likely to be employed, had better criminal performance (measured by fractions of lifetime arrests and months in prison sentenced) (Scheweinhart 2005). The Abecedarian project had also a positive impact on achievement test scores and reduced the incidence of special education. An evaluation of another program, the Chicago preschool program, shows that the rates of school completion rose from 38.5 to 49.7 percent, dropout rates dropped from 55 to 46.7 percent, grade retention dropped from 32.3 to 21.9 percent and the need for special education decreased from 20.7 to 13.5 percent (Reynolds et al 2001).

Impact estimates for Latin America is scarcer, but there is evidence of some benefits of ECD projects. A review of nineteen evaluations of ECD programs in Latin America (Myers 1995) as well as a survey of thirteen programs in developing countries (Myers 1996) show that program participation is associated with improved school readiness, a higher probability of on-time primary school enrollment, lower rates of grade repetition and dropouts, improved academic performance overall. Besides improving children welfare, these programs have additional effects on other family members, especially on those previously in charge of child care activities. Program participation frees women and older siblings to work outside home or to further their own education.

4.3.1. Hogares Comunitarios Program in Colombia

Hogares Comunitarios is a large intervention based on community nursery where poor children receive food (purchased by the government) and child care from one of the mothers in the community. The program, which started in 1984, targeted poor neighborhoods and localities and encouraged eligible parents with children aged 0 to 6 to form 'parents associations'. Each parents association was registered with the program and elected a madre comunitaria (or community mother). The madre comunitaria would receive in her house the children aged 0 to 6 of the parents belonging to the associations. Each family would pay a tiny monthly fee (roughly equivalent to four US dollars), which would be used to pay a small salary to the madre comunitaria. The average number of children is around 12 (The maximum per madre is 15 children). The parents association would receive funds from the government to purchase food that would be delivered weekly at the house of the madre comunitaria. The menu varies regionally and is established by a nutritionist. In addition, the children would also be given a nutritional beverage called bienestarina. Children are fed three times: lunch and two snacks. According to the office responsible for the program, the food received by the children (including the beverage) would provide them with 70% of the advisable daily amount of calories.

Attanasio and Vera-Hernandez (2004) used Instrumental Variable estimation. They argue that given the evolution of the program and the high turnover of mothers in the last years, both the distance from the household to the nearest HC, and this distance averaged at the town level will be good instruments. They present evidence showing the extent to which both the household distance to the nearest HC and its town average affects participation choices. Their identification assumption is that these two distances are unrelated to nutritional outcomes, conditional on the other control variables.

Attanasio and Vera-Hernandez (2004) identify the following benefits from the program:

- **Better antropometric measures:** The authors estimate the effect of having attended a HC during the first six years of life in 3.78 centimetres for a boy (3.83 for a girl) aged 72 months. At that age the median height of boys is 115.5 centimeters (114.5 for girls); therefore, the program effect is an increase over the median height of 3.3%.
- **Better school attainment and progress rates:** The authors considered separately children aged 8 to 12 and those aged 13 to 17. While for the younger group they didn't

identify any significant effect, they found important effects for the older group. According to their tables the probability of progressing a grade among the younger group is 0.777 and 0.655 among the older group. The authors found that for each year a child attended a HC the probability of progressing increases by 0.07. Therefore, we simulate the education distribution for a child that attended one year to a HC and compared it with the distribution for a child that hadn't attended a HC at all. On average, a treated child accumulates 7.5 years of schooling against 7.15 of an untreated child.

- **Increased female labor supply:** The program might have additional benefits caused by the childcare aspect of the program that would allow mothers to work and earn additional resources. According to the authors, when they define as treatment a binary variable that is one if the mother has at least one child currently attending HC, treated women increase their average number of hours in the labor market by 75 monthly hours.

4.3.2.Pre-Primary Education

Most OECD and many middle-income countries have turned to universal pre-primary education in order to give children a better start to their schooling life. Berlinski et al. (2006) examine the returns to pre-primary education by taking advantage of a large infrastructure program aimed at increasing school attendance for children between the ages of 3 to 5. Between 1993 and 1999, Argentina constructed enough classrooms for approximately 186,000 additional children to attend preschool. By conditioning on region and cohort fixed effects, the construction program generated plausible exogenous variation in the supply of school facilities. Using an identification strategy similar to Rosenzweig and Wolpin (1988), Card and Krueger (1992), and Duflo (2001), among others, they exploit the variation in treatment intensity across regions and cohorts to estimate the effect of expanding pre-primary school facilities on subsequent achievement in primary school.

The results in Berlinski et al. (2006) show that attending pre-primary school had a positive effect on subsequent third grade standardized Spanish and Mathematics test scores. They estimate that one year of pre-primary school increased average third grade test scores by 8 percent of a mean or by 23 percent of the standard deviation of the distribution of test scores. They also find that pre-primary school attendance positively affected student's behavioral skills such as attention, effort, class participation, and discipline. This positive effect on behavioral

skills provides evidence of possible pathways by which pre-primary might affect subsequent primary school test performance as preschool education facilitates the process of socialization and self-control necessary to make the most of classroom learning (Currie, 2001). Moreover, behavioral skills are as important as cognitive skills to future success in life.

Berlinski, Galiani and Manacorda (2008) (BGM) estimate the effect of pre-primary education on school stay-on rates and levels of completed education among individuals aged 7-15. They exploit a rather unique feature of the Uruguayan *Encuesta Continua de Hogares* (ECH) for the years 2001-2005 that collects retrospective information on the number of years of preschool attended. In order to control for unobserved household characteristics that are common to all children in the household and that might affect simultaneously exposure to pre-primary education and school progression, they use a within household estimator that only exploits variability in the outcome and treatment variables across siblings. A major expansion in the provision of public pre-primary education in Uruguay over the last decade that led to an acceleration in preschool attendance among subsequent birth cohorts and that mainly affected children from more disadvantaged backgrounds generates sufficient variation in exposure to preschool across siblings to warrant identification.

Nevertheless, parents may treat siblings differently, so that non-random selection within households is a potential threat to the consistency of the within households estimates. Parental preferential treatment of some children or changes in household resources along the family's life cycle might imply that some siblings in the same households are both more likely to attend preschool and to perform better in school or stay-on longer. To address this potential threat to the identification, BGM rely on a variety of approaches. First, they control for some of the potentially spurious correlation between treatment and outcomes by conditioning on a number of children's characteristics, such as order of birth, gender and mother's age at birth. Second, they present instrumental variable estimates that exploit average enrollment by cohort and locality as an instrument for treatment. Such source of variation is arguably uncorrelated with children's unobserved characteristics within each household, hence leading to consistent estimates of the treatment effects.

BGM find a significant positive effect of preschool attendance on completed years of primary and secondary education. This works both through a fall in retention rates since the very early school years (from age 8 onwards) and a reduction in drop out among teenagers (from age 13 onwards). The gains from having attended preschool increase as children grow

older, so that exposure to pre-primary education leads to gradually diverging paths in school performance between treated and untreated children. We speculate that early grade retention increases the incentives for early drop out and raises the probability of grade failure later in the school life. Thus, pre-primary education appears as a successful policy to prevent early school failure and its long lasting consequences.

In poor countries, a large share of the population is excluded from the education system already at an early age and well before completion of the compulsory schooling cycle. Exclusion from the school system encompasses in varying combinations failure to enroll, late entry, intermittent and irregular attendance, high retention rates and eventually early drop out.

In this context, early exposure to the school system appears as a possibly successful policy option. What makes pre-primary school different from primary school is that this is not generally conceived as an academic experience and children are not evaluated based on their performance. In Uruguay, as elsewhere, grade retention in preschool is not an option (while it is in primary school), and children progress to the primary school cycle when they turn compulsory schooling age independently of their performance. This creates an environment for children to learn and socialize without some of the potentially distorted incentives linked to a formal evaluation system (such as competition among students or teachers) and guarantees a common starting ground for children from rather heterogeneous backgrounds. If early success in school is a good predictor of later school performance, and if preschool attendance strengthens early school outcomes particularly among children with worse school potential, then early interventions might yield high returns.

4.3.2.1. Comparing Benefits and Costs[11]

BGM estimated that, on average, the children who attended one year of pre-school at age 15 have accumulated around 0.79 more years of education than their non-treated siblings. They also found that untreated children are more likely to drop out from school than their treated siblings. By age 15 children who attended preschool are 27 percentage points more likely to be in school. We can now use these estimates to compare the cost of offering one year of pre-primary education, say at Kindergarten age, to the additional wealth generated by such intervention, under the assumptions that our estimates extend to all treated children and that the general equilibrium effects of it are not important. The better educational performance

[11] Estimates in this section are based on Berlinski et al. (2008).

induced by attending one year of pre-primary education should translate into higher productivity and wages latter in life. There is also evidence of other long run benefits associated to education in general, and early interventions in education in particular, such as lower criminality, higher taxes revenue and lower welfare payments (see Belfield et al 2006 and Schweinhart 1993). However, in our analysis we abstract from considering among the impacts of the intervention any possibly indirect effect for which we do not have direct evidence in order to minimize the number of assumptions upon which the conclusion would rest.

One important issue related to pre-primary education is that of targeting it to the poor. Certainly, it can be done by means of geographically targeting the supply of new rooms. This is regularly done in LAC. Still, someone might argue that it would be politically difficult to exclude the middle-class from this intervention if they do not have access to it and targeting it to the poor. Nevertheless, since this intervention appears to be very cost-effective, extending the supply of pre-primary education beyond the poor since a sensible policy.

We consider an intervention that consists of providing one year of public pre-primary education to one cohort of 50 students of 5 years of age. We estimate that in each new classroom can fitted 50 students per year in two shifts of 25 students each (see Berlinski, Galiani and Gertler, 2006). In order to normalize the benefits and costs of the project into monetary terms, we transform all cash-flows in terms of Uruguayan Pesos of March 1997. We used the Uruguayan monthly IPC published by the *Instituto Nacional de Estadísticas* (INE) and the monthly exchange rate published by the *Banco Central del Uruguay*. The exchange rate of March 1997 was 9.02 UY$ per US$.

The cost of this intervention is equal to the share of each cohort in the cost of constructing a new room, teacher wages and other miscellaneous costs. There are also opportunity-costs associated to acquiring higher education. For instance, students at school are consuming resources while individuals of the same cohort in the labor market might be contributing to the production of goods and services.

We fixed the cost of building a pre-primary classroom in U$S 35,000 (ANEP, 2000). A given cohort has to bear only a portion of this cost because the classroom will be utilizable by other cohorts of students in the next years. Therefore, we assigned to the project the constant payment needed to cancel a loan of US$ 35,000 in 25 years using an annual interest rate of 10% per year. This assumption might be conservative since it implies that we fully depreciate the investment in 25 years. The spot price of the land over which the classroom is built is

assumed to be US$ 5,000. We also assign to the cost of the project the interest over the value of the land using also an annual rate of 10%. Thus, taking into account both costs, we estimate the infrastructure cost of the intervention considered in UY$ 39,299.

We estimate the average monthly wage of schoolteachers using microdata from the household survey (*Encuesta Continua de Hogares* (ECH)) for the period 1992-1999. Wages were deflated into pesos of March 1997 and then averaged over the period. The monthly wage of a teacher that we assume attends both shifts is UY$ 4,460. Additionally, we estimate miscellaneous monthly costs in UY$ 2,230 (i.e., 0.5 of the monthly cost of a school teacher).

We estimated that the treated children would have higher enrollment rates during the subsequent school period considered. This also entails costs. First, there is the cost associated to the use of resources of the schooling system. In order to compute this cost, we multiply the estimated effect of attending one year of pre-primary education on enrollment by the estimated cost of supplying one year of education, which for simplicity, we assume constant through the schooling system. We use the estimates in Table 5 (column 4) to calculate the effect of pre-school education on educational attainment. For instance, by age 15 treated children are 27 percentage points more likely to be in school. This means that 10 years after the intervention is executed, there is an additional cost that needs to be imputed to the project equal to 0.27 times the total cost of the first year of the program. We do this same computation for children ages 6 to 14; in each case, costs are properly discounted at the prevailing discount rate. Second, we also need to take into account the opportunity cost of attending school. We estimate that 27% of the children that are now in the school would have been in the labor market in the absence of the intervention. A portion of them would have been actually employed. The unemployment rate in Uruguay for the age group 15 to 24 yeas is 0.3. Therefore, we estimate the opportunity cost of the forgone labor income as the probability of being employed (0.7) times the proportion of children in school as a result of the intervention (e.g. 0.27 at age 15) times the mean income for children of each age (e.g. UY$ 1209 at age 15) times 50 children. We assume that only children older than 13 years old participate in the labor market.

By age 15 treated children have accumulated 0.79 more years of education (Table 5; column 8). We assume that this difference will be maintained beyond age 15. We adopt a rate of return to education of 10%. Therefore, a treated individual will earn 7.9 percent more per year than an untreated one. We estimated from the household survey age specific average real wages over the period 1992-1999 using the microdata gathered from the ECH.

We further assume that all individuals enter the labor market at age 16. Then, the benefits stemming from the intervention x years after it is carried away are calculated as: the age-conditional average yearly income of an individual x+5 years old times one minus the unemployment rate times 0.079. Benefits are computed this way for x = 11…60. The net present benefit induced by the program is then calculated by adding the discounted benefits at each age x + 5 for x = 11…60. The unemployment rate for individuals older than 24 years is 0.085.

Using alternative discount rates we find that:

TABLE XII: Net Present Value and Benefit-Cost Ratios

Discount Rate	NPV	B/C
0.03	UY$ 3,365,429	19.1
0.06	UY$ 1,220,804	8.2
0.08	UY$ 643,573	5.0

With these assumptions, the internal rate of return of the intervention is 16%. These results are commensurate with those of other early child interventions. Benefit-Cost ratios for the Perry pre-school program range from 6.87 to 16.14 for annual discount rates of 7 and 3 percent, respectively (see Schweinhart et al 2004). The Chicago Child-Parent Center Program exhibited ratios ranging from 4.3 to 7.14 for discount rates of 7 and 3 percent (see Reynolds et al 2002.). Finally, the ratios for the Abecedarian project were 1.45 to 3.78, respectively (see Masse & Barnett 2003).

We have conducted some sensitivity analysis on these Benefit-Cost ratios. Before, we assumed that one teacher works two shifts. However, it might be that even if they work for 8 hours per day, due to collective agreements or other rules, they only work one shift. In this case, the internal rate of return drops slightly to 14% and the benefit-cost ratio varies between 13.1 and 2.2 depending on the discount rate. Second, we assume that the return to one extra year of education is 8% instead of 10%. The internal rate of return drops to 14.7% and the benefit-cost ratio varies between 15.2 and 2.5, again depending on the discount rate.

In sum, our data suggest that this policy intervention is highly cost-effective. Under the most conservative scenarios, we find an estimated rate of return to the expansion of preschool as high as 14% and Benefits-Cost ratios greater than 2.2.

4.4. Taking Stock

We have presented a set of interventions that, when properly targeted to the poor, appear to be, given our best estimates for their costs and benefits, decidedly cost-effective. These policies are being implemented in some countries of LAC, but surely there is scope now for scaling them up to include other countries in the region.

Conditional cash transfers are not only cost-effective, but, as we have seen, they also do not generate major disincentive effects. There is no evidence of reductions in employment among adults. Much to the contrary, there is some evidence that beneficiary households increased their participation in microenterprise activities and made larger investments in agricultural production activities. There is no evidence of significant changes in fertility rates, which in turn suggests that there has been no change in demographic incentives. CCT interventions also tend to reduce child labor. Finally, they not only promote the enhancement of the human capital of poor children, which may help them to escape poverty during adulthood, but they also increase current consumption in poor households. We want to emphasize this last effect here. Even if other early childhood interventions were more cost-effective than CCT interventions, the corresponding analysis would not take into account intergenerational equity considerations. Additionally, with the exception of countries where poverty is very low, it is likely to be politically unviable to conduct an anti-poverty program based solely on interventions that only affect the future income of the poor, even if these interventions were found to be more cost-effective than CCTs.

Another advantage of CCT interventions is that the transfers to the poor are potentially high and hence could have a substantial impact in reducing poverty and inequality. In other words, interventions that are highly cost-effective, but that transfer very small amounts of resources to the poor, are surely worth adopting, but are limited in their impact on poverty. Thus, we conclude that CCT programs should be at the core of the redistributive component of an integral strategy to reduce poverty in LAC.

Educational factors lie at the center of the perpetuation of poverty and inequality in the region. We believe that the region should invest heavily in education, attempting to achieve ten years of schooling for the poor (i.e., primary and basic secondary school) plus at least one year of pre-primary education (i.e., kindergarten). A combination of CCTs and supply-side interventions to expand the supply of pre-primary education could be effective in achieving these goals.

However, improving the quality of education is also key to overcoming poverty and inequality. Ferreira (2004) shows that, measured by international standards, Latin America has, on average, middling levels of educational inequality but high levels of income inequality. This in part reflects the huge differences that exist in educational quality across income groups. The countries that have participated in international tests have scored substantially below the Organisation for Economic Co-operation and Development (OECD), East Asian and Eastern European countries. The result reflects not only a lower average but also a wide dispersion in LAC. However, there is no consensus as to the best way to go about improving education quality.[12]

Certainly, a progressive plan to reduce poverty in LAC should go beyond CCTs and early childhood interventions in nutrition and education. In the next subsection, we briefly discuss other interventions which could potentially be effective in reducing poverty and inequality but for which we did not have enough information to assess their benefit-cost ratios.

[12] See also the solution paper by Glewwe.

4.5. Other Promising Interventions

a. Education

Indigenous people as a group have been found to lag behind the general population in educational achievement. In recent years, there has been growing interest in bilingual education targeted to minority groups. This type of policy can improve the schooling achievements of the indigenous population (see Dutcher and Tucker, 1994).

In order to promote social mobility and meritocracy, at least those countries with the lowest levels of poverty might consider adopting scholarship programs for tertiary education directed to the poor based on conditional merit (see Galiani, 2007b). Such an intervention may well be cost-effective, since returns to education appear to be convex in LAC.

b. Property Rights and Land Reform

Security of property rights is essential for investment and growth. In LAC, elites tend to have more secure property rights than the rest of society. This situation is especially troubling for the poor because they tend to own land for which titling is incomplete. This makes the land harder to sell or mortgage. This, in turn, detracts from incentives for the poor to invest in productive activities and other assets.

Redistributive land reform has long been advocated as a source of both greater equity and greater efficiency. However, it is important to take into account the relationship between the size of landholdings and productivity. Small farms can be efficient units of production, but this depends on conditions specific to particular crops and associated factors such as marketing and credit (see Walton, 2004). In the case of Mexico, Finan, Sadoulet and de Janvry (2002a) find that there is the potential for making large, poverty-reducing gains from landholdings as small as one or two hectares.

Walton (2004) argues that it is important to distinguish between countries (and among areas within countries) with regard to where existing land rights are and are not contested. In the former case, there is greater scope for land reform to enhance both equity and efficiency. However, whether this type of intervention is cost-effective or not is something we cannot answer right now, although there are grounds for maintaining that such interventions may be useful in attaining large productivity gains. For example, Banerjee et al. (2002) found that a reform of tenancy that forced landlords to raise the share of output going to the sharecroppers and also gave them a secure right to the land raised productivity by about 50%. Thus, in LAC,

where land rights are contested, there appears to be scope for strengthening tenancy markets and for land titling programs. Indeed, the tenancy market in LAC is severely underdeveloped. The primary reasons for this are weak property rights and a lack of conflict resolution mechanisms, sometimes combined with prohibitions on renting (Walton, 2004).

However, the effectiveness of this policy should be weighed with caution, since there is a history of land reform failure in the region. de Janvry and Sadoulet (2002b) argue that this is the result of incomplete reforms or poorly designed reforms which focused on ill-fated production cooperatives. Nevertheless, caution may still be called for in advocating land reform proposals as a means of reducing poverty, since there are large complementarities between the land market and the credit and commercialization markets. Also, access to infrastructure appears to be an important complement to land as a key input in income generation by small farmers. Land reform might easily fail in the absence of actions on other fronts.

The potential of urban land titling to serve as a powerful policy instrument to attack poverty has recently been brought to the fore in policy circles by the work of De Soto (2000). De Soto argues that titled property creates capital because formal landholders can use these assets as collateral for loans. In turn, this credit can be invested in capital goods to increase labor productivity and, hence, the income of the poor.

Galiani and Schargrodsky (2006) exploit a natural experiment to solve the problem of comparability between titled and untitled families. More than 20 years ago, a large number of comparable squatter families occupied a very small area of wasteland in the outskirts of Buenos Aires, Argentina. The area was made up of different tracts of land, each with a different legal owner. An expropriation law was subsequently passed under which the land was to be transferred to the State in exchange for a monetary compensation. The purpose of the law was to allow the State to subsequently transfer legal titles to the squatters. However, only some of the original legal owners surrendered their land, which was then titled to the squatters. Other owners are still contesting the compensation payment in the slow-moving Argentine courts. As a result, a group of squatters obtained formal land rights, while others are still living on similar parcels without legal titles.

Families that received formal title to their land between 7 and 14 years ago now own much better houses than untitled families. Based on an analysis of a broad set of investment indicators, the study concludes that the titled houses are 40% better than the untitled ones. Do

titled households have more access to credit? The evidence suggests that there is not much difference on this count. The effect is small. In addition, there are no differences at all between these two groups' actual earnings. This study also shows that the households that have titled parcels tend to be smaller in size and seem to invest more in the education and health of their children. This would seem to indicate that providing poor households with land titles prompts them to enhance their investments both in their houses and in the human capital of their children, which will reduce their poverty in the future.

d. Rural Infrastructure

The expansion of infrastructure –rural roads, electrification, water and sanitation, and information and communication technologies– is considered to be an important component of poverty alleviation strategies (see, among others, Walton, 2004). Increasing access to infrastructure reduces transaction costs and increases productivity by facilitating access to the markets for factors of production and final goods and by improving production technology. The expansion of infrastructure affects relative prices within the category of agricultural products and between agricultural and non-agricultural products, which in turn influences the allocation of time between different income-generating activities. Increasing access to infrastructure reduces the prices that poor households pay for services that they are currently purchasing: poor people often pay higher prices for services from informal infrastructure providers than they would be charged if the appropriate infrastructure were available.

Unfortunately, there are no credible experimental or quasi-experimental evaluations of the effects of rural infrastructure investments on earnings for LAC. Escobal and Torero (2005) present simple cross-sectional evidence on the effects of access to electricity, water, telephone lines and roads on earnings in rural Peru. They also show evidence of complementarities between access to these different types of infrastructure and their impact on income. Thus, we believe that this evidence points to an important opportunity for furthering the poverty-reduction agenda. Rigorous evaluation is urgently needed in this area.

The growth of agricultural activity in poor rural areas can drive poverty reduction through three broad mechanisms: the direct impacts of increased agricultural productivity and incomes on the rural poor who earn significant portions of their income as farmers or farm laborers; the benefits of cheaper food for both the urban and rural poor; and agriculture's contribution to growth and the generation of economic opportunity in the non-farm sector. Over time, this

leads to structural economic change, as the non-farm economy grows in importance and the relative importance of the agricultural sector declines. The critical role of agriculture and agricultural markets in poverty reduction therefore applies only to poor economies that have not already achieved significant agricultural development.

Markets provide the most important mechanism for efficient, coordinated economic exchange. Promoting more efficient and extensive markets and providing more favorable market access to the poor are important elements in facilitating their access to exchange mechanisms. Development of agricultural markets could play such a role in extremely poor rural areas. Again, however, these types of interventions need to be rigorously evaluated before they can be scaled up throughout the poorest rural areas in the region.

e. Credit and Insurance

The extensive cross-country literature on credit shows a strong correlation between "financial depth" and growth (see, for example, King and Levine, 1993). However, the poor do not have access to banks or other formal financial institutions (see, among others, Banerjee and Duflo, 2007). Credit from informal sources tends to be expensive. Rather than being attributable to high rates of default, this seems to be a result of the high costs of contract enforcement (Banerjee and Duflo, 2005). The poor also have little access to formal insurance.

One much-heralded innovation as regards the delivery of credit and insurance is that of microfinance institutions, which target the poor and rely on peer selection and peer monitoring to overcome the need for collateral. These schemes are typically operated by nongovernmental organizations, but in some cases may need to be subsidized in order to operate properly. A policy of providing subsidies to microfinance institutions could be viewed as a type of intervention with the potential for reducing poverty by facilitating investment projects with very high rates of return (see Banerjee and Duflo, 2005) and by smoothing the effects of severe shocks that seriously impact the poor (see, among others, Gruber and Gertler, 2002).

However, it is worth noting that the success of microfinance initiatives may depend on the context, at least at a certain level. The existence of opportunities to be capitalized upon by borrowers, the degree of stability of the economy, the level of development and other such factors may directly affect the degree of success attained by the investment projects being financed by such institutions and, consequently, the degree of success of the microfinance projects as well. Thus, this idea requires further examination in terms of design and an

extended period of evaluation before it could be scaled up to a region wide level based on the necessary knowledge.

5. Parting Thoughts

Stimulating economic growth should be at the core of any hope to substantially reduce poverty in LAC. However, in order to halve poverty in 10 years, *ceteris paribus*, per capita growth would need to accelerate to around 4% per year, which even though it is not only well above the region's historical average for the last 40 years, but is also higher than the levels achieved during the last decade, we believe it is possible if the reform process initiated 20 years ago is invigorated and enhanced instead of depleted.

To accelerate economic growth, it is of key importance for the region to create an environment that reduces the distortions between the private and social returns to investments, thereby allowing entrepreneurs to appropriate a significant portion of the revenues generated by their investments and innovative projects.

Clearly, there are grounds for arguing that the high levels of inequality prevalent in LAC generate an excess burden of poverty over and above what would be expected given the region's level of development. Thus, reducing inequality is another powerful strategy for reducing poverty in LAC. One striking feature in Latin America is how little redistribution is carried out. Comparing income inequality between members of the Organisation for Economic Co-operation and Development (OECD) and LAC countries, one sees that roughly half of all sharp income inequalities stem from differences in returns to factors of production, while the other half are the result of the more progressive taxation and transfer systems in existence in the OECD area.

Revenues from personal income taxes are low in LAC, even when compared with receipts in countries with similar income levels. This suggests that there is scope for increasing such revenues in order to improve the after-tax distribution of income. Property taxes are also currently underutilized and could be used to increase redistribution in the region. Nevertheless, the potential for achieving greater redistribution only via taxation is to some extent limited in developing countries by the fact that their tax systems rely heavily on indirect taxes.

Additionally, in most developing countries, and certainly in LAC, the poor operate primarily in the informal economy and are therefore beyond the reach of conventional tax and transfer mechanisms. Not only that, but a broad range of labor-market policies dealing with such matters as minimum wages and wage subsidies for unskilled workers, although used in developed countries to affect the income levels of the working poor, are unlikely to be

effective in most of the countries in LAC. This fact represents a constraint for any strategy aimed at reducing poverty and inequality.

In this paper we have presented a set of interventions that, when properly targeted to the poor, appear to be, given our best estimates for their costs and benefits, decidedly cost-effective. These policies are being implemented in some countries of LAC, but surely there is scope now for scaling them up to include other countries in the region.

Conditional cash transfers are not only cost-effective, but, as we have seen, they also do not generate major disincentive effects. There is no evidence of reductions in employment among adults. Much to the contrary, there is some evidence that beneficiary households increased their participation in microenterprise activities and made larger investments in agricultural production activities. There is no evidence of significant changes in fertility rates, which in turn suggests that there has been no change in demographic incentives. CCT interventions also tend to reduce child labor. Finally, they not only promote the enhancement of the human capital of poor children, which may help them to escape poverty during adulthood, but they also increase current consumption in poor households. We want to emphasize this last effect here. Even if other early childhood interventions were more cost-effective than CCT interventions, the corresponding analysis would not take into account intergenerational equity considerations. Additionally, with the exception of countries where poverty is very low, it is likely to be politically unviable to conduct an anti-poverty program based solely on interventions that only affect the future income of the poor, even if these interventions were found to be more cost-effective than CCTs.

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interventions to expand the supply of pre-primary education could be effective in achieving these goals.

Certainly, a progressive plan to reduce poverty in LAC should go beyond CCTs and early childhood interventions in nutrition and education. We outlined a set of other promising interventions. For some of them there is credible evidence on its impact while for others we still know lees. We need more rigorous evaluations in these (and other) areas in order to assess the virtues of these potential interventions, but we also need better estimates of the cost functions of these interventions in order to assess their cost-effectiveness.

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Table VIII: CCT IMPACTS

	PROGRESA (Mexico)		PRAF (Honduras)		BDH (Ecuador)		RPS (Nicaragua)	
	Program impact	Comments	Program impact	Comments	Program impact	Comments	Program impact	Comments
Education (1)								
Enrolment rates	8.7-9.4% all 10-12% girls 7-8% boys	Transition from primary to secondary school. Although smaller, significant positive impacts for all the other grades as well.	3.30 %	There is evidence of greater impacts among the poor.	8.6 % across all grades 17.8 % for 6th grade	Results based on IV estimation methods because of low take-up rates. 'Lottery' effects are smaller.	13-22%	Impacts highly concentrated among the poor: 25-30% for the extremely poor and 5-6% for the non poor
Attendance rates	No sig impact		4.60 %	From a base line rate of 91%			13-26%	33-36% for the extremely poor
Progression rates	8-11%	6-10 year old children	12.30 %	Transition from primary to secondary school				
Grade repetition	(-) 7-12 %	6-10 year-old children						
Drop-out rates	(-) 9%	11-year-old children						
Achievement	No sig impact							
Preventive health care and health status (2)								
Health check-ups	Positive impact	Visits at public clinics. Effect at the family level.					Positive effect	0-3 year old children
Nutritional monitoring visits	30-60 % 25-45 %	0-2 year-old children 3-5 year-old children			No sig impact	Positive effect on parasite treatment, especially on the poorer.	Positive effect	0-3 ncreyear old children
Hospital visits	Reduction Reduction	0-2 year-old children Adults over 50						
Pre-natal care visits	Increase Reduction	1st trimester of pregnancy Other trimester						€
Vaccination rates							30 % increase both in treatment and control areas when decreased in other	

	PROGRESA (Mexico)		PRAF (Honduras)		BDH (Ecuador)		RPS (Nicaragua)	
	Program impact	Comments	Program impact	Comments	Program impact	Comments	Program impact	Comments
								rural areas (children aged 12-13 months)
Illness rates	12 % lower 25.3 % lower 22.3 % lower	0-5 year-old children Newborns 0-3 year-old children						
Infant mortality rates	11 % lower	Rural rates. Municipality level.						
Days of difficulty with daily activities	(-) 19 %	Difficulties due to illness, Adults older than 18.						
Nº of km walked without getting tired	7 %	Adults older than 18						
Days of incapacitation	(-) 17 %	Incapacitation due to illness. Adults older than 50.						
Days in bed	(-) 22 %	Due to illness. Adults older than 50						
Nutritional status [3]								
Probability of stunting	Decreased	Children aged 12-36 months. Impact greater on poorer households and poorer communities					(-) 5 %	0-5 year-old children
Child growth	0.96-1cm taller				Positive impact	Although quite small		
Motor skills *Emotional problems*	Positive impact Positive impact				Positive impact			
Cognitive development measures	No sig impact				Modest impact	Positive impact on 1 out of 5 measures. Greater impact on poorer households.		

	PROGRESA (Mexico)		PRAF (Honduras)		BDH (Ecuador)		RPS (Nicaragua)	
	Program impact	Comments	Program impact	Comments	Program impact	Comments	Program impact	Comments
Hemoglobin levels	Positive impact				Positive impact	On poorer households	No sig impact	
Consumption and investment [4]								
Value of food consumption (per person per month)	2 % one-year impact 10 % two-year impact	Impact on the median household. Greater impact on the poorer: increase of 13.5 % at the 25th percentile after two years.						
Share of food expenditure							4.7 % one-year impact 4.5 % two-year impact	Similar positive impacts on per capita annual total expenditures
Caloric acquisition / dietary diversity	6.40 % 7.10 %	Household caloric acquisition Median caloric intake per person per day					Positive effect	Improvement on the nutritional value of food consumed
Permanent consumption	34 %	After 5 years of program						
Savings	12 cents for every peso transferred							
Investment	Increased participati on in microenterprise activities							
Child labor and time allocation [5]								
Probability of working	(-) 15-25 %	Impact concentrating on children 12-15 years old	No sig impact		(-) 5-6 % / 17 %	Lottery effect	(-) 5 %	7-13 year-old children. Impact on boys twice as large as that for girls.

	PROGRESA (Mexico)		PRAF (Honduras)		BDH (Ecuador)		RPS (Nicaragua)	
	Program impact	Comments	Program impact	Comments	Program impact	Comments	Program impact	Comments
					(-) 17 %	Treatment effect	(-) 9 %	10-13 year-old children . Impact on boys twice as large as that for girls.
Probability of starting to work					(-) 6-8 %	Lottery effect		
Hours of work	No sig impact				(-) 25 % 2.5 hs less	Treatment effect Per week	10 hours less	Per week
Adult labor participation and time allocation (6)								
Labor market participation	No sig impact				No sig impact		No sig impact	
Leisure time	No sig impact							
Time on child-rearing activities							Positive effect	
Change in working patterns							More time working on own farms or work nearer households.	
Other effects (7)								
Fertility rates	No sig impact							
Private inter-household transfers	No crowding out effect							
Women's empowerment	Positive impact							

Notes:

(1) Results reported are based on: Schultz (2000a, 2000b, 2000c, 2001 and 2004), Behrman, Sengupta and Todd (2000 and 2001), Behrman, Parker and Todd (2004b, 2006 and 2007), Coady (2000) for PROGRESA; Shady and Araujo (2006) for BDH; Maluccio (2004), Maluccio et al. (2005) and Maluccio and Flores (2005) for RPS; and Glewwe, Olinto and Souza (2003) and Glewwe and Olinto (2004) for PRAF.

(2) Results based on: Gertler (2000 and 2004) and Barhman (2005) for PROGRESA; Maluccio et al. (2005) and Maluccio and Flores (2005) for RPS; and Paxson and Shady (2007) for BDH.

(3) Results based on: Gertler (2004), Berhman and Hoddinott (2000), Rivera et al. (2004), Gertler and Fernald (2004) for PROGRESA; Maluccio (2005), Maluccio and Flores (2005) for RPS; Paxson and Shady (2007) for BDH.

(4) Hoddinott, Souffkias and Washburn (2000), Hoddinott and Skoufias (2004), Gertler, Martinez and Rubio (2006) for PROGRESA; Maluccio et al. (2005) for RPS.

(5)-(6) Results based on Parker and Skoufias (2000) and Behrman, Parker and Todd (2007) for PROGRESA; Maluccio (2003), Maluccio et al. (2005) and Maluccio and Flores (2005) for RPS; Glewwe, Olinto and Souza (2003) for PRAF; Schady and Araujo (2006) for BDH.

(7) Schultz (2004), Teruel and Davis (2000), Adato (2000).

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