Poverty reduction in Latin America:

the role of demographic, social and economic factors

Jaime Ros

The recent socio-economic development of Latin America presents a puzzle. This is that while economic growth in the region in the past 25 years has been very slow, falling behind past performance and behind most of the rest of the world, poverty rates have continued to fall significantly and soginicial indicators have continued to improve. This paper assesses the role of various factors —income distribution, social spending and demographic changes— in explaining the paradox. The main finding, rather disturbingly, is that with few exceptions (Chile in particular) the major factor contributing to the reduction of poverty has been the demographic dividend brought about by the demographic transition that the region recorded over the period.

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I

Introduction

The recent socio-economic development of Latin America presents a puzzle. This is that while economic growth in the region in the past 25 years has been very slow, falling behind past performance and behind most of the rest of the world, poverty rates have continued to fall significantly and social indicators have continued to improve. In some countries, progress with social indicators appears even to have accelerated compared to past trends. This paper assesses the role of various factors —income distribution, social spending and demographic changes— in explaining the paradox. Have changes in income distribution contributed to the reduction in poverty rates? Have the increase in social spending and more targeted poverty reduction programmes made possible the decline in poverty despite sluggish economic growth? What has been the role of the demographic transition and the associated demographic dividend in the reduction of poverty?

The paper is organized as follows. Section II presents the analytical framework and documents the puzzle of social progress in the midst of slow growth in Latin America. Sections III and IV then present a formal regression analysis of the role of growth, income distribution, social spending and demographic changes in the observed variations in poverty rates and show the contributions that each of these factors has made to poverty reduction. The analysis finds that the demographic transition has had the greatest role in the decline of poverty. Section V concludes with a warning: as the demographic transition is completed, the demographic dividend will disappear and further social progress may necessitate more rapid economic growth. Appendix 1 addresses reciprocal causation between poverty reduction and demographic change and appendix 2 presents the definitions of the variables and data sources used.

II

Poverty reduction and its determinants

The analytical framework adopted is simple. It makes the poverty rate dependent on the level of GDP per worker, the degree of inequality in the distribution of income, government social spending and the AGE structure of the population. The role of the first three determinants is straightforward: other things being equal, an increase in GDP per worker, a fall in inequality, and an increase in social spending will all tend to reduce the poverty rate. The role of the population AGE structure requires more explanation. Given the other determinants, the demographic structure can affect the poverty rate through the

following channels.[1] First, an increase in the working-AGE population as a share of the total population (or a fall in the dependency ratio) and the resulting increase in the activity rate produce the traditional demographic dividend, that is, they imply that the increase in income per capita is greater than it would otherwise have been. Second, the sharp reduction in the growth rate of the number of children allows for an inertial increase, resulting from past investments in education, in enrolments and teacher-student ratios at the primary and secondary levels. An example of such an increase is the fact that, whereas in the early

[1] For surveys on the effects of changes in the AGE structure on economic growth and the consequences of the demographic transition for poverty, see Bloom and Canning (2001), Bloom, Canning and Sevilla (2003), Eastwood and Lipton (2001) and Kelley and Schmidt (2001). For a review of surveys on population and poverty, see Merrick (2001).

1980s some 20% of children of school AGE in Brazil were not attending school, by 2000 the figure was down to 3%.[2] Third, the change in the AGE structure of the population has a positive composition effect on the poverty rate given that the incidence of poverty is higher among children than for the population as a whole. It is worth noting that this list of channels does not include the effects of demographic change on poverty through saving behaviour or inequality. These effects are already controlled for by the inclusion of GDP per worker and the distribution of income among the determinants of poverty. The paper thus concentrates on the role of demographic change as a proximate determinant of poverty.

In the rest of this section, I look at the evolution of the poverty rate in Latin America from around 1990 to 2006 together with the evolution of each of its determinants. The sample of countries for which information is available on poverty and its determinants includes Argentina, the Bolivarian Republic of Venezuela, Brazil, Chile, Costa Rica, Ecuador, Honduras, Mexico, Panama, Paraguay, the Plurinational State of Bolivia and Uruguay.

Following the lost decade of the 1980s and since around 1990, Latin America has resumed the long-term trend towards lower poverty rates that characterized the four or five decades before the debt crisis. According to ECLAC estimates for the region as a whole, the poverty rate fell from around 48% in 1990 to about 35% in 2007 and the extreme poverty rate fell from around 22% to about 13% in the same period. Both urban and rural areas shared in the progress on poverty reduction. As table 1 shows, the reduction in urban poverty rates is a generalized phenomenon occurring in most countries in the region with data available between the early 1990s and 2006. The reduction in poverty is significant —nearly 9 percentage points for the simple average of our 12 countries— and particularly so in the largest countries, since Brazil experienced a fall of over 11 percentage points and Mexico a decline of over 15 percentage points. There are only three exceptions to this pattern: Uruguay, the Plurinational State of Bolivia and especially Paraguay with, as we shall see, a heavy drop in GDP per worker and a significant increase in inequality over the period.

TABLE 1

Latin America (12 countries): Urban poverty rates, 1990-2006

(Percentages)

Country	1990	2006	Change
Chile	38.5	13.9	-24.6
Ecuador	62.1	39.9	-22.2
Mexico	42.1[c]	26.8	-15.3
Brazil	41.2	29.9	-11.3
Panama	32.7[b]	21.7	-11.0
Honduras	70.4	59.4	-11.0
Venezuela (Bol. Rep. of)[a]	39.8	30.2	-9.6
Costa Rica	24.9	18.0	-6.9
Argentina	21.2	19.3	-1.9
Uruguay	17.9	18.8[d]	0.9
Bolivia (Plur. State of)	52.6[c]	53.8[e]	1.2
Paraguay	43.2	48.5[d]	5.3
Average	*40.6*	*31.7*	*-8.9*

Source: Economic Commission for Latin America and the Caribbean (ECLAC), *Social Panorama of Latin America, 2007* (LC/G.2351-P/E), Santiago, Chile, 2007. United Nations publication, Sales No. E.07.II.G.124.

[a] National poverty rate.
[b] 1991.
[c] 1989.
[d] 2005.
[e] 2004.

Along with the reduction of poverty, social indicators have continued to improve (table 2). Life expectancy is up by almost eight years since 1980-1985 and infant mortality has fallen by more than 50%. Illiteracy has been halved and is down to less than 13% while school enrolments are up at all levels of

TABLE 2

Latin America and the Caribbean: health and education indicators

	1980-1985	2000-2005
Life expectancy at birth	65.4	73.1
Infant mortality rate[a]	57.5	24.2
Illiteracy rate (%)	24.2	12.8

	Around 1990	Around 2004
Gross enrolment ratios		
Primary level[b]	103.1	112.2
Secondary level[b]	49.4	74.6
Tertiary level[c]	19.1	30.5

Source: Economic Commission for Latin America and the Caribbean (ECLAC) and World Bank, EdStats.

[a] Per 1,000 births.
[b] Simple average for 17 Latin American countries.
[c] Simple average for 16 Latin American countries.

education, and very significantly so at the secondary and tertiary levels (primary school enrolments were already very high at the beginning of the period).

Meanwhile, growth performance has been disappointing. As can be seen in table 3, total GDP growth and per capita GDP growth since 1981 fell below half their rates in the period 1960-1981 (2.5% against 5.2% in the case of GDP growth). The performance since 1990, following the end of the debt crisis, has been slightly better but still well below the record over 1960-1981 (3.2% against 5.2%). The growth performance of GDP per worker has been even poorer, with a growth rate of -0.3% per year over 1981-2006 and 0.6% from 1990 to 2006. Latin America is lagging behind the rest of the world: in 1981 its GDP per capita was 20% above the world average, but by 2006 GDP per capita was 11% below the world average (table 4).

In our sample of countries, there is only one outlier to this pattern of very slow growth in GDP per worker—Chile, with an annual growth rate of nearly 4% over the period 1990-2006. In the rest of the countries, the annual growth rate was 1.6% or less and in four of them GDP per worker actually fell during this period

(Bolivarian Republic of Venezuela, Ecuador, Honduras and Paraguay).

The average Gini coefficient for the 12-country sample remained nearly constant from 1990 to 2006 (a decline of 0.3 percentage points, see table 6). Income concentration increased in five countries, especially

TABLE 3

Latin America: economic growth
(Percentages, constant 2000 dollars)

Annual growth rate	1960-1981	1981-2006	1990-2006
GDP growth	5.2	2.5	3.2
GDP per capita	2.6	0.8	1.6
GDP per worker	--	-0.3	0.6

Source: prepared by the author on the basis of World Bank, World Development Indicators [online database].

TABLE 4

Latin America: per capita GDP[a] as a ratio of per capita GDP in other regions of the world

Region	1981	1990	2006
East Asia and the Pacific	6.00	3.31	1.34
South Asia	5.41	3.75	2.62
Sub-Saharan Africa	3.37	3.46	4.29
Middle East and North Africa	1.69	1.48	1.38
World	1.20	0.97	0.89
Europe and Central Asia[b]	--	0.79	0.91
High-income OECD countries	0.36	0.26	0.25

Source: prepared by the author on the basis of World Bank, World Development Indicators [online database].

[a] Per capita GDP expressed in year 2000 international dollars.
[b] Developing countries.

TABLE 5

Latin America: annual growth rate of GDP[a] per worker, 1990-2006
(Percentages)

Country	Growth rate[b]
Chile	3.8
Panama	1.6
Argentina	1.6
Costa Rica	1.4
Uruguay	0.7
Mexico	0.7
Bolivia (Plur. State of)	0.2
Brazil	0.2
Ecuador	-0.6
Honduras	-0.9
Venezuela (Bol. Rep. of)	-1.1
Paraguay	-1.4
Simple average	*0.5*

Source: prepared by the author on the basis of World Bank, World Development Indicators [online database].

[a] GDP is measured at purchasing power parity (PPP) in year 2000 international dollars.
[b] Growth rates for each country are calculated over the period for which information on urban poverty rates is available (table 1).

TABLE 6

Gini concentration coefficients in Latin America
(Percentages)

Country	Around 1990	Around 2006	Change
Paraguay	44.7	50.4	5.7
Costa Rica	41.9	46.9	5.0
Ecuador	46.1	50.5	4.4
Argentina	50.1	51.9	1.8
Bolivia (Plur. State of)	53.8	55.4	1.6
Brazil	60.6	59.3	-1.3
Chile	54.2	51.7	-2.5
Panama	53.0	50.1	-2.9
Venezuela (Bol. Rep. of)	47.1	44.1	-3.0
Honduras	56.1	52.7	-3.4
Uruguay	49.2	45.2	-4.0
Mexico	53.0	47.8	-5.2
Average	50.8	50.5	-0.3

Source: Economic Commission for Latin America and the Caribbean (ECLAC), *Social Panorama of Latin America, 2007* (LC/G.2351-P/E), Santiago, Chile, 2007. United Nations publication, Sales No. E.07.II.G.124.

Paraguay, Costa Rica and Ecuador, and declined in seven, especially Honduras, Uruguay and Mexico. There is some apparent inverse correlation between the change in the Gini coefficient and the reduction in poverty: Mexico, with the largest decline in inequality, is one of the countries with the largest reductions in poverty while Paraguay, with the largest increase in inequality, is the country with the largest rise in the poverty rate. However, the overall stability of income concentration suggests that the evolution of inequality is unlikely to explain much of the decline in poverty.

Social spending has increased as a percentage of GDP in the region, a possible consequence of the restoration or establishment of democratic regimes in Latin America.[3] Social spending has increased across the board among the 12 countries in table 7, with the exception of Ecuador, and the (simple) average increase has been 2.6 percentage points. This increase seems, however, rather too modest to explain much of the reduction of poverty in the region. Moreover, and somewhat puzzlingly, there is no clear pattern of correlation between higher social spending and lower poverty. The Plurinational State of Bolivia, with the largest increase, is one of the few countries that recorded an increase in the poverty rate, while

Ecuador, with a decline in social spending, features the second-largest reduction in poverty.

The data on the demographic transition, which began in most Latin American countries before 1990, are also worth recalling (table 8). Between the late 1960s and the mid-2000s, the fertility rate fell from 5.6% to around 2.4% and the population growth rate from 2.6% to around 1.3% per year. From 1970 to 2005, the percentage of the total population under 15 years of AGE declined from 42.4% to 29.6% as a result of a dramatic fall in the growth of the under-15 population from 2.6% per year in the 30 years before 1980 to 0.1% per year today. As a result of these

TABLE 7

Latin America (12 countries): social spending as a percentage of GDP

Country	1990-1991	2004-2005	Change
Bolivia (Plur. State of)	9.0	18.6	9.6
Paraguay	3.2	7.9	4.7
Honduras	7.5	11.6	4.1
Brazil	18.1	22.0	3.9
Mexico	6.5	10.2	3.7
Venezuela (Bol. Rep. of)	8.8	11.7	2.9
Costa Rica	15.6	17.5	1.9
Panama	16.2	17.2	1.0
Uruguay	16.8	17.7	0.9
Chile	12.7	13.1	0.4
Argentina	19.3	19.4	0.1
Ecuador	7.4	6.3	-1.1
Simple average	11.8	14.4	2.6

Source: Economic Commission for Latin America and the Caribbean (ECLAC), *Social Panorama of Latin America, 2007* (LC/G.2351-P/E), Santiago, Chile, statistical appendix table 43. United Nations publication, Sales No. E.07.II.G.124.

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[3] On the democratic dividend in Latin America and its effects on social spending, see Ocampo (2004). More generally, on the positive effects of democracy on social spending, see Lindert (1994) and Brown and Hunter (1999). For a contrarian view that argues that democracies spend the same or somewhat less on social programmes as economically and demographically similar non-democracies, see Mulligan and Gil (2002).

TABLE 8

The demographic transition in Latin America

	1965-1970	1975-1980	1985-1990	1995-2000	2005-2010
Total fertility rate	5.6	4.5	3.4	2.7	2.4
Population growth rate (%)	2.6	2.4	1.9	1.6	1.3
	1970	1980	1990	2000	2005
Population under 15[a]	42.4	39.7	36.1	31.7	29.6
Dependency ratio[b]	87.3	78.9	68.9	58.8	55.0
Labour participation ratio (%)	NA	34.7	39.1	44.1	45.9

Source: Latin American and Caribbean Demographic Centre (CELADE) – Population Division of ECLAC, *Demographic Bulletin*, No. 69, *Latin America and Caribbean: Population Estimates and Projections, 1950-2050* (LC/G.2152-P), Santiago, Chile, 2002; and World Bank, World Development Indicators [online database].

[a] As share of the total population.
[b] (Population aged 0-14 + population aged 65 and over)/population aged 15-64*100.

demographic changes, the dependency ratio declined from 87.3% to 55% between 1970 and 2005. With the decline in the fertility rate, the female labour force participation ratio increased, further contributing to the increase in the overall activity rate resulting from the decline in the dependency ratio.

The overall picture conceals important differences across countries in the region, however. These differences are presented in table 9, which shows the evolution of the dependency ratio and of the share of the population under 15 in the 12-country sample. At one extreme there is a group of five countries (Bolivarian Republic of Venezuela, Brazil, Ecuador, Honduras and Mexico) with a reduction in the dependency ratio of more than 15 percentage points and a reduction of over 7 percentage points in the share of the population under 15 since 1990. With the exception of Brazil, these are countries that had very young populations at the beginning of the period, so that the dependency ratio was initially relatively high and there was scope for the demographic transition to reduce it sharply. At the other extreme, there is a group of four countries (Argentina, Chile, the Plurinational State of Bolivia and Uruguay) with relatively small declines in the dependency ratio (especially Chile and Uruguay) as well as in the share of the population under 15. With the exception of the Plurinational State of Bolivia, these are the countries which had the oldest populations at the beginning of the period and where the demographic transition was already well advanced. They therefore had less potential to reduce the dependency ratio than the previous group of countries. Among the rest of the countries, Costa Rica and Panama show medium-level initial dependency ratios and a medium-sized reduction in this ratio during the period. Paraguay, like the Plurinational State of Bolivia, is an outlier with a relatively high dependency ratio in 1990 but a reduction that is significantly less than the average for the first group of countries.

TABLE 9

Latin America (12 countries): dependency ratio and share of the population under AGE 15, 1990-2006
(Percentages)

	Dependency ratio			Share of population under AGE 15		
	Around 1990	Around 2006	Change[a]	Around 1990	Around 2006	Change[a]
Mexico	76.2	55.6	-20.6	39.3	30.3	-9.0
Honduras	93.0	73.3	-19.7	45.2	38.5	-6.7
Ecuador	75.7	56.8	-18.9	38.9	31.0	-7.9
Brazil	64.1	47.6	-16.5	34.7	26.3	-8.4
Venezuela (Bol. Rep. of)	71.8	56.7	-15.1	38.2	31.2	-7.0
Paraguay	84.1	69.9	-14.2	42.0	37.4	-4.6
Costa Rica	68.6	55.0	-13.6	36.5	29.8	-6.7
Panama	66.5	53.2	-13.3	34.9	28.6	-6.3
Argentina	65.5	57.3	-8.2	30.6	26.5	-4.1
Bolivia (Plur. State of)	81.8	74.4	-7.4	41.4	38.5	-2.9
Chile	56.7	52.0	-4.7	30.1	26.3	-3.8
Uruguay	60.2	59.6	-0.6	26.0	24.3	-1.7
Average	*72.0*	*59.3*	*-12.7*	*36.5*	*30.7*	*-5.8*

Source: Latin American and Caribbean Demographic Centre (CELADE) – Population Division of ECLAC, *Demographic Bulletin*, No. 69, *Latin America and Caribbean: Population Estimates and Projections, 1950-2050* (LC/G.2152-P), Santiago, Chile, 2002.

[a]   Changes for each country are calculated over the period for which information on urban poverty rates is available (table 1).

III

Empirical estimation

This section presents the results of a regression analysis of the model outlined in the previous section for the 12-country sample. For each of these 12 countries, observations are available for four time periods: around 1990, around 1995, around 2000 and around 2006.

As noted earlier, the model to be estimated makes the urban poverty rate dependent on the level of GDP per worker (in constant PPP dollars, GDPw), the degree of inequality in the distribution of income as measured by the Gini concentration coefficient (GINI), the level of government social spending (SG) and the AGE structure of the population (AGE). Two indicators of the level of government social spending are used: the share of social spending in GDP (SG%GDP) and the level of social spending per capita (SG per capita). Two indicators of the AGE structure of the population are considered: the dependency ratio (DEP ratio) and the share of the

population under 15 (POP<15). We thus have four regression equations to be estimated (table 10).

Table 10 presents the ordinary least square (OLS) estimates of the model. As can be seen in the table, all the coefficients have the expected signs and, with one exception (social spending per capita in equation 4), are statistically significant at the usual levels. In particular, an increase in GDP per worker reduces poverty, an increase in inequality increases it, an increase in social spending reduces it, and an increase in the dependency ratio or in the share of the population under 15 years increases it.

Table 11 presents the estimates of a fixed effects model where the constant term has been dropped and a vector of dummy variables for each country has been included to control for country-specific effects. In addition to the four specifications described above,

TABLE 10

Latin America (12 countries): determinants of the urban poverty rate (OLS estimates)[a] [b]

	(1)	(2)	(3)	(4)
Constant	-20.7	-21.09	-32.03[c]	-35.17[c]
	(1.29)	(1.30)	(1.79)	(1.89)
GDPw	-1.03[e]	-0.96[e]	-0.54[c]	-0.77[d]
	(5.39)	(4.82)	(1.83)	(2.63)
GINI	1.08[e]	0.92[e]	0.86[e]	0.70[e]
	(5.03)	(4.23)	(3.59)	(2.94)
SG%GDP	-1.20[e]	-0.99[e]		
	(5.21)	(3.84)		
SG per capita			-0.016[d]	-0.007
			(3.35)	(1.19)
DEP ratio	0.51[e]		0.62[e]	
	(4.06)		(4.51)	
POP<15		1.14[e]		1.51[e]
		(4.01)		(4.43)
Adj. R^2	0.85	0.84	0.80	0.80

Source: prepared by the author on the basis of regression exercises using the data cited in tables 1, 5, 6, 7, 8 and 9.

[a] Number of observations = 48.
[b] Absolute t-values are shown in parentheses.
[c] Significant at 10%.
[d] Significant at 5%.
[e] Significant at 1%.

TABLE 11

Latin America (12 countries): determinants of the urban poverty rate (fixed effects model)[a] [b]

	(1)	(2)	(3)	(4)	(5)	(6)
GDPw	-1.24[e]	-1.08[e]	-1.38[d]	-1.23[d]	-1.25[e]	-1.08[e]
	(3.32)	(2.80)	(2.55)	(2.30)	(3.40)	(2.83)
GINI	0.71[d]	0.66[c]	0.74[d]	0.69[c]	0.73[d]	0.68[c]
	(2.06)	(1.91)	(2.15)	(2.00)	(2.15)	(1.99)
SG%GDP	-0.16	-0.22				
	(0.38)	(0.51)				
SG per capita			0.004	0.005		
			(0.33)	(0.40)		
DEP ratio	0.51[e]		0.58[e]		0.54[e]	
	(3.48)		(3.60)		(4.36)	
POP<15		1.16[e]		1.35[e]		1.25[e]
		(3.39)		(3.49)		(4.25)
Adj. R^2	0.96	0.96	0.96	0.96	0.96	0.96

Source: prepared by the author on the basis of regression exercises using the data cited in tables 1, 5, 6, 7, 8 and 9.

[a] Number of observations = 48.
[b] Absolute t-values are shown in parentheses.
[c] Significant at 10%.
[d] Significant at 5%.
[e] Significant at 1%.

two equations which drop the social spending variables were estimated, given that these variables turned out to be insignificant in the other specifications. The results, as can be seen from the table, are very similar to those

in table 10 except for the lack of significance of the social spending indicators. The rest of the coefficients have the expected signs and in all cases are statistically significant at the usual levels.

IV

Contributions to the reduction in the poverty rate

How much of the reduction in the poverty rate in Latin America can be explained by each of the different determinants? Tables 12 and 13 address this question using the models estimated in the previous section. Table 12 presents the contributions to the predicted reduction in the poverty rate in each country (as well as the Latin American simple average) using regression equation (5) in table 11, which considers the role of growth in GDP per worker, the change in inequality and the change in the dependency ratio (results do not differ significantly when using equation 6 in table 11, which considers the change in the share of the population under 15). For example, the second column of table 12 shows by how much poverty would have

fallen as a result of the increase in GDP per worker in the absence of changes in the other determinants of the poverty rate.

Several remarkable conclusions emerge from the table. First, for the average of the 12 Latin American countries, demographic change, as measured by the fall in the dependency ratio, is by far the main contributor to the reduction in the poverty rate. Out of an average predicted reduction in poverty of 9.7 percentage points (the actual reduction being 8.9 percentage points), the fall in the dependency ratio contributed 6.9 percentage points (71% of the total) compared to only 2.6 percentage points for the growth in GDP per worker (27% of the total) and 0.2 percentage points for the fall in inequality (2% of the total). The absolute contribution of demographic change is of course particularly remarkable in those countries where the fall in the dependency ratio was most pronounced. In the Bolivarian Republic of Venezuela, Brazil, Ecuador, Honduras and Mexico, the fall in the dependency ratio contributed more than 8 percentage points to the reduction in the poverty rate. By contrast, demographic change is much less influential in the Plurinational State of Bolivia and those countries which were already well advanced in the demographic transition at the beginning of the period considered (Uruguay, Chile and Argentina). In these countries the poverty rate increased (the Plurinational State of Bolivia and Uruguay) or, when it fell, growth in GDP per worker was the main contributor to the reduction in poverty (Argentina and Chile). This is especially true in the case of Chile, the country with the largest reduction in the poverty rate, where growth contributed over 15 percentage points to poverty reduction. Growth also had a significant impact (although not as large as that of demographic change) in two other countries: Costa Rica and Panama. Paraguay, the country with the largest increase in the poverty rate, is in a separate category where relatively large negative contributions from the fall in GDP per worker and the increase in

TABLE 12

Latin America (12 countries): contributions of different determinants to the reduction in the poverty rate[a]

(Percentage points, based on fixed effects model)

	Growth[b]	Inequality[c]	Demographic changed[d]
Mexico	3.4	3.8	11.1
Honduras	-1.4	2.5	10.6
Ecuador	-1.1	-3.2	10.2
Brazil	0.5	0.9	8.9
Venezuela (Bol. Rep. of)	-3.1	2.2	8.2
Paraguay	-2.7	-4.1	7.7
Costa Rica	5.4	-3.6	7.3
Panama	4.1	2.1	7.2
Argentina	8.1	-1.3	4.4
Bolivia (Plur. State of)	0.2	-1.2	4.0
Chile	15.2	1.8	2.5
Uruguay	2.1	2.9	0.3
Average	*2.6*	*0.2*	*6.9*

Source: prepared by the author on the basis of the results obtained from regression equation (5) given in table 11.

[a] Equation: UPOV = -1.25 GDPw + 0.73 GINI + 0.54 DEPratio.
[b] Measured by increase in GDP per worker.
[c] Measured by fall in the Gini coefficient.
[d] Measured by fall in the dependency ratio.

inequality were partly offset by a fairly large positive impact from demographic change.

The counterpart of the importance of demographic change in poverty reduction is of course the limited relevance of growth and changes in inequality. Poverty would have fallen by 2.6 percentage points on average as a result of the increase in GDP per worker (in the absence of changes in the other determinants) and by 0.2 percentage points as a result of the reduction in inequality. As the second column of the table reveals, poverty would have fallen significantly as a result of growth only in the cases of Chile (where the reduction of poverty due to growth is 15.2 percentage points) and Argentina. Even in this last case, the seemingly large contribution of growth is in fact the result of the equation overpredicting the fall in poverty during the period considered. Thus, with the exception of Chile, poverty reduction in the midst of slow growth is indeed a puzzle in the context of Latin America's recent socio-economic development. As for changes in inequality, shown in the third column, there are no exceptions to the conclusion that these have had a minor role in poverty reduction.

Table 13 presents the contributions to the predicted reduction in the poverty rate in each country (as well as the Latin American simple average) using regression equation (1) in table 10, the one with the best fit, which considers the role of growth in GDP per worker, the change in inequality, the change in social spending as a percentage of GDP and the change in the dependency ratio.

The main findings are similar to those presented in table 12: the large contribution of demographic change to the reduction of the poverty rate and the limited relevance of the increase in GDP per worker and, especially, the change in inequality. The main difference is of course that in this equation the change in social spending has a significant effect on poverty reduction, larger in fact than the contributions of growth and inequality although much smaller than that of demographic change. It is also worth noting that the average contribution of social spending is pulled up by its relatively large contribution in the Plurinational State of Bolivia and Paraguay, two of the three countries where the urban poverty rate increased. Excluding these two countries reduces the average contribution of social spending to 2.1 percentage points, the same as the average contribution of the increase in GDP per worker.

TABLE 13

Latin America (12 countries): contributions to the reduction in the poverty rate[a]

(Percentage points, based on ols estimates)

	Growth[b]	Inequality[c]	Social spending[d]	Demographic change[e]
Mexico	2.8	5.6	4.4	10.5
Honduras	-1.2	3.7	4.9	10.1
Ecuador	-0.9	-4.8	-1.3	9.6
Brazil	0.4	1.4	4.7	8.4
Venezuela (Bol. Rep. of)	-2.6	3.3	3.5	7.7
Paraguay	-2.2	6.2	5.6	7.2
Costa Rica	4.4	-5.4	2.3	6.9
Panama	3.4	3.1	1.2	6.8
Argentina	6.7	-2.0	0.1	4.2
Bolivia (Plur. State of)	0.1	-1.7	11.5	3.8
Chile	12.6	2.7	0.5	2.4
Uruguay	1.8	4.3	1.1	0.3
Average	*2.1*	*0.3*	*3.2*	*6.5*

Source: prepared by the author on the basis of the results obtained from regression equation (1) given in table 10.

[a] Equation: UPOV = -20.7 -1.03 GDPw + 1.08 GINI - 1.20 SG%GDP + 0.51 DEPratio.
[b] Measured by increase in GDP per worker.
[c] Measured by fall in the Gini coefficient.
[d] Measured by increase in social spending as percentage of GDP.
[e] Measured by fall in the dependency ratio.

V

Conclusions

The results presented in this paper have implications for the present and future of poverty reduction in Latin America. For the present because they suggest that, had it not been for the demographic dividend, poverty reduction would have been much slower than it actually was, and for the future because the demographic transition is now largely over: at around 2.4, the fertility rate is near the 2.1 replacement level and is not expected to go below replacement in the future, while the dependency ratio will not fall by more than a few percentage points and will eventually start rising (towards 2025) as the elderly come to represent an increasing fraction of the population. Thus, from now on the effects of the demographic dividend on poverty will largely disappear. The resumption of faster growth in GDP per worker, the reduction of income inequality and quite possibly further increases in social spending will be imperative if the region is to continue to record a significant reduction in poverty rates.

APPENDIX 1

Reciprocal causation between demographic change and the poverty rate

This appendix addresses the possibility of reverse causation between demographic changes and changes in the poverty rate, i.e., the possibility that changes in the poverty rate cause demographic changes through their effects on the fertility rate rather than vice versa. In doing so, it follows a similar procedure to that adopted in Eastwood and Lipton (1999). This is to include as regressors in the poverty rate equation the contemporaneous change in the fertility rate together with the change in fertility lagged 10 years. Then, if causation runs primarily from poverty to the fertility rate, the change in poverty should be more strongly associated with the contemporaneous change in the fertility rate than with the lagged change in fertility. Conversely, if the change in poverty is more strongly associated with the lagged change in fertility we can conclude that causation runs mainly from fertility to poverty through the demographic changes triggered by the change in fertility.

Table a.1 shows the results of this procedure for a cross-section of 17 Latin American countries with information on urban poverty, the fertility rate and GDP per worker.[4] The contemporaneous change in fertility has a positive and significant effect on the change in poverty when the lagged change in fertility is absent from the equation. Yet when both variables are included as regressors the strongest and only statistically significant association is between the change in poverty and the lagged change in fertility, clearly suggesting that causality runs primarily from demographic change to poverty.

TABLE A.1

Latin America (17 countries): poverty and fertility equations (OLS estimates)[a] [b]

	(1)	(2)
Constant	5.14	7.82[c]
	(1.32)	(2.60)
Δ GDPW	-32.12[d]	-31.34[d]
	(3.60)	(4.70)
Δ Fertility rate	11.54[c]	1.96
	(2.69)	(0.46)
Δ Fertility rate lagged 10 years		9.54[d]
		(3.48)
Adj. R^2	0.44	0.69

[a] Number of observations = 17. The dependent variable is the change in the urban poverty rate from around 1990 to around 2005.
[b] Absolute t-values are shown in parentheses.
[c] Significant at 5%.
[d] Significant at 1%.

[4] Argentina, Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Plurinational State of Bolivia and Uruguay.

APPENDIX 2

Data sources and definitions

This appendix gives the definitions and data sources of the variables used in the econometric analysis.

Dependency ratio: ((population aged 0-14 + population aged 65 and over)/population aged 15-64)*100. Latin American and Caribbean Demographic Centre (CELADE) – Population Division of ECLAC, *Demographic Bulletin*, No. 69, *Latin America and Caribbean: Population Estimates and Projections, 1950-2050* (LC/G.2152-P), Santiago, Chile, 2002, table 10.

Fertility rate: total fertility rate. Latin American and Caribbean Demographic Centre (CELADE) – Population Division of ECLAC, *Demographic Bulletin*, No. 69, *Latin America and Caribbean: Population Estimates and Projections, 1950-2050* (LC/G.2152-P), Santiago, Chile, 2002, table 3.

GDP per worker: GDP is at PPP (2000 international dollars) divided by total labour force. Source: *World Bank, World Development Indicators*, Washington, D.C.

Gini: Gini concentration of income coefficient. Economic Commission for Latin America and the Caribbean (ECLAC), *Social Panorama of Latin America, 2007* (LC/G.2351-P/E), Santiago, Chile. United Nations publication, Sales No. E.07.II.G.124.

Population under 15 years of AGE (percentages). Latin American and Caribbean Demographic Centre (CELADE) – Population Division of ECLAC, *Demographic Bulletin*, No. 69, *Latin America and Caribbean: Population Estimates and Projections, 1950-2050* (LC/G.2152-P), Santiago, Chile, 2002, table 9.

Social spending: government social spending as percentage of GDP or per capita. Includes public spending on education, health and nutrition, social security, employment and social welfare, housing, and water and sewerage systems. Economic Commission for Latin America and the Caribbean (ECLAC), *Social Panorama of Latin America, 2007* (LC/G.2351-P/E), Santiago, Chile. United Nations publication, Sales No. E.07.II.G.124. The data shown for the Plurinational State of Bolivia for 1989 are estimates by the author.

Urban poverty: population under the poverty line (as percentages) in urban areas. Economic Commission for Latin America and the Caribbean (ECLAC), *Social Panorama of Latin America, 2007* (LC/G.2351-P/E), Santiago, Chile. United Nations publication, Sales No. E.07.II.G.124. For the Bolivarian Republic of Venezuela, the poverty rate refers to the total poverty rate.

(Original: English)

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