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The Social Impact of Structural Adjustment in Bolivia

by
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The Social Impact of Structural Adjustment in Bolivia*

Abstract

This paper provides an account of the evolution of poverty and inequality during adjustment in Bolivia, covering the period 1985–99. It turns out that urban poverty declined somewhat after the initial stabilization phase that followed the hyperinflation in 1985. A similar evolution of per capita income suggests a positive impact of growth on urban poverty, although the correlation between the two variables is rather low in international perspective. Urban inequality as measured by the Gini coefficient does not exhibit a clear long-term trend upward or downward, but a rising premium for high-skilled workers indicates increasing disparities in the urban labor market. For rural areas, the scant evidence available points towards persistently high poverty levels and a widening rural-urban gap.

Keywords: Poverty, Inequality, Structural Adjustment, Bolivia

JEL–classification: D3, I3, O1

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I. INTRODUCTION

There is an ongoing debate about the success or failure of structural adjustment programs under the auspices of the IMF and the World Bank (for an overview, see Thiele and Wiebelt 2000). This debate does not only focus on whether the programs have been able to restore macroeconomic equilibrium and initiate a sustained process of economic growth, but also on their impact on poverty and inequality. Bolivia is one of the few adjusting countries where significant achievements in terms of macroeconomic stabilization and structural reforms are beyond doubt. It is less evident whether adjustment in Bolivia has also been associated with lasting improvements in social conditions. This paper attempts to shed some light on this issue by providing a detailed account of the country's social development, starting in 1985, when a hyperinflation made a stabilization program inevitable, which was later complemented by a series of structural adjustment programs.

In assessing the likely social consequences of Bolivia's adjustment efforts, two basic concepts of measuring poverty and inequality are distinguished. One is monetary, based on income or consumption, the other is non-monetary, based on unsatisfied basic needs. Trends in various indicators corresponding to these two concepts are presented in sections II and III, respectively. Section IV deals

with the question of what might have been the major driving forces behind the observable evolution of poverty and inequality, focussing on possible links between trends in social indicators and the macroeconomic and structural reforms Bolivia has undertaken. This is not to deny that microeconomic factors unrelated to structural adjustment may also have affected poverty and inequality. Yet, since many of these factors are covered elsewhere (e.g. World Bank 2000a; Andersen 2001), they will not be discussed here. The paper closes with suggesting some steps which might be taken to enhance the opportunities for the poor to participate in the gains from structural adjustment.

II. THE EVOLUTION OF INCOME POVERTY AND INEQUALITY

To track changes in income poverty for Bolivia, three different indices have been used, which all belong to a class of poverty measures developed by Foster, Greer and Thorbecke (1984).[1] The first measure is the *headcount ratio* or poverty incidence, which is simply the proportion of the population with incomes (or consumption) below the poverty line. The second measure, which captures the depth of poverty, is the *poverty gap*. It estimates the average

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1 For a derivation of these poverty measures, see Appendix 1.

distance separating the poor from the poverty line as a proportion of that line. The third measure is the *squared poverty gap* or poverty severity index. It does not only take into account the shortfall of income or consumption of the poor vis-à-vis the poverty line, but also the inequality among the poor by giving higher weights to the poorest.

Table 1 provides an overview of the studies that have measured poverty for urban Bolivia, covering the period 1986–99. It has to be noted that results cannot easily be compared across researchers because they use different poverty lines, welfare indicators (income vs. consumption) and units of analysis (individuals vs. households). These choices can have a significant impact on measured poverty. Household level poverty measures, for example, tend to be lower than individual level poverty measures because larger households tend to be poorer. Furthermore, income may exhibit large fluctuations over the life cycle and, particularly in rural households, even from year to year, whereas consumption expenditures tend to evolve more steadily as people smooth them via saving and dissaving.[2]

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[2] Because of this property consumption should be chosen as the preferred welfare indicator whenever household surveys contain appropriate consumption modules.

A distinction is made between *extreme poverty*, which refers to the population below a poverty line equal to the costs of a basic food basket, and *moderate poverty*, which is based on a poverty line that additionally includes some basic non-food items. For the stabilization phase (1986–89) following the hyperinflation of 1985, the only existing study by Psacharopoulos et al. (1992) suggests a slight increase in both extreme and moderate poverty, according to all three poverty measures. In contrast, the evidence for the subsequent decade points towards moderately declining poverty levels, with one notable exception: those two studies where consumption is employed as a welfare indicator (World Bank 1996; Vos et al. 1998) do not detect a fall in poverty between 1989 and 1993. The most likely explanation for this result is that poor households decided to postpone adjustments in consumption spending until they were sure that the rise in their incomes was not merely transitory. Overall, urban poverty has declined somewhat during the whole adjustment period. As a central tendency estimate one might regard a drop in the headcount index of about 5 percentage

Table 1 — Trends in Urban Poverty, 1986–1999[a]

Source	Unit of analysis	Unit of measurement[c]	Poverty measure	1986	1989	1990	1991	1992	1993	1994	1995	1996	1997	1999, March	1999, Nov.
Extreme Poverty Incidence[b]															
Antelo (2000)	Household	Adj. income	Headcount			24.5			20.9				19.3		
CEPAL (1994)	Household	Adj. income	Headcount		22.1			17.5							
CEPAL (1999)	Household	Adj. income	Headcount			20.0				17.0			16.0		
Molina et al. (1999)	Household	Adj. income	Headcount			26.2	21.1	24.0	22.3	18.0	20.8				
Pereira/Jimenez (1998)	Household	Adj. income	Headcount			26.0				17.0					
Psacharopoulos et al. (1992)	Individual	Adj. income	Headcount	22.5	23.2										
			Poverty gap	7.6	9.3										
			Sq. poverty gap	3.6	5.4										
Vos et al. (1998)	Individual	Income	Headcount		46.0				30.0		32.2				
	Individual	Consumption	Headcount		27.9				28.3						
			Poverty gap		8.2				8.5						
			Sq. poverty gap		3.4				3.5						
World Bank (1996)	Individual	Consumption	Headcount		28.1				29.3						
	Household	Consumption	Headcount		21.8				22.4						
World Bank (2000a)	Individual	Adj. income	Headcount						25.5				21.5	23.4	21.6
			Poverty gap						11.4				7.4	8.9	7.5
			Sq. poverty gap						7.7				3.7	5.1	3.9
Poverty Incidence[b]															
Antelo (2000)	Household	Adj. income	Headcount			53.3			49.1				46.9		
CEPAL (1994)	Household	Adj. income	Headcount		49.6			45.7							
CEPAL (1999)	Household	Adj. income	Headcount			47.0				46.0			44.0		
Jimenez/Yañez (1997)	Household	Adj. income	Headcount			53.3					47.8				
Molina et al. (1999)	Household	Adj. income	Headcount			52.4	46.8	50.4	48.1	45.3	47.1				
			Poverty gap			23.7	20.1	22.3	21.2	19.0	20.7				
			Sq. poverty gap			13.6	11.0	12.5	11.8	10.2	11.5				

Table 1 continued

Source	Unit of analysis	Unit of measurement[c]	Poverty measure	1986	1989	1990	1991	1992	1993	1994	1995	1996	1997	1999, March	1999, Nov.
Pereira/Jimenez (1998)	Individual	Adj. income	Headcount			53.0				44.9					
			Poverty gap			24.9				19.0					
			Sq. poverty gap			13.6				9.6					
Psacharopoulos et al. (1992)	Individual	Adj. income	Headcount	51.1	54.0										
			Poverty gap	22.8	24.4										
			Sq. poverty gap	13.1	14.6										
UDAPSO (1995)	Household	Consumption	Headcount		52.9			53.3							
Vos et al. (1998)	Individual	Income	Headcount		70.8				56.9		59.3				
			Poverty gap		37.4				27.5						
			Sq. poverty gap		26.0				16.6						
	Individual	Consumption	Headcount		60.9				60.3						
			Poverty gap		25.2				25.6						
			Sq. poverty gap		13.3				13.6						
World Bank (1996)	Individual	Consumption	Headcount		60.1				61.6						
	Household	Consumption	Headcount		51.6				52.6						
World Bank (2000a)	Individual	Adj. income	Headcount						52.0				50.7	50.0	47.0
			Poverty gap						24.4				21.0	21.7	11.4
			Sq. poverty gap						15.3				11.5	12.7	10.8
Wodon et al. (2000)	Individual	Income	Headcount	70.0								64.0			

a Only the main cities are covered, which account for about 80 percent of the total urban population. – b *Extreme poverty incidence* relates to the share of the population below a poverty line equal to the costs of a basic food basket, while *poverty incidence* is based on a poverty line that additionally includes the costs of a basic non-food basket. – c Adj. income: Income adjusted for underreporting.

points, which has reduced the share of extremely poor people from above to below 20 percent and the share of moderately poor people from above to below 50 percent. Vos et al. (1998) and Wodon et al. (2000) obtain much higher poverty estimates because they use unadjusted income, whereas in all other studies income data from surveys are adjusted upwards so as to account for underreporting of income.[3]

Evidence on rural poverty, which is presented in Table 2, turns out to be very limited. Since household surveys before 1997 did only cover selected rural departments and a low number of households, they were not representative of rural Bolivia, thus precluding any meaningful assessment of the evolution of rural poverty over time. And even the results for 1997 and 1999, which are based on representative surveys, cannot be compared because the 1997 survey uses income and the 1999 survey consumption as a welfare indicator. The only firm conclusion that can be drawn is that poverty in the late 1990s was much more widespread in rural than in urban areas, with the vast majority of the rural population being at least moderately poor, and more than half failing to reach the extreme poverty line.

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[3] Since adjustments for underreporting of income inevitably are crude, higher measurement accuracy is a further reason to prefer consumption as a welfare indicator.

Table 2 — Rural Poverty, 1991–1999

Source	Unit of analysis	Unit of measurement	Poverty measure	1991	1995	1997	1999
Extreme Poverty Incidence							
UDAPSO (1995)	Household	Consumption	Headcount	58.6			
Vos et al. (1998)	Individual	Income	Headcount		73.3		
	Individual	Consumption	Headcount		85.8		
World Bank (1996)	Individual	Consumption	Headcount		79.1		
	Household	Consumption	Headcount		72.7		
World Bank (2000a)	Individual	Income	Headcount			58.2	
			Poverty gap			33.7	
			Sq. poverty gap			24.1	
	Individual	Consumption	Headcount				58.8
			Poverty gap				26.3
			Sq. poverty gap				14.8
Poverty Incidence							
UDAPSO (1995)	Household	Consumption	Headcount	68.8			
Vos et al. (1998)	Individual	Income	Headcount		77.1		
	Individual	Consumption	Headcount		88.3		
			Poverty gap		58.6		
			Sq. poverty gap		44.1		
World Bank (1996)	Individual	Consumption	Headcount		87.7		
	Household	Consumption	Headcount		82.4		
World Bank (2000a)	Individual	Income	Headcount			77.3	
			Poverty gap			48.7	
			Sq. poverty gap			36.4	
	Individual	Consumption	Headcount				81.7
			Poverty gap				45.8
			Sq. poverty gap				30.2

To measure Bolivia's income distribution, most studies have relied on the *Gini index*, the most commonly used summary statistic of inequality, which can take on values between zero (perfect equality) and one (perfect inequality).[4] The main weakness of the Gini index is that it is most sensitive to inequality changes around the median and therefore may not change much when income is redistributed between the upper and lower tail of the income distribution. As a response to this deficiency, some authors present the income shares accruing to different percentiles of the population as additional distributional indicators. One study (World Bank 2000a) also employs an alternative summary statistic, the *Atkinson index*, which allows for putting explicit weights on changes at different points of the distribution. Like the Gini index, the Atkinson index is normalized so as to lie between zero and one, with a higher value indicating higher inequality.[5]

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4 The calculation of the Gini index is shown in Appendix 1.

5 The formula for the Atkinson index is given in Appendix 1.

Table 3 summarizes the evidence on inequality for the period 1985–99. The most striking result appears to be that inequality must have declined quite dramatically right after the end of the hyperinflation. This conclusion can be drawn when one compares the studies by Jemio (2000), who estimates a sharp decline in the Gini index between 1985 and 1989, and by Psacharopoulos et al. (1992), who find that the Gini index remained roughly constant from 1986 to 1989. The significant improvement of the income distribution between 1985 and 1986 suggested by these results is highly plausible because in a situation of hyperinflation poorer segments of the population typically possess much lower means to protect the real value of their income than do wealthier segments.

Apart from the immediate stabilization effect, the evidence on the evolution of urban inequality is inconclusive. For the early 1990s, some studies – most clearly UDAPSO (1995) – detect a widening gap, while others – most clearly CEPAL (1999) – detect a narrowing gap. Likewise, Jemio (2000) and CEPAL (1999) report a deterioration of the income distribution over the mid-1990s, whereas the World Bank (2000a) tends to suggest the opposite. It obtains a constant Gini index but a declining Atkinson index, a discrepancy that may

Table 3 — Trends in Inequality, 1985–1999

Source	Unit of analysis	Unit of measurement	Inequality measure	1985	1986	1989	1990	1993	1994	1995	1996	1997	1999, March	1999, Nov.
Antelo (2000)	Household	Urban income	Share of bottom quintile				4.1	3.9				4.0		
			Share of top quitile				57.3	59.4				58.2		
CEPAL (1999)	Household	Urban income	Gini index			0.48			0.43			0.46		
			Share of poorest 40%			12.1			15.1			13.7		
			Share of top decile			38.2			35.4			37.0		
Jemio (2000)	Household	Urban income	Gini index	0.59		0.43		0.45			0.48			
Molina et al. (1999)	Household	Urban income	Gini index				0.52	0.56	0.53	0.55				
Pereira/Jimenez (1998)	Household	Urban income	Gini index				0.54		0.53					
			Share of bottom quintile				3.3		4.0					
			Share of top quintile				59.7		58.4					
Psacharopoulos et al. (1992)	Individual	Urban income	Gini index		0.52	0.53								
			Share of bottom quintile		3.9	3.5								
World Bank (2000a)	Individual	Urban income	Gini index					0.54				0.53	0.54	0.48
			Atkinson index					0.63				0.44		0.36
			Share of bottom quintile					3.1				3.9		4.1
			Share of top quintile					58.3				58.3		53.7
	Individual	Rural income	Gini index									0.63		
			Share of bottom quintile									1.6		
			Share of top quintile									65.2		
	Individual	Rural consumption	Gini index											0.42
			Share of bottom quintile											5.2
			Share of top quintile											48.0
World Bank (1996)	Individual	Urban consumption	Gini index			0.47		0.48						
	Household	Urban consumption	Gini index			0.47		0.52						
	Individual	Rural consumption	Gini index							0.45				
	Household	Rural consumption	Gini index							0.47				
UDAPSO (1995)	Household	Urban income	Gini index			0.42		0.49						

be due to the fact that the Atkinson index better reflects the increasing income share going to the bottom decile of the population. Finally, between 1997 and 1999, results depend on whether one takes the March 1999 or the November 1999 survey as a base for comparison. Since the decrease in the Gini index by 6 percentage points within less than a year seems implausible and thus probably involves sampling errors, the changes revealed by the November survey should only be seen as a first indication of an improving income distribution.

Overall, there is no clear long-term trend upward or downward, with measured urban inequality always remaining close to a Gini index of 0.5. As for a comparison between rural and urban inequality, the 1997 survey suggests a higher disparity of incomes in rural areas, with a Gini index exceeding 0.6. The much lower Gini index for rural consumption in 1999 cannot be taken as a base for comparison as inequality is typically smaller with consumption than with income. The national Gini index, which also captures the rural-urban income gap, amounted to about 0.57 in 1997 (World Bank 2000a), a very high level viewed from a world-wide perspective, but fairly typical for Latin America.

III. THE NON-MONETARY DIMENSION OF POVERTY

The income- or consumption-based measures introduced in the previous chapter provide an *indirect* way of assessing the command of households over basic commodities. Another option is to measure *directly* how well people are endowed with certain necessities. To this end, Bolivian institutions have constructed an aggregate indicator of unsatisfied basic needs, which will be discussed in section III.1. In section III.2, two individual component parts of this indicator, education and health, will be analyzed in some more detail. These two areas are of particular importance because they not only constitute essential elements of current living conditions, but via their role in human capital formation also determine the prospects for those currently poor to participate in long-run development.

1. The Evolution of an Aggregate Non-Monetary Indicator of Poverty

As a base for constructing a non-monetary indicator of poverty, the so-called *NBI index* (NBI = Necesidades Básicas Insatisfechas), a number of variables in four different categories – housing, basic services, education, and health – were

selected.[6] For each of these variables an index was constructed, which measures the distance between the level of the variable realized in a particular household and a minimum level that is defined to be the norm for satisfying basic needs.[7] In the category of basic services, for example, the kind of fuel used for cooking was measured against the minimum requirement that liquid gas or electricity is available. Finally, using equal weights, the sub-indices for all variables were aggregated to form the overall NBI index of the household. The ultimate objective of the Bolivian government was to establish a poverty map based on the NBI indices, and to use this map as a guide for social policy (Ministerio de Desarrollo Humano 1994).

As Appendix 2 illustrates, the NBI index is based upon a wealth of information about social conditions in Bolivia. A problem with this index is, however, that – like other composite social indicators such as the UNDP Human Development Index – it suffers from serious, if not insurmountable, methodological weaknesses as there is no theoretical framework for aggregating indicators relating to different dimensions of well-being, making any weighting scheme

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6 Surprisingly, the NBI index does not contain a food component, although a sufficient calorie intake may be considered as the most elementary basic need. This omission is probably due to the fact that the censuses for 1976 and 1992, on which the numerical calculation of the NBI index is based, do not provide sufficient information on food consumption.

7 The steps involved in constructing the NBI index, as well as a list of all variables and the minimum levels attached to each of them, are presented in Appendix 2.

arbitrary. The NBI index should, therefore, be interpreted very cautiously, and the main emphasis should be put on analyzing its component parts. When it comes to policy formulation, a focus on individual indicators is necessary, anyway.

Table 4 shows the rural and urban poverty incidence as measured by the NBI index for the years 1976, 1992, and 1998. A very clear picture emerges, with almost no progress in rural areas and a near halving of urban poverty between 1976 and 1998. In the 1990s, the significant drop in the overall NBI index for urban Bolivia reflects significant improvements in all component parts, whereas in rural Bolivia only the provision with health care services improved markedly. All in all, the regional differences are so pronounced that, methodological problems notwithstanding, one can speak of a large and widening rural-urban gap in living conditions.

Table 4 — Share of the Population Poor According to Unmet Basic Needs, 1976–1998

	Overall index	Housing materials	House crowding	Sanitary services	Energy services	Edu-cation	Health
1976[a]							
National	85.5						
Urban	66.3						
Rural	98.6						
1992[a]							
National	69.8	48.9	69.2	73.9	52.6	65.7	53.4
Urban	51.1	21.9	68.0	58.5	21.0	51.0	43.7
Rural	94.0	83.8	70.7	93.7	93.5	84.7	66.1
1998[b]							
National	59.3	41.1	62.8	62.0	43.4	58.5	37.8
Urban	35.6	13.7	59.5	44.0	9.5	38.9	31.8
Rural	90.8	77.6	67.3	85.9	88.6	84.8	45.9

[a] Based on the 1976 and 1992 Census, respectively. – [b] Based on the 1998 National Demographic and Health Survey.

Source: World Bank (2000a); Government of Bolivia (2000).

2. The Evolution of Individual Non-Monetary Indicators of Poverty

a. Education

The main poverty-related objective in the education sector arguably is to achieve broad-based access, particularly to primary schooling. Judged by school enrollment rates, which improved at all levels of education between 1985 and 1997 (Table 5), Bolivia has made progress towards meeting this objective. Only

over the period 1985–90 enrollment rates declined somewhat, reflecting the adjustment costs during stabilization. Viewed from an international perspective, Bolivia in 1997 had the same primary enrollment levels as the average of lower middle income countries. Tertiary enrollment was above average, whereas pre-primary and secondary enrollment were below average.

Table 5 — School Enrollment Rates, 1985–1997

	1985	1990	1995	1997	Latin American average (1997)	Lower middle income average (1997)
Gross enrollment rate						
Pre-Primary level	38.6	31.9	40.2	41.8	56.2	42.3
Primary level	95.3	94.7	100.0	101.7	105.9	101.0
Secondary level	38.8	36.6	46.0	53.4	58.5	67.2
Tertiary level	22.7	22.2	23.7	24.0	20.7	22.4
Net enrollment rate						
Primary level	86.5	91.2	98.0	97.4	90.6	88.5
Secondary level	47.3	37.0	40.0	40.0	n.a.	n.a.

Source: World Bank (2000b).

The relatively high gross primary enrollment rates might lead to the conclusion that coverage in primary schooling is no longer a problem in Bolivia. An examination of retention rates, i.e. the percentage of students who complete each grade level, suggests, however, that gross primary enrollment rates are

overstated. Table 6 reveals that only 51 percent of the students who enter primary school complete the full primary cycle. The drop-off continues in secondary school with the consequence that a mere fourth of students completes all 12 years of schooling.

Table 6 — Share of Entering Cohort that Completes Grade (percent), 1997

Primary	1st	2nd	3rd	4th	5th	6th	7th	8th
	100	90.7	84.1	77.7	72.0	66.3	58.0	50.9
Secondary	9th	10th	11th	12th				
	44.9	37.0	31.9	28.0				
Graduates	25.7							

Source: World Bank (1999).

The high dropout rates can be explained by a combination of supply and demand factors. On the supply side, low quality of schooling plays a role. Recent test scores for language and mathematics in the third and fourth grade place Bolivian students well below the Latin American average, especially in language attainment (UNESCO 1998). Another problem is that very few primary schools cover all grades from first to eighth. On the demand side, direct and indirect costs of schooling may account for low attendance. While public

schools are free, there are corollary expenses such as cost of uniforms, school materials, and transportation. In urban areas, these costs have been estimated to add up to over US$ 120 per year, a high amount for poor families given that their annual income often does not exceed US$ 500 (Inchauste 2000). Indirect or opportunity costs of schooling, which may be proxied by forgone wages, are frequently even higher and tend to increase with age, thus providing a rationale for a dropout after some years of schooling.

Beside being a manifestation of unsatisfied basic needs, low educational attainment also is a crucial determinant of income poverty, as Table 7 illustrates. People without any formal education are more than three times as likely to be poor than people with more than 12 years of education. The relationship between the duration of education and income poverty exhibits one interesting peculiarity, namely that dramatic reductions in the probability of being poor can only be realized by completing the full cycle of 12 years. By contrast, especially in urban areas, those who dropped out after 7 or 8 years are not much better off than those who did not attend school at all. A possible explanation for this kind of threshold effect may be that the one and only formal graduation received after 12 years of schooling serves as an important door-opener for better-paid jobs.

Table 7 — Poverty Incidence by Years of Education, 1999

Years of education	Urban	Rural
None	60.9	92.1
1 to 5 years of schooling	56.0	86.4
6 to 8 years of schooling	55.5	76.6
9 to 12 years of schooling	43.2	65.5
More than 12 years	19.5	25.9

Source: World Bank (2000a).

b. Health

Most basic health indicators have improved markedly during adjustment in Bolivia (Table 8). Infant mortality, for example, declined by almost 40 percent between 1985 and 1988. The only area where very little progress has been made is in the coverage of children in vaccination campaigns.

While the overall upward trend in Bolivia's health situation is beyond doubt it needs to be put into perspective. First, steadily improving health conditions are not specific to Bolivia but characterize the vast majority of developing countries. Second, by virtually any comparison with countries at similar levels

Table 8 — Selected Health Indicators, 1985–1998

Indicator	1985	1989	1994	1998
Infant mortality rate (per 1000 live births)	108	96	75	67
Under five mortality rate (per 1000 live births)	148	130	116	92
Child malnutrition (% under 5 years)	n.a.	13.3	15.7	7.6
Vaccination rates for children				
DPT3	n.a.	28.3	42.8	48.6
Measles	n.a.	57.5	55.7	50.8
Polio	n.a.	37.8	47.5	39.1
Access to and usage of medical personnel				
Percent of births with some prenatal care by trained medical personnel	n.a.	44.0	49.5	65.1
Percent of births occurring in medical facilities	n.a.	37.6	42.3	52.9
Percent of severe diarrhea cases treated by medical personnel	n.a.	24.0	32.4	36.4

Source: World Bank (1999; 2000b).

of GDP per capita, Bolivia's performance was still very poor in the second half of the 1990s. To take just one example, the World Bank (1999) has compared Bolivia in 1997 to low and high performers with respect to key indicators related to infant mortality. A country was considered to be a low (high) performer if its infant mortality rate was significantly higher (lower) than would have been predicted given its per capita GDP. Based on a regression of infant

mortality on GDP per capita, the difference between predicted and actual infant mortality was calculated for 75 countries with GDP per capita between US$ 1000 and US$ 5000. The 20 countries with the largest positive values of the difference were then defined as low-performing, and the 20 countries with the largest negative values were defined as high-performing. The results of this analysis are reported in Table 9. For most indicators, Bolivia compares unfavorably even to the low-performing countries. Its share of births attended by trained personnel, for example, is 35 percentage points (or 55 percent) lower than would be predicted based on its GDP per capita, compared to an average of 8 percentage points (or 12 percent) for the group of low performers. Finally, health conditions in Bolivia continued to be much worse for the poorest than for the richest quintile of the population (ibid.). Infant and child mortality rates, for example, were more than twice as high in the mid 1990s, and malnutrition was more than three times as prevalent. Discrepancies of similar magnitude across income quintiles have been calculated for various other developing countries. Altogether, despite improvements, Bolivia's health situation has remained unsatisfactory by international standards.

Table 9 — Bolivia's Health Situation in International Perspective, 1997[a]

Indicator	Low performing countries	High performing countries	Bolivia
Infant mortality rate (per 1000 live births)	24.6 (0.71)	–18.1 (-0.40)	18.8 (0.37)
Access to safe water (% of total population)	-7.1 (-0.10)	6.7 (0.10)	-7.7 (-0.11)
Access to safe water (% of rural population)	-6.4 (-0.09)	7.8 (0.13)	-28.4 (-0.51)
Child malnutrition (% under 5 years)	4.6 (0.94)	-1.5 (-0.10)	-2.2 (-0.12)
Immunization rate	-14.7 (-0.19)	8.2 (0.10)	-31.4 (-0.39)
Deliveries attended by trained personnel	-8.2 (-0.12)	15.6 (0.25)	-34.6 (-0.55)

[a]Deviations from values expected given the countries' GDP per capita levels; figures in parantheses denote percentage differences.

World Bank (1999).

IV. FORCES BEHIND THE TRENDS IN POVERTY AND INEQUALITY

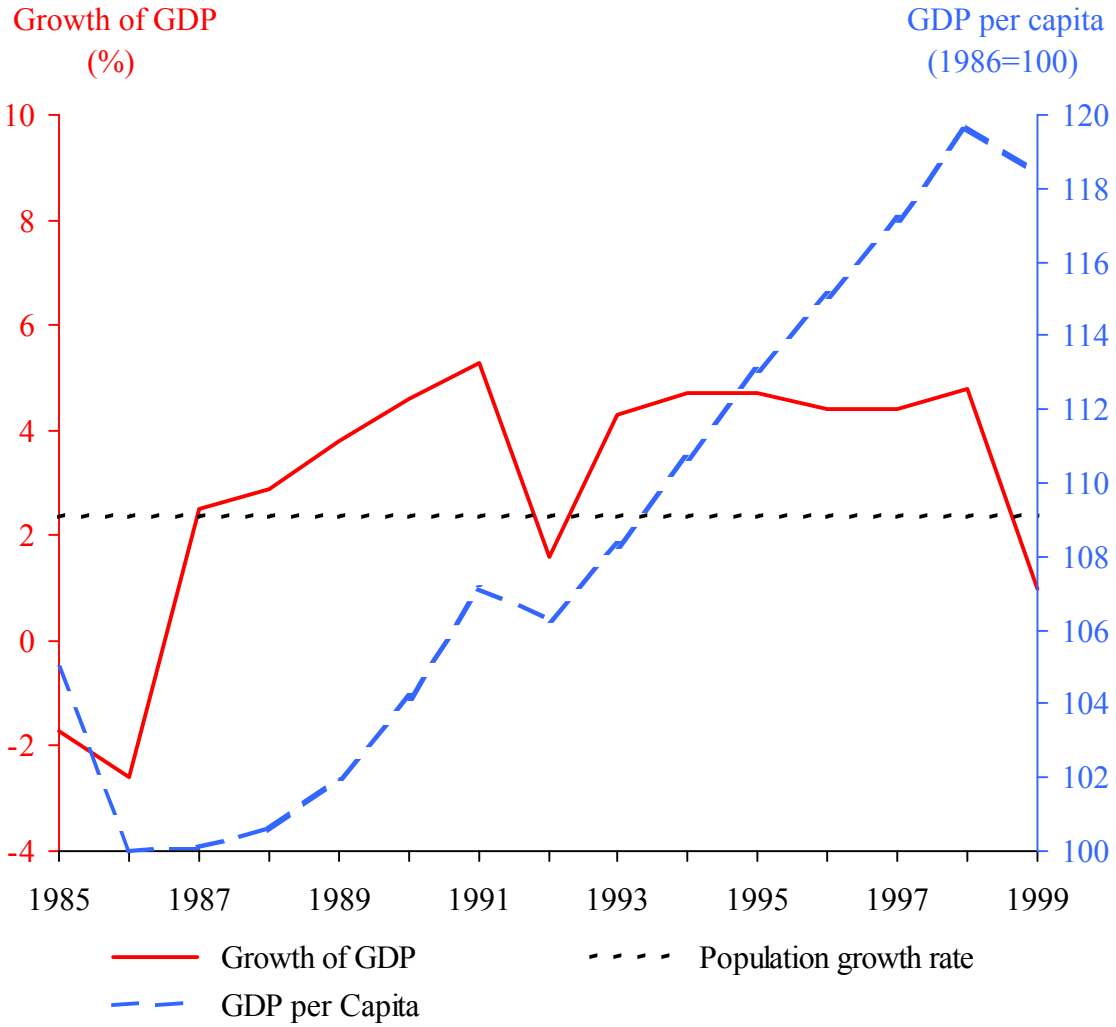
Movements in social indicators may be caused by adjustments at the macro level via two basic chanels. First, growth and structural change tend to affect the earning opportunities and the cost of living of most individuals, thereby changing their real primary income. Second, public expenditure reforms may affect the level of secondary income and the provision with basic services. The relevance of these two chanels for Bolivia will be discussed in this chapter.

1. Growth

The most well-established link between macroeconomic and social indicators is that running from growth to poverty. A number of cross-country analyses have come up with the result that sustained growth of GDP per capita is, on average, associated with declining poverty (e.g. Dollar and Kraay 2000). Does this also apply to Bolivia? Figure 1 shows that after the initial stabilization phase Bolivia's GDP per capita increased steadily, with the exception of the two recession years 1992 and 1999 where the rise in GDP fell short of the population growth rate. The quite similar evolution of urban poverty shown above suggests a poverty-reducing impact of growth. And, indeed, empirical studies have estimated a significantly negative elasticity of the headcount index

of poverty with respect to growth (Nina and Rubio 2001; Wodon et al. 2000). However, with levels of around –0.6 to –0.7, this elasticity is low in international perspective. For a sample of twelve other Latin American countries, for instance, the average elasticity has been estimated to be –1 (Wodon et al. 2000).

Figure 1 — Growth of GDP and GDP per Capita, 1985–1999



Source: INE (2001a).

Between growth and inequality, no significant statistical relationship can be identified for Bolivia. This finding is in line with the evidence for many other countries and reflects the theoretical ambiguities concerning the nexus between the two variables (see, for example, Bruno et al. 1996).

2. Structural Change in Production and Factor Markets

Beside aggregate growth, changes in the sectoral production structure and in factor income and employment may also have affected poverty and inequality. Household surveys reveal that, in addition to education (see Chapter III.2), the sector of activity and the type of employment are among the main factors determining an individual's probability of being poor. According the November 1999 survey, the poverty incidence in the rural service sector, for example, was less than half that in agriculture (Table 10). The same is true for white collar workers as compared to unpaid family workers, both in rural and urban areas. These numbers illustrate that structural change can make a difference for the poor.

In explaining possible changes in the production structure during adjustment, the evolution of two core relative prices, the real exchange rate and the rural-urban terms of trade, is of particular importance. Typical structural adjustment

Table 10 —Poverty Incidence by Sector of Activity and Type of Employment, 1999

	Rural	Urban
Sector of activity		
Agriculture	85.2	60.2
Mining	55.2	39.7
Manufacturing	74.5	55.1
Electricity, gas and water	/a	43.3
Construction	65.9	44.8
Commerce	46.0	39.2
Transport	45.3	39.0
Finances	/a	24.0
Services	37.6	29.7
Non-traded goods	78.6	45.9
Traded goods	84.6	54.8
Type of employment		
Blue collar worker	71.5	53.3
White collar worker	40.2	28.3
Employer	78.5	21.3
Self-employed	51.5	47.0
Unpaid family worker	88.1	57.5
House employee	/a	30.2
Formal	57.4	32.5
Informal	83.3	50.4

[a]Representing less than 0.1 percent of the economically active population.

Source: World Bank (2000a).

programs are characterized by real devaluations concomitant with improvements in the terms of trade of the more outward-oriented rural sector. They thereby provide strong incentives for farmers and contribute to rural poverty alleviation. In Bolivia, developments have been quite different. As shown in Figure 2, the country experienced a substantial real devaluation right at the beginning of the stabilization phase. Then, the Boliviano steadily appreciated in real terms until the mid-1990s and exhibited no clear trend thereafter.[8] The rural-urban terms of trade deteriorated by more than 20 percent in the first stabilization year and never fully recovered from this drop. Movements in these two core relative prices have thus not turned out to be favorable for outward-oriented sectors and for agriculture, which in Bolivia is not among the most outward-oriented activities.

This pattern of incentives is at least partly reflected in the evolution of the sectoral production structure (Table 11). The combined share in GDP of the two most outward-oriented sectors, mining and manufacturing, has remained roughly constant over the period 1985–99, while agriculture's share has decreased somewhat. Within agriculture, however, the export-oriented modern

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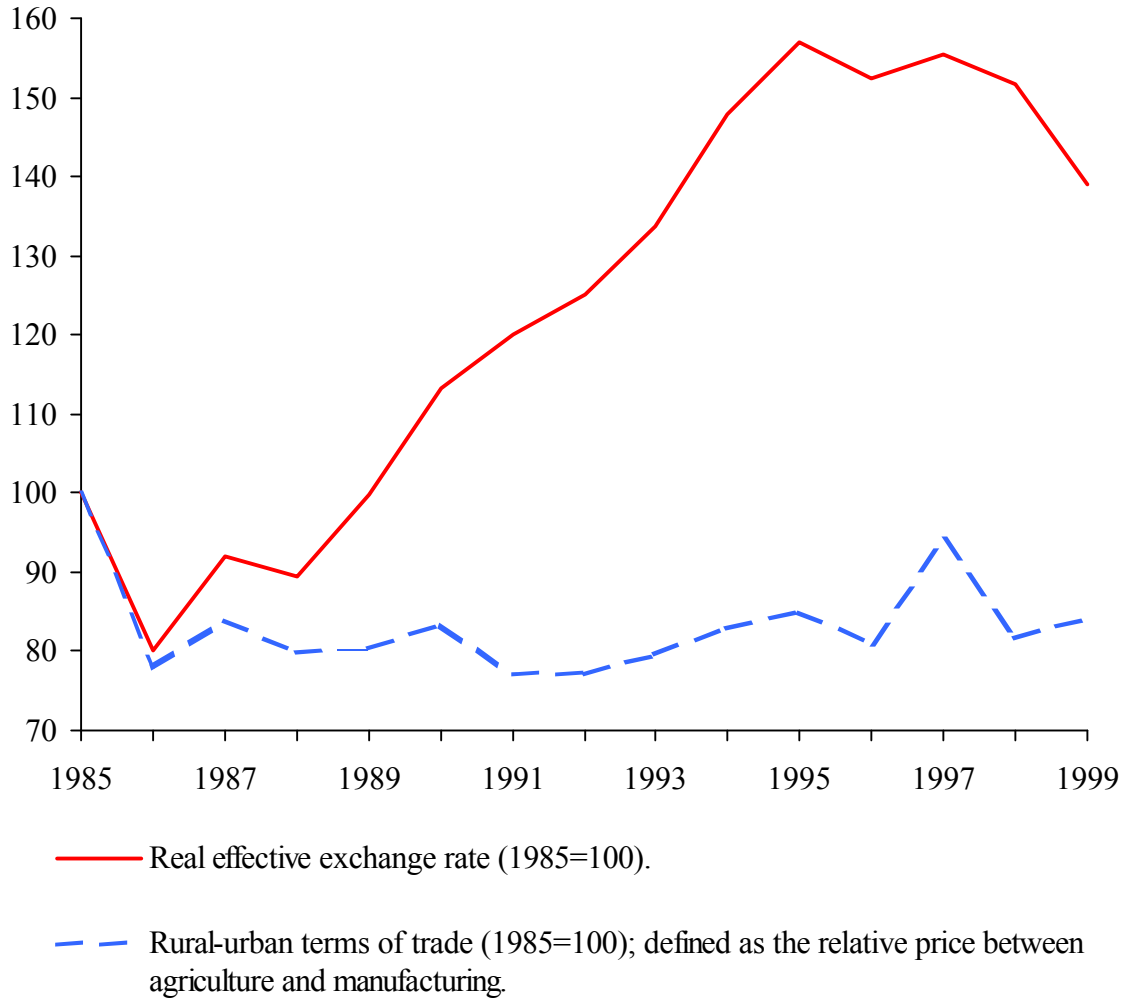
8 For a discussion of the macroeconomic implications of real exchange rate movements in Bolivia during adjustment, see Schweickert (2001).

Figure 2 — The Real Effective Exchange Rate and the Rural-Urban Terms of Trade, 1985–1999



Source: INE (2001a).

Table 11 — GDP by Sector of Origin, 1985–1999

Sector	1985	1990	1995	1999
Agriculture	16.2	15.4	14.9	14.2
Traditional	15.0	13.9	12.3	11.6
Modern	1.2	1.5	2.6	2.6
Mining	10.7	10.3	10.2	9.5
Manufacturing	16.2	17.0	17.1	16.6
Construction	3.2	3.1	3.4	3.7
Commerce	8.6	8.9	8.6	8.5
Transport	8.4	9.3	10.0	10.9
Services	19.4	17.6	17.8	19.4
Public Administration	11.8	10.1	9.4	8.9

Source: INE (2001a).

segment has gained substantially at the detriment of the much more inward-oriented traditional segment where most of the rural poor earn their living. Unfortunately, given the lack of survey data on rural income development, it cannot directly be assessed whether the relative decline of traditional agriculture primarily reflects the outmigration of farmers that has taken place at a considerable scale, or whether it also corresponds with stagnating average

incomes for the remaining smallholders. An indication of the latter is the very limited productivity growth of most traditional crops.

Developments in factor markets are probably even more relevant for poverty and inequality than changes in the production structure, because factor income is the single-most important income source in Bolivia given the low degree of redistribution undertaken by the government. In the following, the evolution of urban employment and income will be discussed. The above-mentioned data shortage renders it impossible to do the same for rural areas.

Changes in the urban labor force by sector of activity clearly reveal the process of fiscal retrenchment (Table 12). Many of the people who became redundant in the public administration and in other public services found a new job in commercial activities. During the stabilization phase, open unemployment increased as well. It ceased to be a major problem in the 1990s, declining to an average rate of below 4 percent between 1994 and 1998. The higher unemployment rate shown for 1999 is due to the recession of that year.

Viewed by the type of employment, the most striking feature is the persistently high share of the labor force working in the informal sector. It has to be kept in mind that the definition of the informal sector here is rather crude, following

Table 12 — The Urban Labor Force by Sector of Activity and Type of Employment (percent), 1985–1999

	1985	1989	1999
Sector of activity			
Agriculture	2.2	2.2	3.8
Mining	3.0	2.0	0.9
Manufacturing	17.8	14.1	18.4
Construction	6.1	7.8	8.8
Commerce	23.5	26.1	33.1
Transport	7.8	7.8	8.6
Services	30.7	32.6	22.5
Administration	8.9	7.2	3.9
Type of employment			
Wage Earners	/a	50.7	44.7
Blue collar	/a	11.6	10.3
White collar	/a	39.1	34.4
Employer	/a	2.7	4.3
Informal Sector	/a	46.7	50.0
Self-employed	/a	38.0	39.1
Family workers	/a	8.7	8.8
House employee	/a	/	3.0
Unemployed	6.0	10.4	7.2

[a]No comparable data available.

Source: Jemio (2000); Vos et al. (1998); own calculations based on the 1999 household survey (INE 2001b).

official statistics.[9] Moreover, the data for 1989 and 1999 are not strictly comparable because of definitional changes. Nevertheless, one can conclude that the informal sector has at least retained its importance for urban labor absorption. This result is confirmed by Lay (2001) in his in-depth study of Bolivia's urban labor market.

The development of urban factor income also differs between sectors of activity and types of employment. Particularly revealing is a comparison of the three dominating occupational groups, i.e. blue collar workers, white collar workers, and the self-employed. Figure 3 shows that over the period 1989–99 white collar workers experienced by far the largest real income increases. While income growth for blue collar workers still exceeded the average of 20.8 percent, incomes of the self-employed virtually stagnated. The rising skill premium for white collar workers suggests growing disparities in the urban labor market, and the meagre results for the self-employed point towards a relative decline of earning opportunities in the informal sector.

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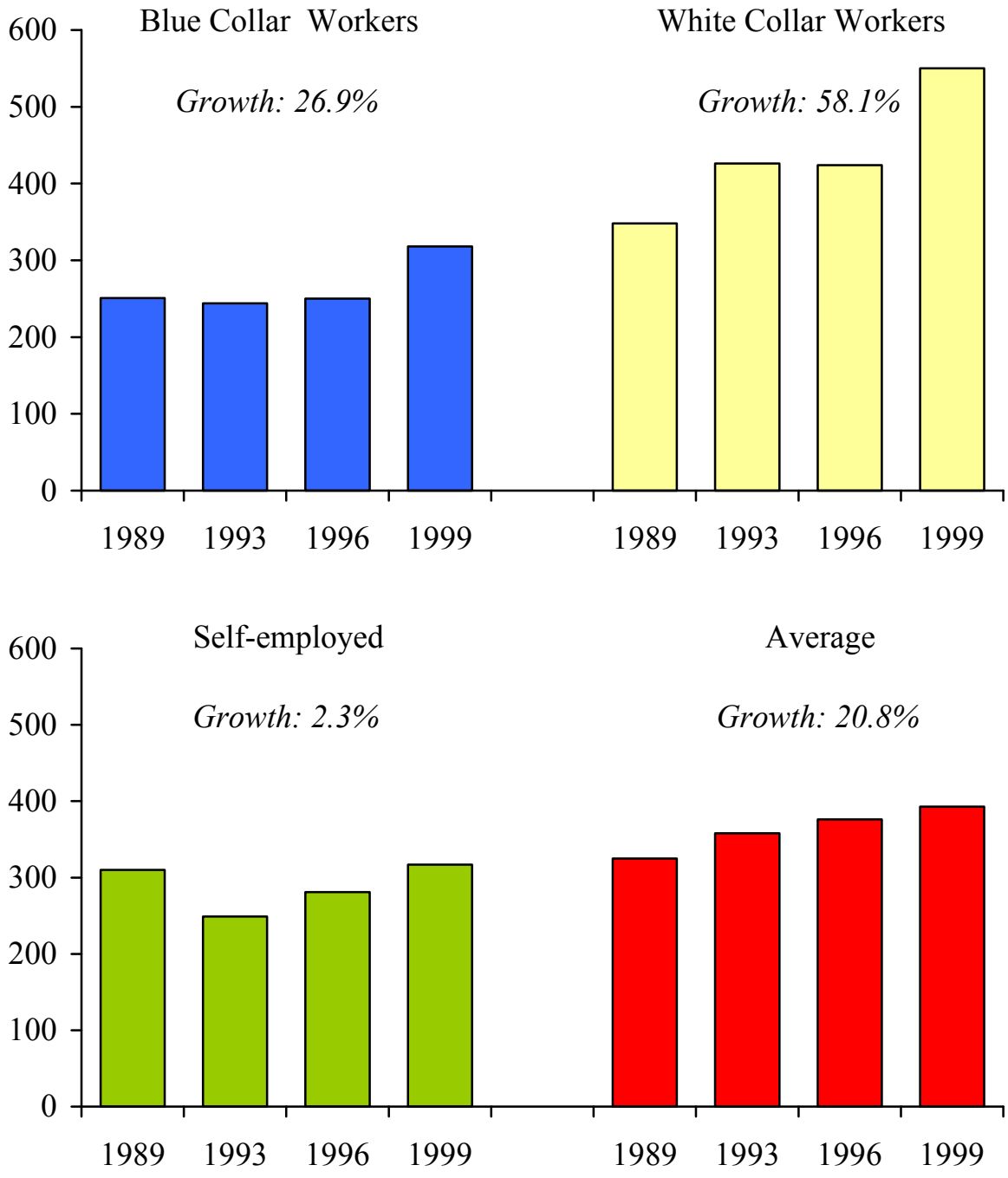
9 A wider variance of definitions of the informal sector can be found in Lay (2001).

Figure 3 — Urban Factor Income by Type of Employment, 1989–1999[a]



[a]Monthly averages in 1989 Bolivianos.

Source: Jemio (2000); Vos et al. (1998); own calculations based on the 1999 household survey (INE 2001b).

3. Changes in Public Expenditures

Among government expenditures, social spending and public investment have the most direct bearing on the poor. The evolution of these two expenditure categories over the adjustment period is shown in Table 13. In contrast to what critics of structural adjustment fear, Bolivia has not only preserved but even expanded its social budget. A large part of the marked increase in social expenditures has been accounted for by the education sector. Starting from a low base, educational spending grew only slowly during the stabilization phase but then experienced a sharp increase over the 1990s, which may have contributed to the improvements in school enrollment identified in Chapter III.2.a. In 1998, Bolivia's public expenditures on education as a share of GDP (5.7 percent) exceeded the average for lower middle income countries (5.0 percent).

Within the education budget, the allocation of funds differs considerably from the international pattern (Table 14). Most striking is the extremely low share going to secondary schooling, which corresponds with a lower-than-average secondary enrollment rate (see above). Likewise, in tertiary education, higher-than-average budget allocations are associated with higher-than-average enrollment rates.

Table 13 —Public Investment and Social Expenditures (percent of GDP), 1985–1998

	1985	1990	1995	1998
Social expenditures[a]	3.1	6.0	11.1	12.1
Education	2.0	2.5	5.3	5.7
Health[b,c]	n.a.	1.4	1.0	0.8
Public investment	n.a.	4.4	6.1	6.0
Agriculture	n.a.	0.48	0.24	0.27

[a]Excluding pensions. – [b]Excluding pensions for Chaco war veterans. – [c]Only comprising expenditures by the central government.

Source: World Bank (1999; 2000b); Montenegro and Guzmán (2000); own calculations.

Table 14 — Structure of Educational Expenditures (percent), 1998

	Bolivia	International Average[a]
Pre-Primary	3	/
Primary	46	39
Secondary	10	29
Tertiary	25	19
Other	16	13

[a]Comprising countries with GDP per capita of about US$ 1500.

Source: World Bank (1999).

In the health sector, public expenditures were low throughout the 1990s, and they probably even declined as the reduced spending by the central government shown in Table 13 was not fully compensated for by rising municipal expenditures in the course of the decentralization process initiated in the 1990s. Overall public health expenditures amounted to roughly 1 percent of GDP in 1998, a very low value relative to the average of 2.6 percent for all lower middle income countries which provides one possible explanation for Bolivia's poor health situation.

Public investment has shown a high degree of stability over the 1990s. After increasing somewhat in 1991, it remained constant at a rate of about 6 percent of GDP. As for the allocation of public investment, one of the most significant changes was the drop in the share agriculture received from more than 10 percent in 1990 to less than 5 percent in 1998. This may have made public investment more regressive because in agriculture it tends to be more pro-poor than in other sectors.

V. MAKING ADJUSTMENT WORK FOR THE POOR

The foregoing analysis has shown that progress towards alleviating poverty in Bolivia since 1985 has only been moderate given the successes in stabilizing the

economy and restoring growth. Reforms in four main areas may lead to a stronger participation of the poor in the gains from structural adjustment:

First, distributional data for rural areas have clearly been deficient in the past, preventing any serious evaluation of the rural poverty situation. With the 1997 and the November 1999 surveys, large steps have been taken towards establishing a comprehensive data set that can be used as a base for targeted policy interventions in favor of the rural poor such as school feeding programs. To be of use for policy, future surveys should be held at least every two years.

Second, there are indications that rural poverty stagnates at a very high level and that traditional agriculture, where most of the rural poor earn their living, lags behind the rest of the economy. Migration can, and will, help solving this problem, but it cannot bear the whole burden. Therefore, a top priority should be to enhance the productivity of traditional agriculture. Comparisons with neighboring countries suggest that there is room for productivity increases, although the difficult natural conditions in much of Bolivia clearly set limits. Among the measures that may prove most effective are investments in public goods, such as agricultural research, which have been severely neglected in recent years. In many rural areas, the lack of a reliable infrastructure constitutes another bottleneck for the achievement of higher productivity growth. Finally,

smallholders have almost no access to formal credit and thus are constrained in their investment opportunities. This problem can partly be solved by streamlining the myriad of existing land tenure systems so as to facilitate the use of land as collateral, or by broadening the range of assets that can be used as collateral to include livestock, for example. While such measures can improve the functioning of the formal credit market for smallholders, a significant complementary role for microcredit initiatives is likely to remain.

Third, despite recent improvements, human capital formation continues to be insufficient. This is particularly true for the health sector where Bolivia performs much worse than its per capita income would predict. Given the low health budget, substantial increases in public health expenditures are justified. The bulk of the additional resources should go to areas with a high impact on the poor, such as immunizations. In the education sector, expenditures compare favorably internationally and thus need not be increased as a percentage of GDP. Spending on secondary and pre-primary education should, however, be increased at the expense of university education. This would not only help remove existing bottlenecks in Bolivia's education system but also make expenditures more progressive. Moreover, reforms are needed to reduce dropout rates. Among these might be a rise in the number of schools that provide the whole primary cycle, a first graduation after 8 instead of 12 years of schooling,

and the provision of scholarships covering the schooling expenses of very poor pupils.

Fourth, the urban labor market is characterized by a persistently high degree of informalization, with stagnating average real incomes for self-employed workers. To facilitate access of the poor to formal employment, a two-pronged strategy is called for. On the demand side, it should be checked whether Bolivia's complex and costly labor regulations, which raise labor costs by as much as 40 to 60 percent above the basic wage, can be made more flexible so as to reduce the barriers between the formal and informal labor market. On the supply side, only better education can make the poor more attractive for formal employers. Human capital formation is probably the single-most important means to achieve lasting improvements in the poor's labor productivity. However, since investments in human capital take a very long time to materialize, labor market reforms seem to be the most powerful tool available in the short to medium run.

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APPENDIX 1

FORMAL DESCRIPTION OF THE POVERTY AND INEQUALITY MEASURES

The general specification of the class of poverty measures developed by Foster, Greer and Thorbecke (1984) is

$$(1) \qquad P_a = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]^a$$

with

P_a = poverty index depending on value of a

n = total number of households (individuals)

q = number of poor households (individuals)

z = poverty line

y_i = income (or consumption level) of household (individuals) i.

If $\alpha = 0$, then

$$(2) \qquad P_0 = q/n,$$

which is the *headcount ratio* or poverty incidence.

If $\alpha = 1$, then

$$(3) \qquad P_1 = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right],$$

which is the *poverty gap*.

If $\alpha = 2$, then

$$(4) \qquad P_2 = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]^2,$$

which is the *squared poverty gap* or poverty severity index.

To derive the summary statistics of inequality, it is assumed that there are n observations of incomes $y_1, y_2, \ldots, y_n$, which are ranked in increasing order, and that f_i people receive incomes y_i, where

$$(5) \qquad \sum_{i=1}^{n} f_i = N,$$

and where the mean income is

$$(6) \qquad \bar{y} = \left(\sum_{i=1}^{n} f_i y_i\right) \Big/ N.$$

Then the Lorenz curve is formed by calculating for all k the proportion of the population with income less than or equal to y_k

$$(7) \qquad F_k = \left(\sum_{i=1}^{k} f_i \right) \Big/ N,$$

and their share of total income

$$(8) \qquad \Omega_k = \left(\sum_{i=1}^{k} f_i y_i \right) \Big/ N\,\bar{y}.$$

The *Gini index*, G, is the area between the Lorenz curve and the diagonal of identical incomes, relative to the whole triangle below the diagonal. It can be calculated as

$$(9) \qquad G = \left(\sum_{i=1}^{n} \sum_{j=1}^{n} |y_i - y_j| \;/\; \left(2N^2 \bar{y}\right) \right)$$

The *Atkinson index, A*, is calculated from the formula

$$(10) \quad 1 - A = \left[\sum_{i=1}^{n} f_i \; \left(y_i / \bar{y}\right)^{1-e} \Big/ N \right]^{1/(1-e)},$$

where e is the inequality aversion parameter. The higher e, the higher is the sensitivity of the index to changes in the lower part of the income distribution.

APPENDIX 2

CONSTRUCTION OF THE NBI INDEX

The NBI index for each household is constructed using the following procedure:

i. In four broad areas – housing, basic services, educational levels, health care services – one or more variables are selected. In housing, for example, the variables selected reflect the quality of the materials used for construction of the floor, roof, and walls, and the area available in the house.

ii. The levels of satisfaction for each variable are determined. For example, the floor is ordered hierarchically, according to the quality of materials used.

iii. A minimum level is defined for each variable – this is needed to determine the unsatisfied basic need. For example, the minimum level for the variable floor is brick or cement.

iv. Each level is given a value according to its distance from the norm.

v. A standardized gap index is determined for each variable.

vi. The overall NBI index, which measures the degree of satisfaction of basic needs in the household, is determined using simple weights.

The minimum levels established for each variable are presented below.

Group A: Housing

Subgroup A.1: Main building materials used to construct the house

- Floors: brick and cement.
- Roof: calamina y plancha.
- Walls: adobe revocado and wood.

Subgroup A.2: Areas available in the house

- Two rooms for every five persons.
- One room for another use for every five persons.
- One room exclusively used as kitchen.

Group B: Basic Services

Subgroup B.1: Water and Sanitation

- Minimum level of adequate water supply.
- Water from a pipeline outside the house, but inside the terrain, or from a well connected to the inside of the house through a pipeline.
- Sanitation with sewerage system or septic room (urban areas).
- Sanitation with drainage system to a well or surface (rural areas).

Subgroup B.2: Energy

- House has electricity.
- Liquid gas or electricity used for cooking.

Group C: Education

- For persons between 6 and 16, access to an institution of formal education.
- For persons 10 and older, the ability to read and write.
- For persons 17–29, 10 years of schooling.
- For persons 30–44, 8 years of schooling.
- For persons 45–98, 5 years of schooling.

Group D: Health

- Access to care in an institution under the Ministry of Public Health.