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Structural Adjustment and Poverty in Bolivia

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Summary

Bolivia ranks among Latin America=s so-called >early adjusters=. While Bolivia=s economic reforms, which began in 1985, have clearly brought economic stability and some structural change, they have failed so far to bring a major boost to the economy and export production. Using household survey data, this paper analyzes how and to what extent these economic changes have made an impact on living conditions of the Bolivian population between 1985 and 1995.

The analysis shows that per capita income growth has been slight and the economic gains after a decade of reform policies have been able to achieve little, if anything to reduce poverty. Urban poverty groups (unskilled workers, self-employed) gained from job creation in the private sector (both formal and informal), but witnessed negative growth in their primary incomes. A portion of the families headed by blue collar workers managed to escape poverty conditions by engaging more household members in the income generation process. The self-employed appear to have followed the same survival strategy, but nevertheless saw an increase in the incidence of poverty between 1989 and 1993. The wage increases mainly benefitted white collar workers in declining public and non-traded goods sectors. It should be noted that, although inconsistent with orthodox structural adjustment policies, the wage hike for public sector employees has been consistent with administrative reform policies providing incentives for high quality workers to remain in the public sector. In more recent years, between 1993 and 1995, there has been some reversal in these trends with real wages falling for public employees and lower unemployment allowing for some recovery of real wages in the low income segments of the labour market. Rural poverty remains widespread and severe for structural reasons, related to extremely poor human resource endowments and poor productive infrastructure.

The Bolivian government has made steps towards reforms in a number of key areas with the objective of reducing poverty and inequality in the long-run. This strategy may be summarized in four major areas of reform: (1) economic reforms; (2) social sector reforms; (3) reforms to the social safety net systems; and (4) administrative and institutional reforms. While ambitious steps in the right direction it is less clear whether all areas add to a successful strategy. Based on Bolivia=s poverty profile analyzed in this paper it should be concluded that the reform strategy contains some important potential pitfalls. While economic reforms were initiated a decade ago, much of the crucial social reform process has only started recently. Although it is still difficult to evaluate or even to speculate about their precise impact on poverty reduction, it is clear that Bolivia=s road to reform will be long and rocky.

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1. Economic Reforms and Adjustment

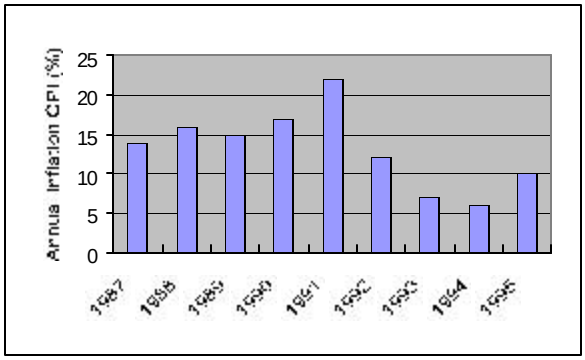
Bolivia ranks among Latin America=s so-called >early adjusters.= In the early 1980s, external debt payment problems, a collapse in the world market price of minerals (at the time representing 40 percent of exports), and imprudent macroeconomic management culminated in a major economic crisis and hyperinflation in 1984-85 (Morales and Sachs 1989). A radical orthodox stabilization program implemented by the newly elected Paz Estenssoro government managed to halt hyperinflation in September 1985. The stabilization program unified the exchange rate, drastically cut public spending and tightened monetary policies. As part of the anti-inflation effort, the program also eschewed all wage and price controls, while the suspension of payments on external debt was probably the only unorthodox element of the program. Next to measures geared at short-term stabilization of the economy, the ANew Economic Policy≅ of the Paz Estenssoro government also comprised long-term adjustment measures in addition to the price liberalization, including a freeing of trade and capital flows, financial sector reform, a simplification of the tax system, privatization and reform of public enterprises, and the closing of unprofitable state-owned mines. To compensate for some of the expected social costs of the adjustment, the Bolivian government implemented an Emergency Social Fund (ESF) in 1986 intended to provide temporary employment in small-scale infrastructure and social projects to those displaced by the economic crisis. The ESF was replaced by the Social Investment Fund (FIS) in January 1990.[12] These reforms have been largely maintained under the Paz Zamora government (1989-93) and widened in scope under the government of president Sánchez de Lozada who took office in August 1993. The recent reforms include a program of capitalization of state enterprises (that is, privatization based on increased share capital), an education sector reform and an administrative reform of decentralization of public expenditure programs through the >popular participation= law.

The initial reforms reduced the role of the state in the economy and radically reformed the economy to one based on market incentives and a more diversified export base. Economic growth and stability should bring greater income gains to all Bolivians and reduce widespread poverty. Bolivia has received much international acclaim for its successful stabilization policies initiated over a decade ago. However, so far there have been fewer signs of success of the long-term economic reform measures. Macroeconomic indicators continue to show stability as inflation has been kept below 20 percent per annum since 1989 and has been below the 10 percent mark since 1993 (see Figure 1a) and GDP growth has been steady since the introduction of the economic reforms (2 to 4 percent per year; see Figure 1b).

[12] The FIS focuses more explicitly on poverty alleviation through the provisioning of health, water supply, sanitation and education services, targeting the neediest communities in 80 priority (poor) provinces. The FIS is mainly externally funded.

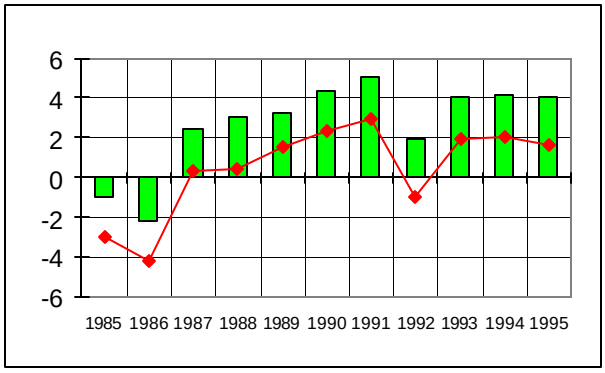
However, given the high population growth in Bolivia (2.4 percent per year), gains in per capita income have been only very modest (Figure 2). Income per capita increased at a slow but fairly stable pace of 0.7 percent per annum between 1985 and 1995. Real GDP (1990 prices) per capita reached near US$ 876 in 1995, up from US$ 808 in 1985. In addition, export growth has failed to take off, despite a substantial and continuous depreciation of the real exchange rate (see Figure 3).

Figure 1a. Bolivia: Inflation Rate (CPI) (%)



Source: IDB, Economic and Social Data Base.

Figure 1b. Bolivia: GPD and GDP per capita Growth (%),1985-95

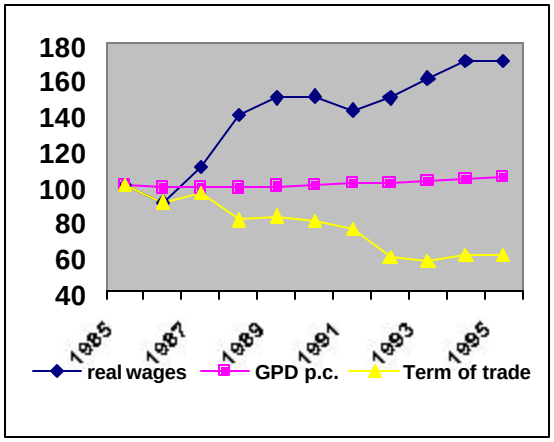


Source: IDB, Economic and Social Data Base

Economic stability and growth are important ingredients in poverty reduction. Bolivia has shown a positive record on both counts over the past decade, obtaining a good deal of the former, but much less of the latter. Yet neither (stability nor growth) is a sufficient condition for a successful anti-poverty strategy. Apart from the rate of growth and its stability, income growth for the poor will also depend on the rate of employment growth which is related to factor intensity (that is, the nature of technological change involved with the structural adjustment of the economy and hence the impact on the demand for various types of labour) and on the degree of labour mobility (across sectors, regions, etc.). These factors, along with possible discriminatory factors in the labour market (such as ethnicity or sex), will determine the distributive outcome of the adjustment and growth process and hence the impact on poverty. Another essential feature in this process will be the access to social and physical infrastructure. Living conditions are greatly influenced by investment in social services, providing individuals with better education, health, etc. and hence with greater opportunities to participate and gain in the economic process. No less important in rural Bolivia are the factors that determine access to land, irrigation, credits and other basic agricultural inputs,

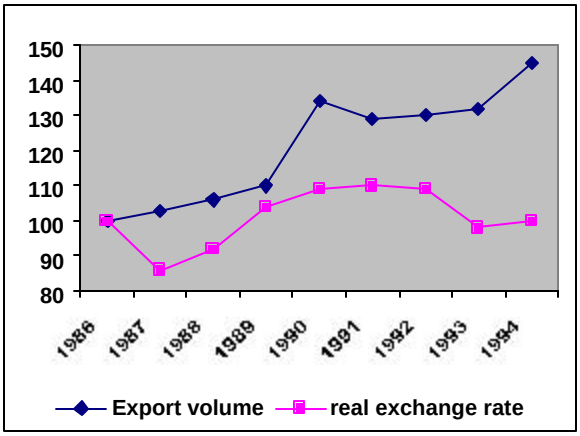
which remain critical bottlenecks to rural development and hence the persistence of widespread rural poverty.

Figure 2. Bolivia: Real Wages, GDP per capita and Agricultural Terms of Trade (1985=100)



Source: IDB, Economic and Social Data Base.

Figure 3. Bolivia: Exports and the Real Exchange Rate (Index 1985=100)



Source: IDB, Economic and Social Data Base.

Bolivia=s initial conditions do not seem to provide the best prospect for a smooth transition towards the creation of a >virtuous cycle= of growth, employment creation, and poverty reduction. First, its export orientation shows heavy reliance on primary commodities (agriculture and mining), most of which is produced with low labour intensity. The collapse of world markets of minerals (tin in particular) led to a decline in one part of the export sector, while expansion of agricultural export production in the Santa Cruz area (soya, in particular) also mainly applies large scale technologies. Second, its small and underdeveloped industrial base makes a shift towards labour-intensive, export-oriented manufacturing more difficult. Third, low educational levels of the majority of the population would indicate the need for sustained high investment in education for many years to provide a better trained work force. Fourth, compensatory programs such as the ESF and the FIS cannot be expected to fully make up the social cost of the economic recession and restructuring by their sheer nature (they were designed to be temporary, small scale in nature, targeted to specific groups, and, in principle, not meant to override universal provisioning of basic social services).

This paper intends to provide a poverty profile of the Bolivian population, identifying the main socioeconomic and demographic characteristics associated with poverty, as well as an analysis of the main changes in poverty conditions since the second half of the 1980s. This

assessment will be connected with the changes in the economic environment and will suggest some priority areas for policy interventions. It is not the intention, nor for that matter the pretension, of this paper to evaluate the impact of social and economic reform policies on poverty, as this would require a more extensive analysis.

We use two, now widely accepted, approaches to quantify poverty: the income or indirect approach and the direct approach (Vos 1996). The indirect approach defines poverty as a shortfall of income or consumption levels with respect to a specific poverty line which reflects the costs of a minimum level of nutritional needs and other basic needs. The direct method, captures welfare and deprivations thereof, in terms of social indicators with regard to education, health, housing conditions, water supply and sanitation. Available data sources are still quite limited for in-depth poverty analysis over time. Data available from the household survey system only cover urban areas, while only the 1992 population census and a special limited survey of rural areas (for 1995 and representative for the highlands only) are available to provide household level data on living conditions of the rural population. Despite these limitations, these sources have been used to characterize poverty in Bolivia. The findings in this paper are largely consistent with those of a recent World Bank report on poverty in Bolivia (World Bank 1996) which uses the same data sources. However, as we show in this paper some conclusions regarding the trends in living conditions and the structural characteristics of poverty have to be taken with caution as these tend to be influenced by particular definitions of poverty and poverty lines. In order to distinguish between robust and less robust findings we perform a sensitivity analysis for alternative poverty concepts and poverty lines. The key interest of this sensitivity analysis is not so much to detect the effect of different definitions on the magnitude of poverty as such, but rather on the direction of change over time and on the characterization of poverty across segments of the population. The results show overall robustness of the results in terms of the identification of poverty groups (with the exception of some of the findings for poverty characteristics by gender), but the results as to whether (urban) poverty increased or decreased in recent years appear sensitive to the choice of both the poverty line and the welfare measure (income or consumption).

The next section provides an overview of poverty estimates for Bolivia using the indirect and direct approaches to its measurement. Section 3 provides a detailed description and analysis of urban poverty, while section 4 focuses on rural poverty. The final section summarizes the main findings and links them to the structural adjustment process of the past decade and draws some conclusions with respect to the prospects of structural poverty reduction in Bolivia and the economic and social policies that should support that process.

2. Poverty Estimates for Bolivia: An Overview

As indicated above, information on poverty in Bolivia is scarce and it is difficult to obtain consistent data that could provide good insights about trends over time. Household surveys provide the key source for the estimation of poverty conditions. Survey information prior to the initiation of the economic reforms is not comparable with more recent information and even recent household surveys show problems of comparability from year to year. Further, survey data of good enough quality to make some comparisons over time is only available for urban areas. Here we use the 1989, 1993 and 1995 surveys (the *Encuesta Integrada de Hogares*, EIH) for the analysis of urban living conditions.[2] Data sources for analyzing poverty in rural areas are the 1992 Population Census (1992) and a partial rural survey (highlands only) for 1995 conducted by UDAPSO, but they do not permit the recording of changes over time in a consistent fashion. See Appendix 1 for a brief note on the data sources. Due to the lack of strictly comparable urban and rural data, we do not attempt to estimate national aggregates, but analyze conditions in rural and urban areas separately.

Poverty: Indirect Method

Table 1 provides an overview of available poverty estimates using the *indirect method* (i.e., poverty as a shortfall of income or consumption *vis-à-vis* a given minimum threshold), as these can be derived from recent studies. In the table the extreme poverty incidence refers to the population share with income or consumption levels below the cost of minimum food requirements, while the poverty incidence refers to the share of the population unable to meet a poverty line considered adequate to meet minimum food requirements as well as a basket of other basic needs. Estimates differ for various reasons, including - as indicated in the table - the use of income versus consumption data and possible adjustments for alleged underreporting of survey estimates and - as indicated in Appendix 2 - differences in poverty line definitions.

Despite the differences in estimates, one may safely conclude that poverty is widespread in Bolivia, both in urban and rural areas. Poverty is estimated to affect 70 to 90 percent of the population in the rural areas of the Sierra in 1995. No estimates are available for the rural lowlands around Santa Cruz, but the general perception is that average incomes are higher and poverty is less in that part of the country. Table 1 shows that estimates for urban poverty may vary from 30 to 62 percent for 1993, depending on which poverty line is used and whether one takes income or consumption as the >appropriate= measure of welfare.

[2] We did not use the 1995 survey for the poverty profile analysis. As explained further below consumption data are used for this part of the analysis, but the EIH 95 did not include a consumption module.

Instead of opting to select one >best= measure and one >best= poverty line, we will show most results in this paper using both income and consumption measures and for several poverty lines. We take two benchmarks: a >**high= poverty line** (Bs. 271 per month, per capita at 1995 prices for urban areas and Bs. 159 for the rural Sierra) which is the one used in studies performed by Bolivian institutions engaged in policy advice and in a recent World Bank study (UDAPSO 1995a and World Bank 1996), and a >**low= poverty line** (Bs. 140, at 1995 prices) which reflects a uniform, minimum income of US$ 60 international purchasing power parity (PPP) at 1985 prices per person per month, a threshold frequently applied in international comparisons of poverty conditions (e.g., World Bank 1990, Morley 1994, and Psacharopoulos et al. 1993).[3]

Table 2 shows a summary of the poverty incidence estimates for 1989-95 using income and consumption data from the available household surveys and the high and low poverty lines. The table demonstrates that not only the magnitude of poverty changes quite substantially, but also conclusions about the trends in urban poverty. The choice of both the welfare measure and the poverty line appear to affect conclusions regarding the change in urban poverty. Using the income estimate would yield a range of urban poverty between 30 and 57 percent of the urban population in 1993, while according to the consumption measure between 28 and 60 percent would be poor depending on the choice of the poverty line. Using the income estimate would indicate that urban poverty fell quite significantly between 1989 and 1993, but rose between 1993 and 1995 (when both using the >high= and >low= poverty lines). However, according to the consumption measure and using the >low= poverty line it *increased* from 27.9 to 28.3 between 1989 and 1993, while, if we use the >high= poverty line the conclusion would be that poverty fell (from 60.9 to 60.3). In Appendix 3 we apply a first order dominance test of this aspect for a wide range of poverty lines showing that the findings regarding the direction of change in poverty are >robust= for the income measure, while for the consumption measure the direction of change as indicated in Table 2 holds for values above 1.1 times the >high= poverty line (see Figures A.1 and A.2). Outside this range the change in poverty would be zero or show a (very) slight increase. Figure A.1 also shows, however, that the consumption distribution lines for 1989 and 1993 almost coincide, suggesting that in the aggregate poverty has remained by and large the same.

For rural areas, the range in the poverty incidence estimate is essentially a product of using income versus consumption data, rather than using the >high= or the >low= poverty lines which for rural areas are not wide apart (Bs. 159 and Bs. 140 respectively). The latter result does hint at the severity and intensity of poverty in the rural Sierra of Bolivia, a finding we

[3] See Appendix 2 for a brief discussion of these poverty lines. As it turns out, the >low= poverty line is almost half the >high= poverty line. Given that the food share (or Engel coefficient) of the households around the >high= poverty line is about 0.55, the >low= poverty line might also be interpreted as the threshold level of extreme poverty.

explore further in Section 4. A first order dominance test of rural versus urban poverty indicates, as one might expect, that rural poverty is more severe, independent of the poverty line chosen (see Appendix, Figure A.7).

For policy making and evaluation both the estimate of the magnitude of poverty[4] (e.g., for the definition size and scope of poverty reduction programs) and the nature of the change will be important. Policy needs may thus require a decision regarding one specific measure (income versus consumption) and a specific poverty line. There is a wide body of literature discussing the related conceptual and theoretical issues on both counts, but without providing any clear-cut consensus on either count.[5] In practice the choice is mostly geared by data availability and reliability.[6] In this paper we will avoid the choice of measure and poverty line, but rather analyze to what extent these may affect the identification of whom the poor are and why they are poor.

Poverty: Direct Method

Aggregate trends in social indicators show important progress over the past decades, although shortfalls in the satisfaction of basic needs remain large and widespread. Bolivia ranks among the poorer Latin American countries as measured by health status and educational levels. Social progress in Bolivia, as measured by the indicators listed in Table 3, is well below the Latin American average. The infant mortality rate is near 100 per thousand live births in rural areas (the Latin American average is 43), the average total fertility rate is 5 live births per woman (6.3 in rural areas and 3.1 for Latin America), and more than half of the Bolivian population lacks access to safe drinking water (20 percent for Latin America). Illiteracy affects one quarter of the total female population and half of women in rural areas. Gross primary enrollment has increased only slightly since the early 1970s but shows a decline in recent years. The Latin American average of gross enrollment in primary education is above 100 (due to overage and repetition). Data on education are of poor quality in Bolivia, but after comparing various sources the declining trend in recent years might reflect two tendencies: first, there seems to have been some improvement in the internal efficiency of education with lower repetition rates and higher educational attainment of those that enter into the system, and, second, lower enrollment rates (due to high drop out) in rural areas affecting girls in particular. Nevertheless, rural-urban migration, improved efficiency in urban education, and easier access to schools in urban areas appear to have facilitated rising levels of educational

[4] And its intensity, as we shall discuss further below.
[5] See for instance Sen (1980, 1985), Lipton and Ravallion (1995), Deaton (1994) and Mejía and Vos (1996) for discussions. The World Bank study opts for consumption as the best measure of welfare, however, the cited literature lists at least as many theoretical arguments in favour as against the choice of consumption over income.
[6] See Appendix A.3 for brief comments on the reliability of the income and consumption estimates produced by the Bolivian household surveys.

attainment of the urban population and females closing in on the gap of years of schooling *vis-à-vis* males (see Section 3).

The 1992 population census data have been exploited extensively to measure the geographical distribution of living conditions in Bolivia. This has resulted in several >poverty maps= which try to identify the most deprived regions of the country using a composite social indicator (>indicator of unsatisfied basic needs=).[7] Aggregate or composite social indicators suffer from serious, if not unsurmountable, methodological weaknesses, as we lack a theoretical framework to add indicators of different dimensions of well-being (and poverty, for that matter) into one composite indicator.

[7] See for instance, Ministerio de Desarrollo Social (1994), UDAPSO (1995a), and INE (1996).

Table 2. Bolivia: Poverty Incidence by Welfare Measure and "High" and "Low" Poverty Lines, 1989-95
(headcount ratio, P_0)

Poverty Measure	Area	1989	1993	1995
"High" Poverty line				
Consumption	Urban	60.9	60.3	..
	Rural	..	..	88.3
Income	Urban	70.8	56.9	59.3
	Rural	..	..	77.1
"Low" Poverty line				
Consumption	Urban	27.9	28.3	..
	Rural	..	..	85.8
Income	Urban	46.0	30.0	32.2
	Rural	..	..	73.3

Sources: INE, *Encuesta Integrada de Hogares*, 1989 and 1993; and UDAPSO, *Encuesta Socio-Económica de Hogares*, 1995.

Note: Poverty incidence estimates refer to individuals. Consumption and income measures are survey estimates, unadjusted for possible underreporting.

Table 3. Bolivia: Social Indicators, 1970-92

	Around 1970-75	1992 Total	1992 Urban	1992 Rural
Education (%)				
Overall illiteracy rate	37	20	9	37
Female illiteracy	..	25	15	50
Overall gross primary enrollment	85	83	92	74
Female gross primary enrollment	76	78	89	69
Health				
Infant mortality (< 1 year, per 1,000 live births)	151	75	58	94
Life expectancy (years)	47	59	64	54
Total fertility rate (live births per woman)	6.5	5.0	4.2	6.3
Access to safe drinking water (% of population)	34	46	74	33

Sources: World Bank, *Social Indicators of Development*; Ministerio de Desarrollo Humano (1994) (Poverty map); and IDB, *Economic and Social Data Base.*

The methodological weaknesses of composite indicators have been well spelled out in the literature and none of the poverty maps constructed for Bolivia overcome them despite a the degree of statistical sophistication of some of them.[8] Although this type of composite welfare measure (BNI indicator), as such, lacks transparency about the type of deprivation in different regions, the poverty maps do play a policy role in the distribution of social spending, in particular for the FIS. It is more useful for policy making (and subsequent evaluation of impact) to use maps of the geographical disparity for each individual indicator, that is the component parts of the BNI indicator. Tables A.2 to A.4 (Appendix) present poverty map data at the departmental level for the composite BNI indicator and some educational and health indicators used for the UDAPSO poverty map. It shows that the ranking of departments by basic needs shortfalls tends to vary depending on the indicator used. By the composite BNI indicator Pando, Potosí, Beni and Chuquisaca have (in that order) the highest incidence of population with unsatisfied basic needs, while the highest infant mortality rates are recorded in Potosí, Oruro, Beni and Chuquisaca and for illiteracy the order is Chuquisaca, Potosí, Cochabamba and Tarija.

Location is an important variable for social policy decision-making. As indicated, poverty map information needs to be tailored to specific policy objectives and the geographical location of the poor as such tells us little about the determinants of poverty conditions to overcome this, we will therefore concentrate in the next section on the socioeconomic conditions underlying poverty in Bolivia.

3. Urban Poverty and Inequality: Trends and Determinants

The conclusions in the previous paragraph complicate the search for an answer to the question of whether the economic reforms have had a positive impact on living conditions of the Bolivian population. As inidcated, one may conclude that poverty either increased or decreased depending on the welfare measure. The macroeconomic indicators show only a slow growth of per capita income over the past decade. Real wage incomes have increased significantly thanks to the successful control of inflation and substantial nominal wage increases in recent years (cf. Figure 2). Such indicators might provide support to a view that poverty has indeed decreased in urban areas, but also that, given the drop in the agricultural terms of trade (Figure 2), the rural-urban income gap has widened in the process.

[8] UDAPSO (1995a) takes account of both incidence and intensity of shortfalls in basic needs satisfaction reflected in the housing, education and health variables. INE uses a principal component analysis to discriminate the most important indicators explaning geographical differences in basic needs satisfaction and uses this statical procedure to assign weights to aggregate the different social indicators into an index of marginality.

Nevertheless, again a more cautious look at the data is required. The household survey data for 1989 and 1993 indicate that real wage incomes dropped by about 8% in that period, contradicting other sources.[9] Wages recovered in more recent years, showing a 3% increase between 1993 and 1995, concommittant with a drop in the unemployment rate. Changes in composition of the labour force reflect the structural adjustment process set in motion since 1985. As shown in Table 4 the share of wage earners increased with a major increase in blue collar workers hired by the private sector, to some extent at the expense of white collar workers in the public sector. Most of these adjustments took place between 1989 and 1993, but growth of employment for unskilled urban wage earners has stagnated in more recent years. Although its share in the total work force decreased somewhat, the absolute number of self-employed workers (including unremunerated family workers and domestic employees) in the urban informal sector also increased substantially between 1989 and 1995, suggesting labour demand in the modern, traded goods sector has been insufficient to absorb the growth in the labour supply. Urban unemployment fell from about 9% in 1989 to 7% in 1993 and further to 5% in 1995. The survey data suggest that urban poverty is essentially a problem of a lack of remunerative employment and that the structural adjustment process, so far, has not been particularly helpful to find a way out as:

- employment growth has been concentrated in lower paid jobs as blue collar workers in modern traded goods sectors or as self-employed and family workers in informal activities;

- employment has shifted substantially to private sector employment and slightly to more employment in traded goods sectors, but real primary income increases have been initially (1989-93) concentrated - contrary to what the structural adjustment process should achieve - in the hands of workers in the public and non-traded goods sectors, rather than in the traded and private goods sectors. This trend was nevertheless reversed in more recent years (1993-95);

- as shown further below, the probability of being poor is higher for blue collar workers and the self-employed, but remunerations from the primary income source (wages and self-employed income respectively) of both groups of workers decreased in real terms between 1989 and 1993 (see Table 4). However, as we show below the poverty incidence for households headed by blue collar workers *decreased* somewhat between 1989 and 1993. The explanation for this paradox of decreasing real primary incomes and increasing household welfare seems to lie in a rise in the average number of income earners per household, which increased from 1.98 in 1989 to 2.2 in 1993 for blue collar worker-headed households. Self-employed-headed households followed the same survival strategy, but the extra number of

[9] The real wage figures shown in Figure 2 are the mean real wage levels of (mostly urban) firms registered in the administrative records of the Labour Ministry and likely overrepresent modern, large firms and underrepresent the bulk of small (informal) enterprises and the wage earners they employ.

income earners (from 1.9 to 2.1) appears to have been insufficient to compensate for the primary income loss, pushing this group of the population further below the poverty line.

The above conclusions are also confirmed by the poverty profile analysis presented in Tables 5 and 6, and the related analysis discussed below. The tables show the poverty incidence (P_0), poverty gap (P_1) and poverty intensity (P_2) measures for subgroups by different socioeconomic and demographic characteristics of the urban population for 1989 and 1993.[10] Due to the lack of consumption data no poverty profile was calculated from the 1995 survey data.

Tables 5 and 6 present the poverty profile using the consumption measure only, but for both the >high= and >low= poverty lines (see Appendix 2 for a discussion of the poverty lines). The tables show that the descriptive poverty profile does alter in terms of identifying which sub-group within each socio-demographic category (e.g., male or female, blue collar workers or other, etc.) is most affected by poverty conditions and which sub-group contributes most to overall poverty after weighting for their respective population shares. However, there seems to be some sensitivity of the results with respect to the welfare measure (income or consumption), as shown in Appendix Tables A.5a-b and the logit/probit analysis of poverty discussed further below.

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[10] The three indices used in the table refer to a class of additive poverty measures as developed by Foster, Greer and Thorbecke (1984). The general specification is:

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

where: P_a = poverty index depending on value of a; n = total number of households (individuals); q = number of poor households (individual); z = the poverty line; and y_i = the income (or consumption level) of household (individual) *i*.

- if a = 0, then $P_0 = q/n$, which is the poverty incidence measure or headcount ratio, that is the proportion of the population with incomes below the poverty line
- if a = 1, then $P_1 = (1/n)\Sigma\,[(z-y_i)/z]$, which is the poverty gap, or the average shortfall of income (or consumption) of the poor *vis-à-vis* the poverty line.
- if a = 2, then $P_2 = (1/n)\Sigma\,[(z-y_i)/z]^2$, which is the poverty intensity index, measuring the shortfall of income (or consumption) of the poor *vis-à-vis* the poverty line giving a higher weight to the poorest. The P_2 is sensitive to the distribution of income (consumption) among the poor and satisfies the transfer axiom of welfare economic theory which states that a transfer from rich to poor should lead to a reduction in poverty. Using the P_0 measure this axiom is not necessarily satisfied, as a transfer of income from people living around the poverty line to the poor might in fact lead to an increase in the poverty incidence (P_0).

The poverty indices may be estimated by sub-groups of the population. The sum of the population weighted P_a =s of the subgroups is equal to the overall index. In Tables 5 and 6 the column expressing Acontribution to overall poverty≅ gives the share of the weighted poverty indices by subgroup in the total ($P_a = \Sigma(n_i/n)\,P_{ai}$). The increase in poverty in some specific subgroup of the population will increase total poverty at the rate of the population share.

Table 4. Bolivia: Urban Labour Force Structure and Real Income Growth, 1989-93

Occupational Category	1989 % of EAP	1993 % of EAP	1995 % of EAP	Real primary income growth[1] 1989-93	1993-95
Wage earners	45.9	46.5	44.1	-3.0	3.1
Blue collar	10.5	15.5	15.1	-21.4	6.1
White collar	35.4	30.9	29.0	7.2	-0.7
Informal sector	42.3	40.7	43.7	-28.2	9.8
self-employed	34.4	27.5	27.9	-27.0	7.6
fam. workers,	7.9	6.2	5.2	-36.1	33.7
dom. servants		7.1	10.6	n.a.	n.a.
Employer	2.4	5.7	7.1	-15.6	3.5
Unemployed	9.4	7.1	5.1		
TOTAL	100.0	100.0	100.0	-8.0	1.2
Memorandum:					
Workers in:					
Public sector	45.9	34.1	32.9	20.6	-3.8
Private sector	54.1	65.9	67.1	-14.9	10.1
Traded goods sect.	21.2	21.5	22.0	-11.2	1.3
Non-traded sect.	78.8	78.5	78.0	-6.8	1.1

Source: INE, *Encuesta Integrada de Hogares*, 1989 and 1993.
Note: 1. Income refers to primary income per worker.

The main results of the poverty profile analysis may be summarized as follows:

! **Employment characteristics**: as indicated above, the poverty profile confirms that both the poverty incidence is highest among ***blue collar workers*** (75.6% in 1993 for the high poverty line) and ***self-employed*** (63.5%), and because of their weight in those sectors, it is also highest in the private sector and ***traded goods activities*** (agriculture, manufacturing, mining). Also, the poverty intensity is highest for these occupational categories. Tables 5 and 6 further indicate, however, that - according to the consumption measure - the poverty incidence decreased for blue collar workers (from 78.1 to 75.6), and their poverty intensity decreased slightly (from 18.5 to 18.2) between 1989 and 1993. This suggests that income distribution (or actually the distribution of consumption) among this group of workers has become less unequal. In contrast, in the case of self-employed both the poverty incidence and intensity *increased* between 1989 and 1993, but a decomposition of the poverty increase in income (consumption) growth and change in income (consumption) distribution shows the main factor in explaining the rise of poverty among this group is an increase in inequality.[11] As shown by Table 7, rising inequality is the main factor explaining the rise in poverty observed for most socio-economic groups (except indigenous households and those headed by a blue collar worker, see below). In effect, greater inequality more than offsets the overall growth in consumption of the urban population between 1989 and 1993.

- **Education:** As might be expected, low educational levels constitute another major determinant of income deficits. The poverty incidence and intensity of households whose head has less than primary education or a few years of secondary education, is well above that of households with household heads who have at least been able to finish secondary education. The data indicate at the same time, however, that urban poverty is also widespread among those with a few years of secondary education (62.5% poverty incidence in 1993). The above picture emerges from a look at the

[11] Changes in the poverty index (P_a) can be decomposed in growth and distribution effectos after estimation of the Lorenz curve of the distribution of income (or consumptioin). Using the method proposed by Datt and Ravaillon (1992) one may rewrite the Foster, Greer and Thorbecke index in general form as follows:

$$P_{at} = P_a\left(z/m_{t+n}, L_t\right)$$

where P_t is the poverty index for period t, z is the poverty line μ_t is the average income of the overall population in period t. *The descomposition of growth and distributional components of the change in poverty may be represented by:*

$$P_{a_{t+n1}} - P_{a_t} = G + D + R$$

Where G is the growth effect, D the distributoin effect and R the residual effect. G and D are definde as:

$$G = P_a\left(z/m_{t+n}, L_t\right) - P_a\left(z/m_t, L_t\right)$$

$$D = P_a\left(z/m_t, L_{t+n}\right) - P_a\left(z/m_t, L_t\right)$$

average educational level of all the members of urban households. Poverty affects well over 80 percent of the individuals living in households with an average level of less than 6 years of formal education, but is still high for those living in households whose members have 6 to 10 years of formal education (64.3% in 1993, up from 59% in 1989). This finding suggests as much that greater coverage of basic education by itself is not a sufficient condition to escape from conditions of poverty.

Table 5 Bolivia: Urban Poverty Profile High Poverty Line, 1989 and 1993

Socio-demographic characteristics	1989							1993						
	Total pop. (% share)	P_0	% contr.	P_1	% contr.	P_2	% contr.	Total pop. (% share)	P_0	% contr.	P_1	% contr.	P_2	% contr.
Overall		60.9		25.2		13.3			60.3		25.6		13.6	
Gender of head of household														
Male	83.3	53.9	85.9	21.0	85.8	10.7	85.7	82.1	53.7	84.8	21.5	84.9	10.9	84.4
Female	16.7	44.1	14.1	17.3	14.2	8.9	14.3	17.9	44.0	15.2	17.5	15.1	9.3	15.6
Ethnicity														
Indigenous	27.7	71.4	33.5	31.9	36.9	17.7	39.0	34.4	65.5	38.3	29.0	40.5	15.9	42.3
Non-indigenous	72.3	54.2	66.5	21.0	63.1	10.6	61.0	65.6	55.2	61.7	22.3	59.5	11.4	57.7
Educational level of head of household														
No education	6.8	72.8	8.8	31.3	9.5	17.1	10.0	0.3	56.5	0.3	32.8	0.4	21.3	0.5
Incomplete primary	26.2	69.0	32.1	30.5	35.6	16.8	37.7	15.6	74.6	22.6	32.5	24.9	17.6	26.4
Complete primary	9.2	67.5	11.0	26.3	10.8	13.7	10.8	12.6	63.8	15.7	25.9	16.1	13.4	16.3
Incomplete secondary	33.2	57.6	34.0	22.5	33.2	11.3	32.2	30.0	62.5	36.5	25.9	38.2	13.4	38.8
Complete secondary	10.4	45.5	8.4	14.5	6.7	66.	5.9	15.5	48.7	14.8	16.7	12.8	7.7	11.6
Incomplete university	8.4	26.8	4.0	8.3	3.1	3.6	2.6	12.3	26.7	6.4	8.3	5.1	3.5	4.1
Complete university	5.8	16.5	1.7	4.4	1.1	1.7	0.8	13.8	13.7	3.7	3.9	2.6	1.6	2.2
Average education level household members														
Less than 6	37.3	83.2	51.0	39.7	58.8	22.7	63.7	26.6	84.2	37.3	41.4	43.3	23.9	46.9
6 to 10	40.0	59.0	38.7	21.6	34.3	10.4	31.4	45.4	64.3	48.6	26.2	46.6	13.4	45.0
10 or more	22.7	27.7	10.3	7.6	6.8	2.9	5.0	27.5	30.7	14.0	9.4	10.2	4.0	8.1
Employment characteristics														
Blue-collar worker	11.6	78.1	16.3	34.2	18.2	18.5	19.2	16.7	75.6	23.1	33.6	25.2	18.2	26.3
White-collar worker	39.2	43.7	30.8	15.6	28.0	7.5	26.3	33.3	41.4	25.3	15.3	22.9	7.4	21.4
Employer	2.6	35.8	1.7	13.2	1.6	6.6	1.5	6.2	34.9	3.9	10.9	3.0	4.7	2.5
Self-employed	37.9	61.0	41.6	24.2	42.1	12.5	42.3	29.5	63.5	34.4	26.7	35.5	14.2	36.4
Other	8.7	61.2	9.6	25.3	10.1	13.8	10.7	14.3	50.4	13.2	20.7	13.3	10.8	13.4
Wage earners by sector														
Public sector	45.9	45.8	40.2	17.3	39.5	8.6	39.0	34.1	40.0	26.0	14.5	23.1	6.9	21.6
Private sector	54.1	57.7	59.8	22.4	60.5	11.4	61.0	65.9	59.1	74.0	24.9	76.9	13.0	78.4
Wage earners by sector														
Trade sectors	21.2	63.5	26.1	26.8	28.6	14.2	30.0	21.5	67.4	26.6	28.5	27.6	15.0	28.1
Non-traded sector	78.8	48.4	73.9	18.0	71.4	8.9	70.0	78.5	51.0	73.4	20.5	72.4	10.5	71.9

Source: INE, Encuesta Integrada de Hogares 1989 and 1993 *Note:*
See text, footnote 10, for definition of poverty indices and Appendix A. 2 for poverty line definitions.

Table 6 Bolivia: Urban Poverty Profile High Poverty Line, 1989 and 1993

Socio-demographic characteristics	1989							1993						
	Total pop. (% share)	P_0	% contr.	P_1	% contr.	P_2	% contr.	Total pop. (% share)	P_0	% contr.	P_1	% contr.	P_2	% contr.
Overall		27.9		8.2		3.4			28.3		8.5		3.5	
Gender of head of household														
Male	83.3	22.5	86.4	6.3	85.9	2.5	84.5	82.1	22.7	85.1	6.4	83.4	2.6	81.1
Female	16.7	17.7	13.6	5.2	14.1	2.3	15.5	17.9	18.1	14.9	5.9	16.6	2.7	18.9
Ethnicity														
Indigenous	27.7	37.4	39.5	11.7	42.6	5.1	44.7	34.4	33.7	43.2	10.6	45.4	4.5	46.9
Non-indigenous	72.3	21.9	60.5	6.1	57.4	2.4	55.3	65.6	23.2	56.8	6.7	54.6	2.7	53.1
Educational level of head of household														
No education	6.8	35.7	10.0	11.3	11.1	4.9	11.6	0.3	46.8	0.5	17.8	0.7	8.6	0.9
Incomplete primary	26.2	34.9	37.8	10.8	40.6	4.7	42.8	15.6	38.2	27.8	11.2	28.8	4.6	29.9
Complete primary	9.2	28.9	11.0	8.5	11.3	3.5	11.3	12.6	28.3	16.7	7.9	16.5	3.2	16.7
Incomplete secondary	33.2	23.5	32.3	6.3	30.0	2.4	28.3	30.0	27.6	38.7	8.0	39.8	3.2	39.6
Complete secondary	10.4	13.8	5.9	3.2	4.8	1.1	4.0	15.5	15.6	11.4	3.7	9.5	1.3	8.4
Incomplete university	8.4	6.8	2.3	1.6	1.9	0.6	1.7	12.3	5.8	3.3	1.4	2.8	0.5	2.6
Complete university	5.8	3.0	0.7	0.5	0.4	0.2	0.3	13.7	2.4	1.5	0.8	1.8	0.3	1.9
Average education level household members														
Less than 6	37.3	48.7	65.1	15.6	71.1	6.8	74.4	26.6	51.0	48.2	16.5	51.8	7.3	55.1
6 to 10	40.0	21.2	30.3	5.4	26.3	2.0	23.8	45.4	27.7	44.6	8.0	43.0	3.2	40.7
10 or more	22.7	5.6	4.5	1.0	2.7	0.3	1.8	27.5	7.4	7.2	1.6	5.2	0.5	4.2
Employment characteristics														
Blue-collar worker	11.6	40.3	20.2	11.8	20.7	4.8	20.5	16.7	38.6	26.9	11.5	27.8	4.8	28.8
White-collar worker	39.2	14.9	25.3	4.0	23.4	1.6	22.5	33.3	15.0	20.9	4.0	19.2	1.5	17.5
Employer	2.6	13.7	1.5	3.6	1.4	1.4	1.3	6.2	10.0	2.6	2.2	1.9	0.7	1.4
Self-employed	37.9	25.9	42.6	7.5	42.6	3.0	42.7	29.5	29.5	36.4	8.8	37.5	3.7	38.9
Other	8.7	27.5	10.4	9.1	11.9	4.0	13.0	14.3	22.1	13.2	6.6	13.5	2.6	13.4
Wage earners by sector														
Public sector	45.9	45.8	40.2	17.3	39.5	8.6	39.0	34.1	40.0	26.0	14.5	23.1	6.9	21.6
Private sector	54.1	57.7	59.8	22.4	60.5	11.4	61.0	65.9	59.1	74.0	24.9	76.9	13.0	78.4
Wage earners by sector														
Trade sectors	21.2	63.5	26.1	26.8	28.6	14.2	30.0	21.5	67.4	26.6	28.5	27.6	15.0	28.1
Non-traded sector	78.8	48.4	73.9	18.0	71.4	8.9	70.0	78.5	51.0	73.4	20.5	72.4	10.5	71.9

Source: INE, Encuesta Integrada de Hogares 1989 and 1993
Note: See text, footnote 10, for definition of poverty indices and Appendix A. 2 for poverty line definitions.

The survey data show a substantial improvement in the educational attainment of the urban population in recent years. The average years of schooling of the population of 18 years and over increased from 8.7 to 9.8 years between 1989 and 1993 (see Table 8 for the 1993 data) and a small improvement took place between 1993 and 1995 (average of 9.9 years). The educational reform program initiated in 1994 may provide the conditions for further improvements in the access to and quality of education in Bolivia, but it may take several years more before these improvements become visible in overall educational levels. Table 8 reveals the inequality in access to education. Differences in educational attainment in urban areas are significant between males and females, indigenous and non-indigenous population groups (but with indigenous groups catching up, see below) and between occupational groups more likely to face poverty conditions (blue collar workers, self-employed) and other groups (office workers and employers).

An analysis of the effect of education on the earning capacity of urban workers, using Mincerian earnings functions, [12] shows that (see Tables A.6-A.11):

- the private return on an additional year of education is 10 percent (1993) and seems to have increased since 1989 (8%);
- the rate of return on education for urban workers shows a drop (to 5%) however according to the 1995 survey data (Table A.8). This decrease might be explained by government wage policies affecting income of skilled workers in the public sector (white collar), while allowing a small wage hike for unskilled workers in the private sector (cf. Table 4);
- the educational return is slightly higher for workers in the non-traded sector (11%) than in the traded sector (10%), but that the premium on additional schooling in both traded and non-traded sectors increased since 1989. And again in 1995 a decrease occurs in both sectors leaving traded workers with a higher return than non-traded;
- returns to education are higher for non-indigenous workers, but returns for indigenous workers show an increase between 1989 and 1993. Results also show that there is little premium for indigenous workers to have more experience or to work longer hours;

12 The standard Mincerian earnings function tries to explain wage differentials by differences in years of schooling, experience, and number of hours worked, i.e. $W = f(S, E, HR, ..)$, where W is the level of wage earnings, S the number of years of schooling attained, E the years of work experience (proxied by the age of the worker less the number of years of schooling, less 6 years of pre-school age). In Tables A.6-A.11 results are shown for the Mincerian functions estimated for subgroups of workers, using a semi-logarithmic specification. Preliminary results showed that for experience (age) a significant hyperbolic relation exists, but not for schooling, such only a quadratic expression for experience was included in the estimated function.

- returns to education were lower for females in 1989 (6.8%) but higher in 1993 (11.0% versus 9.4% for males). In 1995 the returns are lower for both groups, but still higher for females. However, as shown below, this is the economic return to education at the margin. It does not mean average earnings for females have become higher than for men (see below);
- returns to education are lower for poverty groups (structurally and independent of the poverty line definition or welfare measure), many of which face labour market discrimination for being indigenous and/or having less than primary education.

These differences hint at the persistence of important labour market rigidities and inequalities in income earning opportunities.

! **Gender**: As indicated above, women in urban Bolivia tend to have less years of schooling and, even more markedly, show substantially higher illiteracy rates than males (Table 8). These conditions make it more likely for women to face poverty conditions as measured through the indirect (income) method. According to the household survey data, about 18 percent of urban households are headed by females. The relative living conditions of these households *vis-à-vis* male-headed households appear to depend on the welfare measure used (income or consumption). When using the consumption measure for either the >high= or >low= poverty line (Tables 5 and 6), it appears that the poverty incidence and intensity of female-headed households are lower than that of male-headed households and that the poverty incidence decreased for the female-headed households (see also Table 7). However, when using the income measure, the evidence is somewhat blurred: in 1989 the poverty incidence for female-headed households is higher, but improvements in educational attainment and earnings returns in the labour market indicate that the probability of female-headed households being poor had decreased significantly by 1993. These findings are further substantiated by the logit/probit analysis of poverty conditions (see below).

Thus, using 1989 and 1993 as benchmarks for trends in the period of structural adjustment (for lack of further comparable data), we may safely conclude that poverty decreased for females, which we are inclined to ascribe to improved access to education and, hence, labour market opportunities. Yet, a substantial gender gap remains:

- Urban illiteracy is nearly ten points higher for females than for males, and more than twenty points higher for female household heads (see Table 8). As suggested by other studies, high female illiteracy tends to be highly correlated with high fertility rates,[13] higher nutritional deficits among young children and low use of health services.[14]

[13] The total fertility rate for women with primary education or less is estimated at 6, whereas that for women who have complete secondary education is 2.7.

[14] See Behrman and Deolalikar (1995) for a review of the literature. UDAPSO (1995b) and Ii (1994) estimate demand functions for health care services in Bolivia, showing a strong positive correlation between both literacy and the educatio nal level of the mother on the demand for health care (for both adults and children). See also

- Further, school enrollment is positively associated with parents= education and, at the primary level, particularly strongly with the educational level of the mother (see UDAPSO 1995b, World Bank 1996). In urban areas enrollment rates are about the same for boys and girls (about 87 percent, gross enrollment), with rates for girls improving at a faster rate than for boys. As indicated in the next section, this contrasts with the situation in rural areas, where access of females to education is substantially lower, a factor, among other things, closely associated with the mother=s illiteracy and the high incidence of indigenous population.
- Females continue to face labour market discrimination. Despite having caught up on the educational gender gap, average pay for female workers remains nearly half that of male workers (see Table 9).

Table 7. **Bolivia: Growth and Distribution Effects of Changes in Poverty in Urban Areas by Selected Socioeconomic Groups 1989-93**
(percent)

	Change in poverty incidence $(P_0)^2$	Growth effect	Distribution effect	Interaction effect
TOTAL URBAN	-0.6	-1.1	0.6	-0.1
Blue collar workers	-2.5	-1.3	-1.2	0.0
Self-employed	2.5	-1.2	1.6	2.1
Traded sector workers	3.9	-1.1	5.0	0.0
Non-traded sector workers	2.6	-1.0	3.6	0.0
Indigenous	-5.9	-1.0	-4.8	-0.1
Non-indigenous	0.9	-1.2	2.1	0.0
Males	-0.2	-1.1	0.7	0.2
Females	-0.1	-0.6	1.7	-1.2

Notes:
1. Refers to socioeconomic characteristics of head of household. See footnote 12 for estimation methodology.
2. Poverty incidence change (positive sign means increase in poverty incidence) as estimated by using consumption as welfare measure and high poverty line. Decomposition analysis for changes in poverty using the low poverty line and using the poverty gap or poverty intensity measures yield changes of different size, but do not alter the direction of change for the growth or distribution effects.

! **Ethnicity:** A large share of the Bolivian population can be characterized as indigenous. Ethnicity is defined here by language, a commonly accepted criterion in demographic analysis. There is no official definition, though. The 1992 population census and the urban surveys permit the use of a consistent definition by the language criterion. In this paper the indigenous population (as in other studies, UDAPSO 1995c, World Bank 1996) includes bilingual (Spanish and native language) and

monolingual (native language only) speakers.[15] By this criterion, 34 percent of the urban population (up from 27 percent) is indigenous.[14]

Table 8. Bolivia: Educational Achievement and Access to Drinking Water by Socioeconomic Characteristics, Urban Areas 1993

	Average years schooling		Illiteracy (%)		Access to safe drinking water (%)
	Head househ.	Individ. (>18)	Head househ.	Indiv. (> 15)	
Total urban	9.4	9.8	5.9	6.4	92
Below/above poverty line					
Extreme poor	6.9	7.7	9.6	10.7	86
Poor	7.8	8.5	8.1	8.6	89
Non-poor	11.2	11.3	3.6	3.8	97
Gender					
Male	9.6	10.3	2.3	1.9	92
Female	8.6	9.4	22.5	10.3	93
Ethnicity					
Indigenous	8.4	8.5	8.2	11.4	91
Non-indigenous	10.7	11.0	2.9	2.2	94
Occupational category					
Blue collar worker	7.6	8.3	3.2	2.9	88
White collar worker	11.8	12.6	0.2	0.2	96
Self-employed	8.3	8.0	8.5	11.7	90
Employer	10.2	10.6	0.0	0.2	95
Other	6.9	7.7	9.1	6.3	90
Economic sector					
Traded	8.9	9.1	2.6	3.8	91
Non-traded	9.8	10.1	4.0	5.3	92

Source: INE, *Encuesta Integrada de Hogares*, 1993.
Note: Poverty defined by >high= poverty line and using consumption measure.

As shown in Table 6, the extent and intensity of poverty are much higher among indigenous households (in 1993, P_0 was 66% using the high poverty line definition and P_2 was 16%, both indices well above the urban average). Living conditions of the indigenous population did show some improvement though, among others reflected in a reduction of the poverty incidence by almost 4 percentage points between 1989 and

[15] Bolivia has seven native languages spoken by at least 10,000 persons, of wich Quechua, Aymara and Guaraní are the most important.

[14] This rather large increase in the share of the indigenous population in urban areas between 1989 and 1993 may be partly explain by the rapid rural-urban migration, most consisting of indigenous population, and higher natural population growth of indigenous groups (associated with lower educational levels and higher fertility rates). It is possible, however, that inadequate updating of the sample frame for the household surveys and related sampling biases may have affected the outcome as well.

1993. As indicated above, average educational levels attained by the indigenous population are behind this trend, which is further reflected in income growth and a reduced inequality among indigenous workers and their families (see Table 7). Yet, despite these positive trends large inequalities and labour market discrimination persist *vis-à-vis* non-indigenous workers and households. As indicated above, private returns to education are lower for indigenous workers and average pay is nearly 40 percent below that of non-indigenous workers. A substantial earnings differential remains after taking account of educational, employment and gender differences, as shown by Table 10.

Education is clearly a crucial factor in achieving greater equality between indigenous and non-indigenous groups by creating better labour market access through reduced illiteracy, better skills and overcoming linguistic differences. The existing process is one where the burden of assimilation is put on the indigenous population requiring to adapt to the urban, Spanish culture dominated social and economic life. Reduced discrimination in the labour market will also require attitude changes from non-indigenous employers. Educational programs and curricula recognizing multi-ethnicity may help to promote change in this direction, while more appropriate curricula targeted at the non-Spanish speaking population may help to raise further enrollment of the indigenous population.

! **Geographical location:** The ranking of poverty in urban areas by geographical location partially coincides with that of the concentration of indigenous population. In 1993, the poorest urban areas (city, departments) in terms of the *intensity* of poverty (P_2) were - with the share of indigenous population in parentheses: 1. Potosí, Potosí (53.2); 2. Oruro, Oruro (45.3); 3. Sucre, Chuquisaca (55.3); 4. El Alto, La Paz (51.7); 5. Cochabamba, Cochabamba (47.6); 6. Tarija, Tarija; 7. Trinidad, Beni (6.5); 8. La Paz, La Paz (39.4); 9. Santa Cruz, Santa Cruz (9.3); 10. Cobija, Pando (22.1). Geographical dispersion of living conditions as measured by Aunsatisfied basic needs≅ (see Section 2) is smaller than that observed by the income/consumption measure,[17] and shows a slightly different ranking from poor to less poor: Beni, Oruro, La Paz (capital and El Alto), Potosí, Cochabamba, Tarija, Santa Cruz, Pando and Chuquisaca (Sucre). This suggests that in most urban areas of the highlands, poverty seems to be structural and chronic (low incomes, low basic needs satisfaction and access to social services), while in some parts of the lowlands (Santa Cruz, Beni) poverty may be characterized as >inertial= (higher incomes, but low basic needs satisfaction).

[17] The incidence of urban households with unsatisfied basic needs ranges from 40.4 (Chuquisaca/Sucre) to 67.4 (Beni/Trinidad), using data from the Population Census and UDAPSO=s poverty map methodology (Ministerio de Desarrollo Humano, 1994), while the poverty incidence using the consumption measure for the >high= poverty line ranges from 26.7 (Pando/Cobija) to 82.8 (Potosí).

In sum, urban poverty in Bolivia, as measured by the indirect method, is closely associated with the following characteristics of the head of the household: employment characteristics (affecting blue collar workers in traded sectors and self-employed workers in particular); low educational levels; being indigenous; and being relatively young. A logit/probit analysis performed for the 1989 and 1993 surveys confirms that these are the key features in determining the probability of belonging to a poor household, for all income/consumption based poverty definitions (see Appendix Tables A.12-14).18 The analysis also confirms the ambiguity regarding gender as a determinant of the likelihood of being poor: using consumption as the welfare measure, the female status of the head of the household shows a negative probability, while using income the probability is positive. As discussed in Appendix A.2, measurement problems may underlie this outcome, but it could also hint at a tendency among female household heads to give higher priority to consumption and immediate basic needs satisfaction, than male-headed households. However, a more detailed analysis of consumption and savings patterns would be required to substantiate this point.

18 According to the logit model, the probability that someone is poor is defined as:

$$P = \frac{1}{1 + e^{-\Sigma b_i X_i}}$$

where X_i are the characteristics of the household/individual and $ß_i$ the coefficients for the respective variables. The probability that someone is poor is P and non-poor 1-P. The odds ratio is defined as P/(1-P) which is equal to:

$$\frac{P}{1-P} = \frac{1}{e^{-\Sigma b_i X_i}} = e^{\Sigma b_i X_i}$$

and the logit or log-odds ratio is:

$$\log\left(\frac{P}{1-P}\right) = \Sigma b_i X_i$$

where the logit coefficients $ß_i$ indicate the change in the logit as a result of a unit change in X_i.

Table 9. Bolivia: Male-Female Earnings Differentials in Urban Areas, 1989, 1993 and 1995
(Average monthly earnings in Bolivianos, at 1993 prices)

	Mean monthly earnings, 1989		Mean monthly earnings, 1993		Mean monthly earnings, 1995		Male/Female		
	Males	Females	Males	Females	Males	Females	1989	1993	1995
Total urban	800	447	917	547	867	499	1.8	1.7	1.7
Ethnicity									
Indigenous	430	159	633	302	...	...	2.7	2.1	...
Non-indigenous	582	194	837	556	...	...	3.0	1.5	...
Educational level									
No education (less than primary)	262	131	422	213	481	321	2.0	2.0	1.5
Primary, complete	465	151	544	257	578	342	3.1	2.1	1.7
Secondary, complete	554	206	695	498	766	462	2.7	1.4	1.7
University, complete	1,462	453	1,839	916	1,801	1082	3.2	2.0	1.7
Occupational category									
Blue collar worker	547	296	428	252	481	281	1.8	1.7	1.7
White collar worker	872	511	851	627	956	704	1.7	1.4	1.4
Self-employed	843	491	1,207	552	768	405	1.7	2.2	1.9
Employer	2,028	1,217	1,614	1,753	1,716	1,334	1.7	0.9	1.3
Other	55	114	307	188	339	209	0.5	1.6	1.6
Economic sector									
Traded	697	389	675	422	749	430	1.8	1.6	1.7
Non-traded	833	456	761	427	909	510	1.8	1.8	1.8

Source: INE, *Encuesta Integrada de Hogares*, 1989, 1993 and 1995.

Table 10. Bolivia: Indigenous/Non-indigenous Earnings Differentials in Urban Areas, 1989 and 1993
(Average monthly earnings in Bolivianos, at 1993 prices)

	Mean monthly earnings, 1989		Mean monthly earnings, 1993		Indigenous/ Non-indig.	
	Indigenous	Non-indigenous	Indigenous	Non-indigenous	1989	1993
Total urban	484	762	630	896	0.6	0.7
Educational level						
No education (less than primary)	153	172	295	468	0.9	0.6
Primary, complete	290	314	379	468	0.9	0.8
Secondary, complete	314	388	580	666	0.8	0.9
University, complete	676	1,121	1,288	1,464	0.6	0.9
Occupational category						
Blue collar worker	417	595	384	435	0.7	0.9
White collar worker	536	827	693	812	0.6	0.9
Self-employed	495	817	664	1,142	0.6	0.6
Employer	1,227	2,248	1,238	2,035	0.5	0.6
Other	94	98	186	206	0.9	0.9
Economic sector						
Traded	437	732	472	749	0.6	0.6
Non-traded	496	769	496	721	0.6	0.7

Source: INE, *Encuesta Integrada de Hogares*, 1989 and 1993.

4. Rural Poverty

The structural adjustment process clearly shifted relative prices towards traded goods sectors, as expressed through the real exchange rate (see Figure 3). However, the domestic relative price for the agricultural sector did not move in the same direction as visualized in the declining trend of the agricultural terms of trade since 1985 (see Figure 2). With rising (urban) modern sector wages (see Figure 2 and Table 4), this seems to indicate that structural adjustment in Bolivia has led to a widening, rather than to a closing of income disparities between urban and rural areas. Agricultural production increased at 2.8 percent per annum over the past decade that is just above the population growth rate. Much of the expansion has concentrated in the development of export crop production in the lowlands around Santa Cruz, while farming for self-consumption and the domestic market in the *Altiplano* has been virtually stagnant.

No comparable household survey data exist for rural areas in Bolivia and the available 1995 survey only covers four departments of the rural Sierra. Nevertheless, the trends for the agricultural sector sketched above provide little optimism about improvements in living conditions in rural Bolivia. While incomes in the rural lowlands may have increased on average, levels of basic needs satisfaction remain very low throughout the rural areas (see Tables A.2-4). More than 90 percent of the rural population in all rural areas (including Santa Cruz) is affected by unsatisfied basic needs, as defined by the poverty map of the *Ministerio de Desarrollo Humano* (1994) (but see Section 2 above). One third of the rural households has children not attending school, illiteracy rates range from 22.6 percent of the adult population in rural Santa Cruz to 54.2 percent in rural Chuquisaca and infant mortality rates are almost double those in urban areas. The survey data for the rural Sierra for 1995 confirm this picture of great shortfalls in basic needs satisfaction. Table 11 shows that adults have enjoyed less than four years of formal education, nearly 28 percent is illiterate and 60 percent has no access to safe drinking water. Indicators show an even more worrisome situation for females who, on average, have had barely more than a year of education.

Table 11. Bolivia: Educational Achievement and Access to Drinking Water by Socioeconomic Characteristics, Rural Sierra 1995

	Average years schooling		Illiteracy (%)		Access to safe drinking water (%)
	Head househ.	Individ. (>18)	Head househ.	Indiv. (> 15)	
Total rural Sierra	4.3	3.7	19.5	27.8	40
Below/above poverty line[1]					
Extreme poor	4.2	3.6	20.9	29.6	36
Poor	4.2	3.6	20.7	29.5	38
Non-poor	4.4	4.2	13.3	17.4	54
Gender[2]					
Male	4.5	4.9	14.8	12.8	40
Female	2.6	1.3	67.7	42.1	40
Ethnicity[2]					
Indigenous	4.1	3.5	20.3	29.4	40
Non-indigenous	6.8	6.5	8.0	6.9	45

Source: UDAPSO, *Encuesta Socio-Económica de Hogares*, 1995.

Notes: 1. Poverty defined by >high= poverty line and using consumption measure.

2. Socio-demographic characteristic of head of household.

This gloomy picture of widespread, severe rural poverty is confirmed by the estimates using consumption data from the limited rural household survey for 1995.[19] The results reported in Table 12, show a poverty incidence of 88 percent and an average shortfall of consumption levels with respect to the poverty line of nearly 60 percent (poverty gap), reflecting the severity of poverty in the rural Sierra.[20] The poverty profile shows little difference in poverty conditions by ***gender*** and ***ethnicity*** which is a result of both the very low average living conditions and the low proportion (less than 10 percent) of both female-headed households and non-indigenous households in the rural Sierra. The poverty incidence for female-headed households is slightly below that of male-headed households. A slightly higher share of non-

[19] The rural survey shows almost 15 percent of households not reporting any income and moreover income measurement as such shows many weaknesses. For this reason we concentrate on poverty as measured by consumption only, even though the consumption measure should also be taken with caution, as consumption is only measured by main spending categories without detail regarding prices and quantities. Self-consumption is including in the total consumption measure, however, and, according to the survey data, is about 13 percent of the total. In any case, the results should be taken as indicative, rather than as a precise measurement. Given the apparent magnitude of rural poverty, there is great urgency to improve the household survey system in Bolivia and ensure coverage is extended to rural areas.
A first-order dominance test of the poverty incidence in urban areas and the rural Sierra (see Appendix A.3, Figure A.7), shows that - independent of the definition of the poverty line - rural poverty is more severe in rural areas, which is hardly surprising.

[20] The table refers to poverty using the >high= poverty line. The memorandum items show the aggregate result for the >low= poverty line, which for rural areas is close to the >high= poverty line and hence also the poverty estimates by the lower poverty line are much different. Also, the poverty profile does not alter in any significant way.

indigenous households appears to be below the poverty line, but the severity of poverty is somewhat less than in the case of the indigenous households. As reported in Table 12, ***education*** appears to be an important socioeconomic characteristic determining poverty conditions in the rural Sierra. It shows that the poverty incidence and gap fall most significantly for those household with an average level of 9 years or more of formal education. However, this applies only to a tiny proportion of households in the rural Sierra (0.2%) and the difference between the average years of schooling of the heads of household among poor and non-poor is small (4.2 versus 4.4 years; see Table 11). As indicated below, the incomplete survey data suggest that other factors related to asset ownership and access to agricultural inputs are equally important.

The limited survey does not permit the analysis of poverty levels by many other socioeconomic characteristics, relevant to rural conditions. Variables related to the size of land holdings, land quality and tenancy are included in the questionnaire, but upon evaluation failed to show adequate reporting for a large enough portion of the sample. The survey data do indicate, however, that the farm size tends to be very small,[21] many farmers have very fragmented land holdings (on average 2.7 parcels per household), most farmers do possess titles to land, but do not have access to irrigation (80%) or formal credits (86%).

With such a high poverty incidence, it does not make much sense to perform a logit/probit analysis of poverty. Instead, we performed an *exploratory* cross-section regression analysis of possible determinants of the degree of poverty, as measured through the indirect approach. Some important determinants are clearly left out (see above) given the low multiple regression coefficient found in all cases. The coefficients for the variables included in the final regression all showed the expected sign and were stable and significant in various alternative specifications. The results from this analysis show that the poverty intensity (P_2) in the rural Sierra tends to be higher: (a) the lower the number of years of schooling (each additional year reduces the poverty intensity by 2 percentage points); (b) if one belongs to an

[21] The World Bank study (World Bank 1996) estimates an average farm size of about 1.2 hectares and an average parcel size of 0.5 hectares. However, we could not reproduce this result. Moreover, farm size appeared to be recorded for only 20 percent of total reported parcels.

Aymara speaking family; (c) the larger the family size; (d) the younger the head of the household; and (e) if the farm household lacks access to irrigation.[22]

Poverty thus seems closely associated with factors determining agricultural productivity and access to off-farm employment, such as education, experience (age) and access to modern farm inputs (irrigation). Access to land is likely another key factor. The Aymara population appears particularly poorly endowed with such resources.

Table 12 **Bolivia: Poverty Profile in the Rural Sierra, 1995**
(using consumption data and >high= poverty line: Bs. 159)

	Pop. Share	Mean consumption of poor (Bs. month)	Poverty incidence (%) P_0	Poverty gap (%) P_1	Poverty severity (%) P_2
Total rural Sierra	100	54	88.3	58.6	44.1
Gender head of household					
Males	98	53	88.4	58.8	44.3
Females	2	73	82.4	44.8	31.2
Ethnicity					
Indigenous	92	53	88.3	59.1	44.9
Non-indigenous	8	68	88.9	51.1	34.4
Average educational level (household members)					
less than 3 years	52	46	92.2	65.4	52.2
3 to 6 years	38	59	84.8	53.4	37.9
6 to 9 years	9.8	75	81.0	42.5	25.7
more than 9 years	0.2	137	50.0	6.7	1.0
Memo:					
>Low= poverty line (Bs. 140)	100	51	85.8	54.7	40.4
Gini coefficient consumption		0.482			

Source: UDAPSO, *Encuesta Socio-Económica de Hogares, 1995.*

[22] The corresponding regression results for 317 rural households are:

$$P_2 = 0.58 - 0.02\,EDUC - 0.004\,AGE + 0.02\,FAMSIZE + 0.07\,AYMARA + 0.09\,MALE - 0.137\,IRRI$$
$$(5.9)\ (-3.6)\quad (-3.2)\quad (2.3)\quad (2.2)\quad (1.5)\quad (-3.7)$$

$R^2_{adj} = 0.12$

where: P_2 = poverty intensity (FGT index), EDUC = educational level of head of household; AGE = age of household head; FAMSIZE = family size; AYMARA = ethnicity dummy (=1 if Aymara speaking); MALE = gender dummy (=1 if household head is male); IRRI = dummy for irrigation (=1, if farm household has irrigation).

All coefficients (except for MALE), significant at 5% level of confidence or better; t-statistics are in parentheses.

Note: Poverty indices refer to individuals. See footnote 10 for definition of poverty indices.

5. Poverty and Economic and Social Reform Policies

Bolivia=s economic reforms clearly have brought economic stability and some structural change, but it has failed so far to bring a major boost to the economy and export production. Per capita income growth has been slight and the economic gains after a decade of reform policies have been able to achieve little, if anything to reduce poverty (at least, if defined by the consumption measure). Urban poverty groups (unskilled workers, self-employed) gained from job creation in the private sector (both formal and informal), but witnessed negative growth in their primary incomes. A portion of the families headed by blue collar workers managed to escape poverty conditions by engaging more household members in the income generation process. Self-employed appear to have followed the same survival strategy, but nevertheless saw an increase in poverty incidence between 1989 and 1993. The wage increases mainly benefitted white collar workers in declining public and non-traded goods sectors. It should be noted that, although inconsistent with orthodox structural adjustment policies, the wage hike for public sector employees has been consistent with administrative reform policies providing incentives for high quality workers to remain in the public sector. In more recent years, between 1993 and 1995, there has been some reversal in these trends with real wages falling for public employees and lower unemployment allowing for some recovery of real wages in the low income segments of the labour market. Rural poverty remains widespread and severe for structural reasons, related to extremely poor human resource endowments and poor productive infrastructure.

The Bolivian government has taken steps towards reforms in a number of key areas with the objective of reducing poverty and inequality in the long-run. We summarize the strategy in four reform areas: (1) economic reforms; (2) social sector reforms; (3) reforms to the social safety net systems; and (4) administrative and institutional reforms. While ambitious steps in the right direction it is less clear whether all areas add to a successful strategy. Some potential pitfalls are discussed below. While economic reforms were initiated a decade ago, much of the crucial social reform process is just underway and it is as yet difficult to evaluate or even to speculate about their precise impact on poverty reduction. Clearly, the road to reform which is still under construction is likely to be long and bumpy.

! **Economic reforms:** The economic reform process seems irreversible and has established many new rules of the game to the Bolivian economy. Clearly, however, economic liberalization has not proven to be the *deus ex machina* some might have hoped for. Active intervention seems to be required in a number of priority areas that would pave the way towards higher productivity and better labour market

opportunities for remunerative employment. This is not the place to spell out a full-fledged strategy, but key ingredients should include: reforms of the education system (see below), improvements in infrastructure, improving mechanisms providing better access of firms (particularly small firms in agriculture, industry and trade) to credit supplies, and improving access to land and agricultural inputs for poor farmers. Some of these measures will require complex legal reforms (such as in credit regulations and land tenure; see World Bank 1996 for details), while others (investments in infrastructure and education) will require vast resources in the years to come, requiring important support from the donor community.

! **Social sector reforms:** High illiteracy and low educational attainment, particularly evident in rural areas and among the indigenous and female population, are related to the inadequate coverage, low quality and high inefficiency of the educational system. Slight improvements have been attained in urban areas, but vast educational deficiencies remain. The educational reform program launched in 1994 seems a good step in the right direction, but even much greater efforts seem to be required to achieve, as a priority, universal primary education to and reduce barriers for female enrollment and access of the indigenous population. Health indicators have improved over the past decades, but great shortfalls remain. On the supply side, sectoral priorities (preventive/curative, urban/rural) seem poorly defined, leading to inefficient allocation of resources and underinvestment in preventive health care and health services in rural areas. On the demand side, improved health conditions will have to be supported by improvement in other areas (such as a reduction of female illiteracy). Though aware of the problems, a health sector reform is as yet only in its initial stages of design. Both areas, educational and health reform should be given priority in a long-term strategy towards equitable development, but - at least in the short-run - without help from the donor community, it may fall short in coverage and investment resources.

! **Social protection and safety nets:** The Bolivian government created a social fund (ESF) in 1986 to alleviate the initial cost of adjustment that effectively benefited a large number of beneficiaries, providing employment to more than 20,000 workers by mid-1990, many of whom were displaced workers from the restructured mining sector (Jorgensen, Grosh and Schacter 1992). While reasonably effective in relation to its objectives, the ESF could not fully compensate for the income and employment losses suffered during the crisis or, as the data presented in this paper suggest, manage to reduce overall poverty in Bolivia. The Social Investment Fund (FIS) replaced the ESF in 1990. The FIS is to focus on poverty alleviation through the provisioning of infrastructure and the development of basic services in education, health and sanitation. Existing evaluations (UDAPSO 1995d, World Bank 1996) suggest the FIS is reaching its target population of the poor rural population in 80 priority provinces

and has benefited about 1.5 million people (about 20 percent of the total population). The evaluations also indicate, however, that the effectiveness of many projects appears deficient due to inadequate consideration to demand factors (income, parents= education, etc.). As a result, in areas with FIS-supported health centers there has been no increase in treatments for diarrhea, respiratory diseases and pregnancy, considered to be priority areas of attention. FIS-supported schools have failed to record increases in enrollment or reduction in drop-out rates. These findings suggest there is a need to find greater coordination and synergy between the FIS=s activities and the aforementioned reform areas.

! The government has also embarked on a reform of the **social security system** to improve coverage and benefits of lifelong protection of workers and their families. Part of the system=s improvements is contingent on the success of the capitalization (>privatization=) program of public enterprises.[23] If successful, and it=s too early to make judgements about this reform program, it will permit expansion of the social security coverage among (urban) formal sector workers and low-income workers finding employment in the modern sector. Clearly, with a large share of the work force in informal activities in urban and rural areas and with the economy only slowly moving towards the creation of employment in the formal sector, many Bolivians will be unable to benefit from the scheme in the short-run. Moreover, the size of the capitalization program is limited, hence limiting the potential scope of this non-contributory scheme. Further expansion of the social security system will require emphasis on the contributions of workers. The degree of social protection these can provide to workers will depend to a large extent on the growth of remunerative employment. At present earnings levels (even after considering rates of return on savings), social security benefits will likely maintain most pensioners below the poverty line.

! **Administrative and institutional reforms**: The allocation of public investment in social sectors bears (on aggregate) a weak relationship with existing poverty levels as measured by unsatisfied basic needs (World Bank 1996). The targeted FIS program provides some compensation, but as indicated shows apparent weaknesses for failing to take account of demand factors. The *Ley de Participación Popular (LPP)* enacted in 1994 provides the legal framework for an innovative participatory planning process in the allocation of public investment resources at the municipal level. The LPP will likely change the pattern of social sector expenditures in the coming years and allow for a deconcentration of this spending away from the three big urban centers (which traditionally received about 90 percent). Under the LPP, public investment funds will

[23] Under the capitalization program, shares of the privatized public enterprises will be distributed to beneficiaries of the social security system and will be deposited in a share account accessible to beneficiaries when they reach the age of sixty.

be allocated proportionally to the population in each municipality and spending plans are to be decided on at the local level. While bringing spending decisions closer to the population, the local decision-making process and distribution of political power will determine the degree of match between sectoral allocations and needs of the population. There will probably be a deconcentration of resources, but in many areas resources are likely to fall short of needs as allocations are based on population size rather than needs. This seems to imply that there remains a need for targeted social services delivery to attend to areas with the greatest shortfalls of basic needs.

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Appendices

APPENDIX 1: Bolivia=s Household Surveys

The data used for most poverty estimates comes from two different sources, the urban data (1989, 1993 and 1995) come from the *Encuesta Integrada de Hogares (EIH)* executed by the National Statistical Institute (INE), and the rural data (1995) comes from the Limited Household Survey, implemented by UDAPSO.

The 1989 survey covers households in the provincial capital cities in eight departments and in the urban centers with populations of 20,000 and above. The sample size of the 1989 survey is 7,624 households (37,287 individuals) representing a population of 2.4 million. The sample size of the 1993 survey is 4,297 households (19,769 individuals) representing a population of 3.0 million. The sample size of the 1995 survey is 5,534 households (25,314 individuals) representing a population of 3.2 million. The EIH contains a core module of socio-demographic, education and employment data; and other modules with indicators relating to health, maternal health, housing, access to public infrastructure, income, and consumption. The module containing consumption data collects household information on expenditures during a specified reference period includes data on the consumption of non-durable as well as durable goods. Some expenditure data is integrated in the other modules, such as education and health. The income data include all sources of income (wages, rents, interest, self-employment, etc.), but are only based on direct reporting by households. No investigation is available for family/household-based firms or data on household assets to check reliability of estimates derived from these sources.

The rural data for 1995 comes from the Limited Rural Household Survey carried between May and June of that year. The survey was limited to 381 rural households (1,779 individuals) in four departments of the highlands: La Paz, Cochabamba, Oruro, and Potosí, and is therefore not representative for all rural areas. The survey contains socio-demographic information and consumption data.

APPENDIX 2 Poverty Lines for Bolivia

The poverty lines used by the various studies the results of which are included in table 1 of the main text differ mainly because of the value assigned to the minimum food basket required and the Engel coefficient used to convert the extreme poverty line into the poverty line.

The >high= poverty line used by the World Bank (1996) is the nominal value equivalent of a basic food basket for a typical person in La Paz, which was determined at 2,122 calories. The nominal value of this basket was calculated using information on the pattern of consumption as shown in the 1990 Family Budget Survey. The extreme poverty line is defined as the income required to purchase the minimum food basket and has been estimated at Bs. 73.0 (1989), Bs. 121.0 (1993) and Bs. 149.0 (1995) per person per month, respectively. Using an observed Engel coefficient of 0.55 this gives the following poverty lines: Bs. 132.7 for 1989, Bs. 219.9 for 1993 and Bs. 270.9 for 1995.

Psacharopoulos *et al* (1992) define their poverty based on the original poverty lines estimated

by CEPAL.[24] Each of those lines was then deflated or inflated to 1985 levels and converted into US dollars using exchange rates based on the power purchasing parity (PPP) GDP conversion factors provided in Summers and Heston (1988). After a series of calculations, and in order to come out with a poverty line that was comparable across countries the line was set at US$60 monthly per capita with PPP of 1985 and the extreme poverty line was set to be US$30 monthly per capita with PPP of 1985. The countries included in this study are: Argentina, Bolivia, Brazil, Colombia, Costa Rica, Chile, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela. The lines were subsequently inflated using the consumer price index. The lines for Bolivia are for 1986, an extreme poverty line of 34.23 and a poverty line of 68.47. And for 1989 the extreme poverty line is Bs. 55.82 and the poverty line is Bs. 111.63.

Table A.1. Poverty Lines

Poverty line (per capita, per month) in Bolivianos of 1995		
	Urban	**Rural**
World Bank	270.9	158.9
Psacharopoulos et al	207.5	...
UDAPSO	...	96.4
IDB	140.4	140.4

[24] CEPAL developed specific poverty lines for every country in its study (Argentina, Brazil, Colombia, Costa Rica, Chile, Guatemala, Mexico, Panama, Peru, Uruguay and Venezuela). The estimation of the lines started by putting a price to a basic basket of nutritionally balanced food stuff, this basket was developed following the recommendations of a group of experts from FAO and WHO. The choice of articles to be incorporated into the basket took into account the local taste as determined by the latest income and expenses survey for each country. To do this, CEPAL looked at the subgroup of the population which is just meeting an adequate level of nutrition or is slightly above it, in order to reflect the way in which the poor would structure a diet that would meet the nutritional requirements set forth by FAO and WHO.
When there was no data available as to the urban-rural consumption and price differentiations within a country, then the cost of 1,000 calories from the minimum nutrition basket in urban zones was estimated to have a cost equivalent to 95% of the cost in the metropolitan zone, and the cost of 1,000 calories in rural zones was estimated to have a cost equivalent to 75% of the cost in the metropolitan area. Finally the poverty lines were estimated to be twice the cost of the minimum nutrition basket for metropolitan and urban areas, and 1.75 times the cost of the minimum nutrition basket for rural zones.

The >low= poverty line, used by the Inter-American Development Bank in its Economic and Social Data Base (ESDB) is based on the uniform US$60 dollars poverty line estimated by Psacharopoulos *et al*. (1992). But it differs from the line used in that study because the US$60 are converted into current 1985 local currency using the (revised) consumption PPP conversion factor provided by the Penn World Table Mark 5.6a, instead of the GDP PPP conversion factor used by Psacharopoulos *et al.* (1992). The lines were also inflated using the CPI for the corresponding period. The mentioned factors are significantly different, the number used by Psacharopoulos *et al.* (1992) is 0.6119 and the number used by the IDB is 0.4447. For this reason the IDB poverty line differs from that of Psacharopoulos *et al.* and is estimated at, respectively, Bs. 47.8 (1986), Bs. 72.7 (1989), Bs. 121.0 (1993) and Bs. 140.4 (1995). In effect this makes the IDB poverty line (the >low= poverty line in this study) to be almost equivalent to the World Bank=s extreme poverty line.

It is generally assumed that income reported by individuals to interviewers is underestimated in household surveys. The reasons underlying the presumed underreporting are related to poor systematic recording of non-wage incomes by households, as well as fear that reported incomes might be used for fiscal purposes. The major source for underreporting is usually expected to stem from capital incomes (rents, dividends, etc.), other than self-employed incomes. Self-employed incomes are also subject to measurement problems, particularly if no specific investigation is made of the household firm=s activities and income. Self-employed income may be both under- or overreported, the latter if sales rather than net profits are stated as self-employed income. It is a rather common practice in poverty studies for Latin America (e.g., CEPAL, Psacharopoulos) to adjust income data comparing the results obtained using survey data with those from national accounts. In the case of Bolivia the adjustment factors used to correct for possible income underreporting in the surveys are 1.2772 for 1989 and 1.0 for 1993 and 1995. However, as national accounts data are equally subject to potential measurement errors, one cannot be sure whether these adjustments are correct. Moreover, in the Bolivian case, the survey data are directly used for some key national account estimates (e.g. 1993), such that we lack an independent benchmark to assess whether and to what extent survey data actually underestimate incomes.

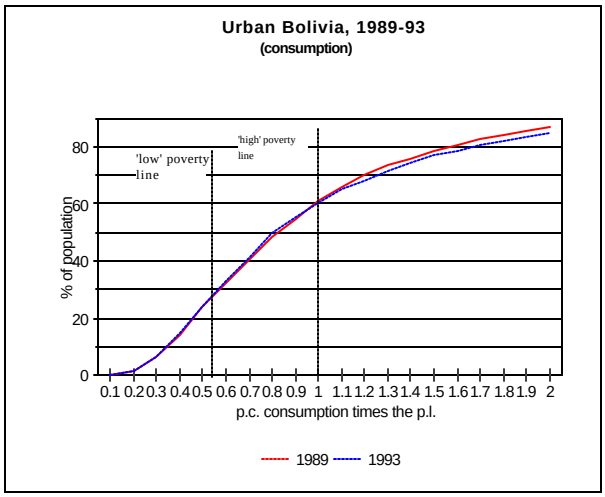
APPENDIX 3 Poverty Lines, Welfare Measures and the Poverty Incidence: First Order Dominance Tests

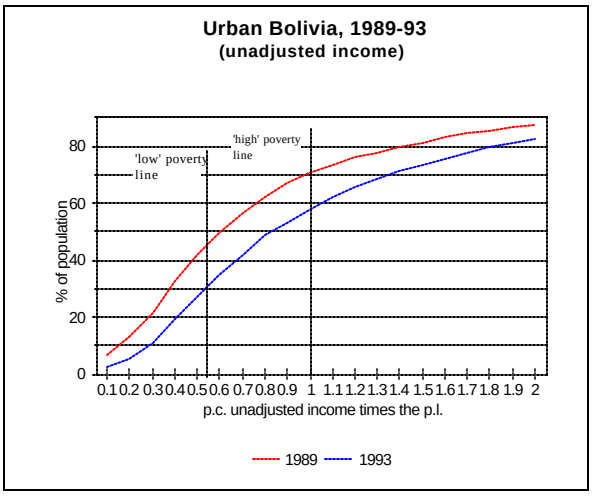
Figures A.1-A.8 show the evolution of the level of poverty in urban Bolivia between the 1989 and 1995 measured using consumption and adjusted and non-adjusted income per capita as the indicators of the well-being of an individual. The y-axis represents the population share, in the x-axis the income/consumption per capita is measure as a share of the poverty line.

The first things worth noting are the almost opposite conclusions that can be drawn depending on what measure of well-being is used to measure poverty, consumption or income. For example, a sensibility analysis comparing the levels of poverty in 1989 and 1993 using consumption (Figure A-1) shows that there has been no virtually change in poverty in Bolivia, independent of the poverty line. On the other hand, when making the same comparison using unadjusted income (Figure A-2) the conclusion is quite different: poverty has clearly diminished in that period. However, if the comparison is made after making an adjustment for incomes (with the aggregate benchmark estimate derived from the

national accounts), the conclusion is similar to that achieved using consumption, the level of poverty has barely changed between 1989 and 1993 (Figure A-3). This is the same conclusion that the analysis of Figure A-8 leads us to, poverty has not changed that much between 1993 and 1995 (for both cases the adjustment factor is equal to one, so that the adjusted and the non-adjusted estimates are the same).

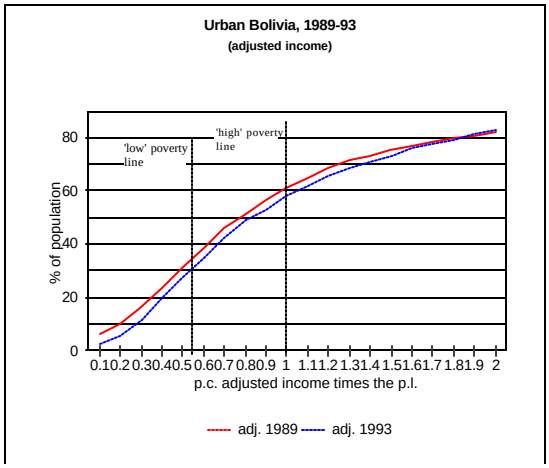
However, the differences do not stop there. When comparing the levels of poverty in one year using income and consumption to measure them it is possible to see that the conclusions that can be drawn are not the same. In the case of 1989, the level of poverty obtained using unadjusted income as the measuring unit is consistently higher than that obtained using consumption regardless of the poverty line that is used (Figure A-4), but in the case of 1993 the conclusion is not that easy because the lines depicting the percentage of the population under the poverty line intersect. Therefore, if the poverty line were below this intersecting point, as is the case with the >low= poverty line (Bs. 139.9 at 1995 prices), the conclusion would be that poverty is lower when measured using consumption. But, if the poverty line were above that point, as is the case with the >high= poverty line (Bs. 270.9 at 1995 prices), the conclusion would be that poverty is higher when measured using consumption (Figure A-5). When repeating this analysis for 1989 using adjusted income data the 1993 situation repeats itself (for 1993 the adjustment factor is equal to one, so the adjusted and unadjusted income figures are the same), poverty is higher if measured according to income until a certain point and then it is higher when measured according to consumption, in this case.

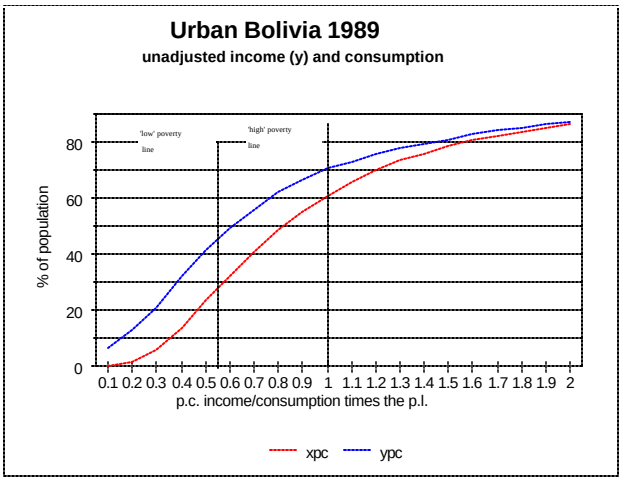


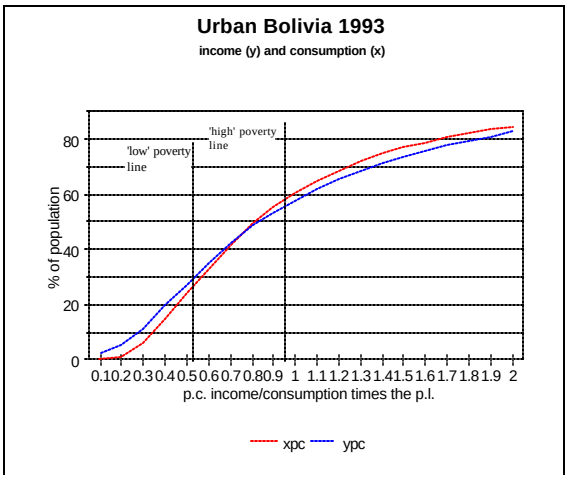


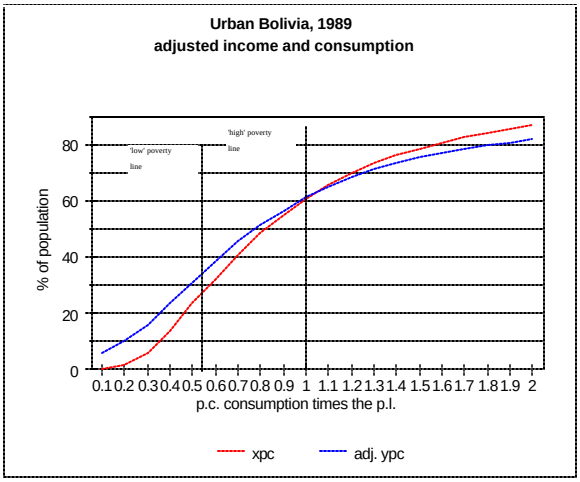
Coincidentally the intersecting point of the two distribution lines is the equivalent of the World Bank=s (i.e., the >high=) poverty line (Figure A-6). An interesting observation is that in both cases consumption per capita is higher than income in the lower levels of the income distribution (i.e., ranging between zero and two times the >high= poverty line), and the situation reverses in the higher levels of the income distribution. This situation may reflect that even the >adjusted= income data are still subject to a degree of underreporting. Alternatively, assuming there is no further underreporting, it would indicate substantial >dissavings= by low income households as a survival strategy.

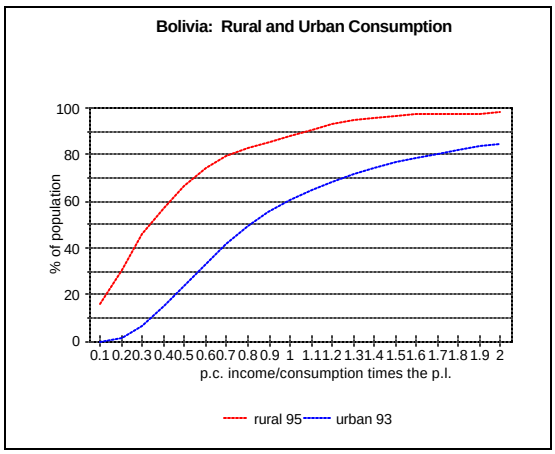
First-order Dominance Tests, Figures A.1-A.8:

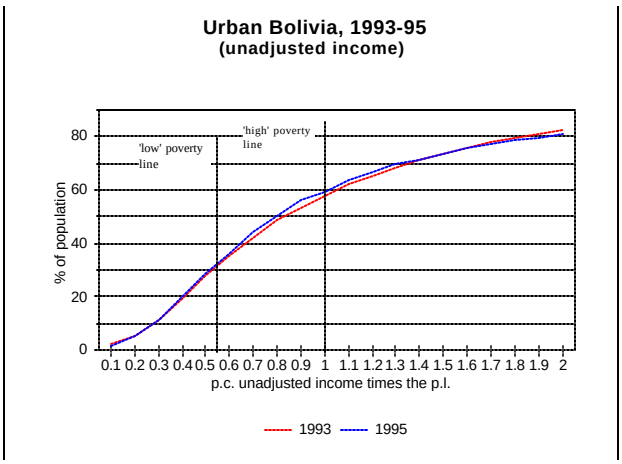

Urban Bolivia, 1989-93
(adjusted income)
'high' poverty line
'low' poverty line
% of population
p.c. adjusted income times the p.l.
adj. 1989
adj. 1993


Urban Bolivia 1989
unadjusted income (y) and consumption
'low' poverty line
'high' poverty line
% of population
p.c. income/consumption times the p.l.
xpc
ypc


Urban Bolivia 1993
income (y) and consumption (x)
'high' poverty line
'low' poverty line
% of population
p.c. income/consumption times the p.l.
xpc
ypc


Urban Bolivia, 1989
adjusted income and consumption
'high' poverty line
'low' poverty line
% of population
p.c. consumption times the p.l.
xpc
adj. ypc


Bolivia: Rural and Urban Consumption
% of population
p.c. income/consumption times the p.l.
rural 95
urban 93


Urban Bolivia, 1993-95
(unadjusted income)
'high' poverty line
'low' poverty line
% of population
p.c. unadjusted income times the p.l.
1993
1995

APPENDIX TABLES

Appendix Table A.2 **Bolivia: Poverty Incidence Based on Basic Needs Insatisfaction (BNI) by Department, 1992**

Department	Overall		Urban		Rural	
	Population share (%)	Pop. with BNI (%)	Population share (%)	Pop. with BNI (%)	Population share (%)	Pop. with BNI (%)
La Paz	29.6	70.5	62.7	55.3	37.3	95.5
Oruro	5.3	70.3	65.3	56.0	34.7	93.2
Potosí	10.1	80.0	33.4	50.2	66.6	94.0
Cochabamba	17.3	70.8	52.0	48.6	48.0	93.4
Chuquisaca	7.1	76.8	32.0	40.4	68.0	95.8
Tarija	4.5	66.3	54.6	46.9	45.4	91.4
Santa Cruz	21.2	58.0	72.4	46.0	27.6	90.4
Beni	4.3	77.4	66.1	67.4	33.9	96.7
Pando	0.6	80.6	25.5	43.8	74.5	95.1
BOLIVIA	100.0	69.8	57.6	51.1	42.4	94.0

Source: Ministerio de Desarrollo Humano (1994) based on 1992 Population Census.
Note: BNI refers to the population share with unsatisfied basic needs, a composite index based on qualitative housing conditions, access to drinking water and sanitation, school attendance, infant mortality rates and fertility rates. See Ministerio de Desarrollo Humano (1994) and UDAPSO (1995a) for a description of the methodology.

Appendix Table A.3 **Bolivia: Poverty Incidence Based on Insatisfaction of Education Needs by Department, 1992**

Department	Overall		Urban		Rural	
	Illiteracy	Non-Attendance in school	Illiteracy	Non-Attendance in school	Illiteracy	Non-Attendance in school
La Paz	16.9	22.3	9.2	17.3	31.2	30.5
Oruro	15.4	18.9	9.2	12.5	27.7	32.2
Potosí	38.2	28.6	14.0	13.6	50.6	37.4
Cochabamba	21.2	26.5	8.1	15.0	36.9	39.4
Chuquisaca	39.5	35.6	12.8	14.4	54.2	46.4
Tarija	21.2	30.3	11.2	20.3	35.0	42.5
Santa Cruz	11.1	25.0	6.9	20.2	22.7	37.7
Beni	12.8	26.7	8.2	22.4	22.6	36.0
Pando	21.0	39.3	4.4	23.1	27.6	45.5
BOLIVIA	20.0	25.7	8.9	17.5	36.5	37.1

Source: Ministerio de Desarrollo Humano (1994) based on 1992 Population Census.
Note: The illiteracy rate refers to population 18 years and older; non-attendance in school refers to children under 18 not attending school and adults that have less schooling than a prefixed threshold level (for 17-29 year olds, schooling of 10 years or less; 30-44 year olds, 8 years of schooling or less; and those over 44 years, schooling of 5 years or less).

Appendix Table A.4 **Bolivia: Poverty Incidence Based on Insatisfaction of Health Needs by Department, 1992**

Department	Overall		Urban		Rural	
	Infant Mortality	Fertility rate	Infant Mortality	Fertility rate	Infant Mortality	Fertility rate
La Paz	70	4.2	63	3.6	81	5.7
Oruro	113	5.0	103	4.4	123	6.3
Potosí	118	6.1	98	5.3	129	6.4
Cochabamba	78	5.0	56	4.0	94	6.2
Chuquisaca	88	6.0	52	4.5	100	6.8
Tarija	60	5.2	46	4.2	74	6.7
Santa Cruz	57	5.1	46	4.5	78	5.6
Beni	90	6.4	77	5.6	109	7.9
Pando	85	6.8	60	4.5	88	7.9
BOLIVIA	75	5.0	58	4.2	94	6.3

Source: Ministerio de Desarrollo Humano (1994) based on 1992 Population Census.
Note: Infant mortality refers to deaths among children less than five years per 1,000. The fertility rate refers to total fertility, i.e., average number of children born alive to a woman during her lifetime.