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Bolivia
Poverty Assessment:
Establishing the Basis for Pro-Poor Growth

December 15, 2005

Poverty Reduction and Economic Management Sector Unit
Latin America and the Caribbean Region

With Contributions From:
UDAPE–Unidad de Análisis de Políticas Sociales y Económicas
INE–Instituto Nacional de Estadística

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CURRENCY EQUIVALENTS

(as of December 7, 2005)
Currency Unit = (Bs) Bolivianos
US$1 = 8.02

ABBREVIATIONS AND ACRONYMS

AAG	Average Annual Growth	IMF	International Monetary Fund
ATPDEA	Andean Trade Promotion and Drug Eradication Act	LAC	Latin American and Caribbean Region
		MECOVI	*Mejoramiento de las Encuestas y la Medición de las Condiciones de Vida en América Latina y el Caribe* (Regional Program of Technical Assistance for Improving the Surveys of Living Conditions in Latin America and the Caribbean)
BONOSOL	*Bono Solidario* (Solidaridy Bond)		
BPRS	Bolivian Poverty Reduction Strategy		
CAS	Country Assistance Strategy		
CPI	Consumer Price Index		
CU	Capacity Utilization		
EEAM	*Encuesta de Establecimientos en la Actividad Manufacturera* (Manufacturing Firms Survey)	MDGs	Millennium Development Goals
		NBI	*Necesidades Básicas Insatisfechas* (Unsatisfied Basic Needs)
EIH	*Encuesta Integrada de Hogares* (Integrated Household Survey)	ODI	Overseas Development Institute
		OECD	Organisation for Economic Cooperation and Development
ENAPD	*Encuesta Nacional de Aspiraciones y Prioridades de Desarrollo Humano* (Nationally Representative Household Survey)	PG	Poverty Gap
		PLANE	*Plan de Emergencia* (Emergency Employment Program)
ENE	*Encuesta Nacional de Empleo* (National Employment Survey)	PPP	Purchasing Power Parity
		R&D	Research and Development
ESW	Economic and Sector Work	RUE	*Registro Único de Exportadores* (National Register of Exporters)
FACS	Firm Analysis and Competitiveness Survey		
FDI	Foreign Direct Investment	SI	Sample Inclusion
GDP	Gross Domestic Product	SIF	Social Investment Fund
GRB	Government of the Republic of Bolivia	SMEs	Small- and Medium-Enterprises
HDI	Human Development Index	TFP	Total Factor Productivity
HIPC	Heavily Indebted Poor Countries	UBN	Unsatisfied Basic Needs
IDB	Inter-American Development Bank	UDAPE	*Unidad de Análisis de Políticas Sociales y Económicas* (Unit for the Analysis of Social and Economic Policies)
IF	Inclusios Forzada (Forced Inclusion)		
IFC	International Finance Corporation		
IISEC	Institute for Socio-Economic Research	UNDP	United Nations Development Program
INE	*Instituto Nacional de Estadística* (National Institute of Statistics)		

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MAIN FINDINGS AND POLICY RECOMMENDATIONS

ES.1   Bolivia faces high levels of persistent poverty and inequality. In 2002, 65 percent of the population was living in poverty and, of that, nearly 40 percent in extreme poverty. There was a decline in poverty in the mid-1990s, however, the rate today remains close to the level of the early 1990s. In addition, income distribution in Bolivia is among the most unequal in Latin America. This report suggests three main reasons for the continuing high levels of poverty and inequality:

- **First**, growth during the 1990s was concentrated in natural resource-based exports, which have a relatively low demand for labor services. Labor-intensive sectors and poorer regions grew at a lower rate. The employment and income gains were insufficient to make a lasting impact on poverty reduction. Since 1999, negative shocks—such as the reversal of capital inflows, declining terms of trade and reduced exports, and the coca eradication program— reduced growth, reversing the earlier progress towards poverty reduction. Moreover, the high returns to capital compared to low returns to labor (especially unskilled labor) accentuated the already-high income inequality.

- **Second**, the low productivity of firms, particularly in the informal labor-intensive sector, has held back the growth of both employment and wages. This has resulted from burdensome business and labor market regulations that discourage innovation and smaller companies from participating fully in the formal economy, scaling up and improving productivity.

- **Third**, the poor have inadequate opportunities to improve their human capital (e.g., through quality education, particularly secondary and above), despite recent progress in access to basic education. This results in low labor productivity and restricted access to better-paying jobs. Moreover, faced with high opportunity costs and inadequate social protection, many of the poor leave school early and end up working in low-paying urban jobs or in the rural economy. Those who do invest in education are often unable to translate it into large earnings gains due to limited learning outcomes by the poor (because of low quality schooling in poor areas, as well as health and nutrition deficiencies limiting early-childhood development) and limited access to the better paying jobs for their skills.

ES.2   The main overall policy lesson is that broad-based economic growth, sustained over the long term, is a fundamental and necessary condition to reduce poverty and inequality. However, this needs to be supported by policies to improve labor productivity and job creation. This can be accomplished through (i) removing obstacles to firm modernization and growth, and furthering their integration into the world economy; (ii) modernizing business and labor regulations, and providing the framework and incentives for firms to participate and remain in the formal sector, especially for small and medium firms; and (iii) strengthening human capital and social protection for the poor to enhance their productivity and ability to market their labor.

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1. The World Bank prepared this report with *Unidad de Análisis de Políticas Sociales y Económicas* (UDAPE) of the Bolivian *Ministerio de Desarrollo Económico* and with the collaboration of the *Instituto Nacional de Estadística* (INE).

I. Trends in Poverty and Inequality

During the 1990s, poverty and inequality declined, but since 1999 most of the gains have been lost.

ES.3   During the period of growth, 1993-99, urban poverty declined from 52 percent to 46 percent, together with its intensity and severity. Urban income inequality remained unchanged. While adequate country-wide data is not available, there is evidence that both national and rural poverty may have also declined in the 1990s.

ES.4   The economic shocks of the late 1990s reduced growth and reversed progress on the poverty front. Between 1999 and 2002, poverty increased from 62 percent to 65 percent and extreme poverty rose from 36 percent to 37 percent. Poor urban households were particularly affected. Urban unemployment increased from 6 percent to 9 percent, and urban poverty reverted to the levels of the early 1990s.

ES.5   Income inequality increased significantly during 1997-2002, and Bolivia currently has a Gini coefficient of about .58, making it one of the countries in the region with the highest income inequality, along with Brazil and Chile. The high income inequality reflects significant disparities in assets (e.g., education and land), household size, and earnings gaps by gender, ethnicity, location, and employment type. Nine of 10 Bolivians—poor and affluent alike—consider the distribution of income "unfair" or "very unfair".

Poverty and inequality are everywhere, but the percentage rates and numbers of poor vary with location.

ES.6   Bolivia's high poverty and inequality transcends rural-urban and regional boundaries. Although an overwhelming portion of the rural populace lives in poverty, there are also large pockets of urban poverty. Poverty is concentrated in the valleys and the central highlands, especially in Potosi and Chuquisaca, followed by Beni, La Paz and Oruro. Santa Cruz and Cochabamba have lower poverty rates, but due to their large populations they contain a large number of poor people. About 40 percent of the population in the department of Santa Cruz is poor, but the poverty rate is only 20 percent in the capital. Many intermediate cities and small municipalities also have low poverty rates.

Indicators of non-income poverty show more improvement than income poverty, but challenges remain.

ES.7   Social indicators related to Unsatisfied Basic Needs (UBNs) and the Millennium Development Goals (MDG) improved significantly during 1992-2001. For example, child and infant mortality rates declined by 30 percent, net enrollment in primary education is approaching 100 percent, and households without safe water and adequate sanitation fell from 50 percent to 30 percent. However, Bolivia still ranks among the worst in the region in malnutrition, maternal and infant mortality rates, and is off track to meet the MDG of universal completion of basic education.

Peoples' self-perception of their well-being is generally aligned with income poverty.

ES.8   Peoples' self-perceptions of their poverty and measures of income poverty are both largely determined by employment, education, access to assets and basic services, ethnicity and location.   Bolivians tend to fall into income poverty—and also consider themselves poor—when they are young, uneducated, unemployed or underemployed, indigenous, rural dwellers, and lacking basic services.

ES.9   There are, however, some differences in income and self poverty perception surrounding ethnicity and location.   Bolivian Quechuas tend to self-rate poorer than suggested by income poverty profiles, while the converse is true for Aymaras.   With equal access to basic services, rural residents perceive themselves as less poor than urban inhabitants, although they are more likely to be income-poor. Thus, exclusion and/or cultural factors (e.g., sense of empowerment or identity) as well as location-specific characteristics (e.g., inequality, social capital, or crime) may have meaningful effects on Bolivians' self-perceptions.

II. Growth, Poverty and Inequality

The growth of the 1990s reduced poverty and improved social indicators.

ES.10   Growth averaged 4.7 percent per year (2.2 percent per capita) during 1993-98, surpassing other Andean countries for the first time in 40 years.   Exports diversified beyond minerals and hydrocarbons to soybeans, coffee, sugar, wood.   Investment levels exceeded 18 percent of GDP, four percentage points above the 1980s average.   Sound stabilization and structural policies help to explain most of the 1990s growth expansion, which was accompanied by increased labor participation (especially among females) and improved overall productivity (1.2-1.7 percent per year).

ES.11   This growth raised incomes (per capita income grew 13 percent cumulatively between 1993 and 1997) and reduced poverty.   Specifically, the incomes of the poor in capital cities grew at the same rate than average incomes, and poverty declined from 52 percent in 1993 to 46 percent in 1999.   In addition, improved rural education and living conditions suggest that poverty in rural areas may have also declined.

ES.12   In spite of these gains, the severity of poverty meant that growth was insufficient to lift many Bolivians out of poverty.   In 1997, 37 percent of Bolivians still were half-way short of the income required to escape poverty.   This implies that a 1 percent increase in per capita income lifted less than half a percent of Bolivians out of poverty—i.e., a poverty-growth elasticity in the range of 0.3-0.5, compared to an average elasticity of 1 for the region.

Poverty reduction would have been greater if the growth had been sustained, more broad-based, and more labor-intensive.

ES.13   Capital-and skill-intensive sectors (e.g., hydrocarbons, telecommunications and financial services) grew faster, with limited spillovers to agriculture and manufacturing, which employ over 60 percent of the labor force.   Exports diversified, but this did not ignite export-oriented labor-intensive sectors, and the export share of GDP remained unchanged.

The growth in modern resource sectors—in the lowlands around Santa Cruz—did not spread as vigorously to subsistence agriculture and low productivity artisans, particularly in the *Altiplano*.

ES.14   A key factor limiting development of more labor-intensive economic activity—necessary for job creation and poverty reduction—is low productivity, particularly labor productivity. Factors holding back productivity include (i) the ability of firms and producers to adopt new technologies and production processes, train workers, and actively develop new products and markets—i.e., the demand for labor; and (ii) the ability of the poor to accumulate human capital and effectively utilize it in labor markets—i.e., the supply of labor.

III. Constraints to Employment Creation—the Demand for Labor

ES.15   Bolivia's weak business environment hampers investment, productivity and job creation. Total productivity gains in the 1990s largely reflected the improved resource allocation from economic reforms, rather than technology upgrading or innovation. Physical capital accumulation (linked to the adoption of new technologies) contributed little to growth, and overall labor productivity (GDP per worker) rose barely 0.5 percent per year during the economic boom, reflecting limited gains in labor productivity in the most productive sectors (e.g., petroleum, food and textiles).

ES.16   Few small and medium enterprises (SMEs) grow larger. Small firms (10 or fewer employees) account for 83 percent of employment—largely unskilled—and 25 percent of output, while a few large firms (50 or more workers) generate two-thirds of output and only 9 percent of employment, largely skilled. In addition, labor demand in manufacturing firms takes over a year to adjust to changes in economic conditions, in the upper LAC range and 2.5 times the OECD average. Furthermore, there is a high wage-employment trade-off. For every 10 percent increase in real wages, demand for unskilled labor in manufacturing falls by 6.4 percent (twice the international average and in LAC's high end).

A weak business climate hinders investment and job creation; small firms are most constrained by regulations, contract reliability, credit and thin markets.

ES.17   A small output market, burdensome regulations, limited and costly credit, and transport infrastructure limit the capacity utilization rates, prospects for expansion, and thus employment creation of manufacturing firms. For smaller firms, regulatory constraints (e.g., registration and operating licenses), high collateral requirements to obtain credit, and skilled labor bottlenecks are the most binding factors. For larger firms, input costs, including credit and access to technology, and market size represent the most binding constraints. More specifically:

- *A thin, localized market.* Domestic trade is highly concentrated and there are a limited number of firms exporting (for example, about 50 percent of large firms export, and only 20 percent of small-medium firms export).
- *Burdensome business regulations and weak institutions.*
  - o Business registration is costly and subject to long delays, despite recent improvements.

o Property is difficult to register and enforcement of contracts or property rights is uncertain.

o Transactions and information costs are high, particularly with regards to credit, technology and information on foreign and domestic markets, accreditation, and disputes of contracts.

* *Limited access to credit.* The costly and high collateral required for lending, especially for smaller firms (over twice the loan amount, and mostly through real estate guarantees), reflects thin credit markets, ineffective assets registries, and insecure and costly debt recovery.

* *A high cost of logistics and risky input and output market conditions.* Supply chains are weak due to expensive and slow transportation (on a unit basis, 20 times costlier than in Brazil), customs dispatching remains cumbersome and costly, the quality of domestic services and inputs is poor (e.g., unreliable supply of power), and as a result, inventories/stock on materials are high (36 to 50 days).

* *Restrictive labor regulations.* Labor legislation (dating from 1943) mandates favorable conditions for workers compared to other countries in the region and elsewhere. This legislation—intending to protect workers—ends up increasing the total labor cost, making firms less competitive and discouraging equitable hiring in the formal market. As a result, it encourages informality, hindering productivity, and employment creation. More specifically:

o Uncapped severance payments lead to dismissal costs 2 to 3 times above most Andean neighbors and poor countries in the region.

o Non-wage benefits (e.g., pension, health) are about 50 percent of labor costs.

o Regulations restrict layoffs (including those due to economic shocks), seasonal work, overtime, and women's length of the work week and night work.

Pervasive informality is interlinked with low productivity, reflecting high costs and low benefits of becoming and remaining formal.

ES.18   Faced with few incentives to comply with regulations to start and run a business, many firms—particularly micro and small ones—remain outside the formal sector and lack access to formal institutions (e.g., credit and external markets). This restricts their potential for expansion as they cannot capitalize on productivity gains from innovation and economies of scale. More specifically,

* *Smaller firms face low benefits and perverse tax incentives to become and remain formal.*

o Regulatory costs for the incorporation of partnerships are high.

o Firms can not deduct valued-added taxes on purchases from firms registered in the simplified tax regime (SII), comprising most small firms.

* *One-size-fits-all labor regulations are not conducive for improving productivity in smaller firms.*

o Mandatory non-wage benefits (primarily social security) are costly to small firms and can amount to up to 8 percent of sales. This creates incentives to remain in the low productivity informal sector and thus forego access to formal institutions of credit,

training and exports. Even small firms registered to operate and report taxes often do not abide by labor laws.

IV. Constraints to Human Capital Accumulation—the Supply of Labor

Getting a high quality education is harder for the poor, and labor market returns to education are not equal.

ES.19   The combination of high opportunity costs and low returns to education discourage children from poor families to stay in school. The public education system, especially at the secondary level and in rural areas offers low quality education, limiting the capacity of the poor to accumulate human capital and improve their earnings opportunities. Further, poor families face high opportunity costs and are often unable to afford keeping their children in school, instead needing them to help the family, either through income-generating activities or domestic and agricultural chores.

ES.20   Returns to education are low—six out of ten graduates from high school are at risk of poverty because of these low returns. In rural areas, only a post-secondary education offers a significant boost to earnings. As well, education does not carry equal returns for all workers. Education returns range from 0 to 60 percent for the least to best paid workers with primary education, 20-30 percent for those with a secondary education, and from 50 to 150 percent for the college-educated. Workers from poor families tend to receive lower returns to education, due to limited learning outcomes by the poor (because of low quality schooling in poor areas, as well as health and nutrition deficiencies limiting early-childhood development) and limited access to the better paying jobs for their skills. The employment gaps faced by women, young and low educated workers and the earnings disparities solely related to gender, ethnicity, location and employment sector are above regional averages.

Low opportunity costs for self-employment and non-wage benefits of informality encourage large employment in the informal sector.

ES.21   Bolivia's urban informal sector is large and heterogeneous. In 2002, more than 55 percent of the labor force was in the informal sector, either as self-employed (40 percent) or salaried workers (15 percent). An additional 10 percent of workers were unpaid, principally working in family businesses or are apprentices.

ES.22   Informal employment largely reflects the low opportunity costs and non-income benefits of informality. For many Bolivians it offers a competitive alternative to low-productivity formal sector jobs or no work at all. As well, self-employment may be more attractive to certain sectors of the population, such as women seeking flexible work hours to balance their work and family obligations, or the indigenous who may face less discrimination as an independent worker than they might as an employee in a company. In fact, the self-employed perceive themselves as less poor than salaried workers with similar characteristics, an indication of the importance of non-monetary benefits of self-employment.

ES.23   Due to the low productivity of workers in the informal sector, the informal salaried workers do appear to have a significant earnings disadvantage when compared to salaried formal sector workers with the same skills and job characteristics, particularly those

at the bottom of the salary scale. In part this is due to the lower access of informal firms to programs to promote worker training, technology adaptation, or other kinds of productivity-enhancing interventions.

Migration has improved earning opportunities but has had limited impact on reducing poverty.

ES.24   While there has been some migration from less developed to more developed regions, it has remained small among the rural poor. Over the mid-1990s, urban areas attracted migrants largely from rural areas. Migration to main urban centers, especially from small cities, accelerated since the late 1990s. There is also significant migration to rural areas experiencing economic booms, especially in the region around Santa Cruz.

ES.25   For the rural-to-urban migrants, earnings were improved by migrating, particularly for those at the bottom of the earnings scale. That is, despite a potential lack of contacts and urban know-how, migrants got competitive urban jobs. Thus, rural-urban migration likely helped to reduce poverty directly and possibly indirectly through remittances.

ES.26   However, small migration flows limit the potential of migration to be an escape valve for the rural poor. About 350,000 people migrated during the 1993-1997 boom, of which only 69,000 were rural-to-urban migrants. Individuals from the poorest locations and indigenous household heads are more prone to rural-to-rural migration. The young, more educated, women, and small families are more likely to migrate to urban areas. As a result, while urban and rural labor markets seem interlinked, the absolute magnitudes of cross flow remain small. This partly reflects the high costs and possibly non-pecuniary factors that affect settlement decisions.

V. Selected Policy Recommendations to Reduce Poverty and Inequality

ES.27   Restoring sustained economic growth and facilitating the development of labor-intensive sectors are essential to reduce Bolivia's poverty and inequality. Bolivia can have higher growth in the medium and long term tied to the development of the gas sector. However, to have a significant impact on poverty reduction, this must be accompanied by a policy environment that promotes, among other things, broader investment, increased productivity and job creation.

ES.28   To achieve these, policy reforms should focus on (i) removing obstacles to firm modernization and growth, and furthering their integration into the world economy; (ii) modernizing business and labor regulations, and providing the framework and incentives for firms to participate and remain in the formal sector, especially for small and medium firms; and (iii) strengthening human capital and social protection for the poor to enhance their productivity and ability to market their labor. Specific policy recommendations are elaborated below.[2]

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2. These recommendations are complemented by other recent or ongoing reports, including the Investment Climate Assessment (Report No. 24746-BO, October 18, 2001), the Public Expenditure Review (Report No.

Removing obstacles to firm modernization and growth and furthering their integration into the world economy. Measures that would help in this area include:

- Simplifying procedures and lowering the cost of business registration, especially in large municipalities, scaling up IFC-supported efforts in this direction in La Paz to other local governments.
- Implementing incentives (for example, limited, tax credits) to adopt new technologies, including in manufacturing not just hardware and software but also management techniques and worker training, and in agriculture small-scale rural technology and new crop varieties.
- Promoting expanded access to prudent financing for SMEs, among other ways through the overhaul of laws on collateral.
- Increasing participation in world markets, in particular through enacting free trade agreements that will deepen exports and promote investment and technology transfer.
- Encouraging the creation of producer/exporter associations to reduce the cost of information to take advantage of trade and other market opportunities.

Modernizing business and labor regulations, and facilitating formal sector participation. Firms would greatly benefit from general improvements in the investment climate, including:

- Reducing the cost of registration and business expansion for micro and SMEs, particularly the cost of incorporation of partnerships, registering in the General Tax Regime and export licensing. This could be accomplished by further rationalizing documentation requirements (e.g., notarization) and government fees, and streamlining on-line business portals for registering and licensing in municipal government offices.
- Establishing pilot initiatives that provide small firms incentives to become formal, encouraging small firms and producers to bid for government contracts (the Presidential Decree No. 27328 "_Compro Boliviano_" lays the legal basis), extending partial credits of value added taxes for eligible firms, and offering business development services (access to market credit, judicial services, management and accounting practices) with special emphasis on supporting innovation initiatives and export production. Bolivia could benefit from the success experience of small business promotion agencies such as those in Chile, Italy, and the U.S.
- Streamlining labor regulations that currently limit the ability of firms to expand and contract along with the economic cycles to align them with international practices, and reducing the cost of mandated labor benefits, which currently total about 40 percent of labor costs.
- Simplifying, reducing the cost, and increasing the transparency of government bureaucracy procedures required to access technology, quality certification, accreditation, and dispute resolution.
- Strengthening institutions and coordinating relevant public agencies to reduce duplication and transactions costs, particularly the Superintendency of Enterprises and the Labor Ministry.

28519-BO, November 18, 2004), the forthcoming Country Economic Memorandum (analyzing other constraints to growth) and the forthcoming Education Sector Study.

Strengthening human capital and social protection for the poor to enhance their productivity and ability to market their labor. This can be achieved through measures such as:

- *Raising the quality of the education system, particularly for the poor.* Implement an education sector strategy geared towards developing basic cognitive skills and improving the productivity of the labor force. Key elements of this strategy, which will be addressed in greater detail in an upcoming Bank education sector study, might include:
  - o Filling coverage gaps in universal basic education, improving secondary education transitions and access to private higher education for poor students, and addressing low quality and inequalities in education achievement at all levels with results-based management, especially in municipalities with weak education outcomes.
  - o Implementing a conditional cash transfer program (similar to *Bolsa Familia* in Brazil or *Oportunidades* in Mexico) that provides incentives for very poor families with children-at-risk to keep them in school and use preventive health and nutrition interventions. Any such program should be developed with medium-term fiscal constraints in mind, such that it can be sustained. The cost of similar programs in the region range from 0.5 to 1 percent of GDP.
- *Improving labor market equity and opportunities.* This could be achieved through:
  - o Reducing obstacles to employment by expanding pre-school facilities and child care centers to facilitate women's and migrants' labor force participation and fostering community-led crime prevention in marginal urban neighborhoods to allow workers, especially women, to take advantage of available job opportunities.
  - o Training in high schools and colleges on relevant skills demanded in the labor market and encouragement of privately provided labor market intermediation services.
  - o Using the newly developed consumption poverty map to target interventions aimed at income generation of the poor. These interventions may include growth-enhancing investments, targeted programs to develop human capital, community assets and income generation, and investments that promote gradual integration of communities through migration.
  - o Strengthening pro-poor community investments and workfare programs.

VI. Prospects for Growth and Poverty Reduction

ES.29   Bolivia's growth prospects remain vulnerable to domestic instability and external circumstances. Nevertheless, the country can improve its future growth potential through deepened economic reform. Simulations, that include some of the recommendations suggested above, indicate that if the policy determinants of growth were to improve significantly, GDP per capita growth could be sustained at, about 4 to 5 percent per year. Because of the depth and breadth of poverty in Bolivia, and the skewed income distribution, these rates are necessary for the medium and longer term if the country's poverty level is to be significantly reduced. Indeed, the national MDG target of reducing the incidence of extreme poverty in half by 2015 could be achieved with growth rates in this range, along

with other pro-poor policy interventions. However, an even higher annual per capita growth rate is needed to meet the MDG of reducing poverty in half. Economic simulations indicate that individual policy reforms will have relatively small impacts on growth and poverty by themselves, but can have a much larger impact when implemented as part of a comprehensive strategy of mutually-reinforcing reforms that includes macroeconomic stability.

INTRODUCTION

1.   Bolivia experienced important economic, political and social changes in the 1990s. Macro-economic stabilization in the late 1980s was followed by market reforms to deregulate the economy, liberalize trade, simplify taxes, reform the pension system, privatize non-performing public companies, and decentralize public resources to municipalities. As part of the Heavily Indebted Poor Countries (HIPC) initiative in 2000-2001, the country developed its national Poverty Reduction Strategy (BPRS) with broad participation of different sectors and donors.

2.   Bolivia's reform efforts swiftly paid off, with high rates of investment and growth. The economy expanded at an average annual rate of 4.7 percent (2.2 percent per capita) during 1993-98. Exports diversified, social spending increased substantially, and living conditions improved, particularly education, health and other Millennium Development Goals (MDGs) indicators. However, progress in many areas was limited and not sustained. After several external and internal shocks in 1999, growth decelerated to an average rate of only 1.7 percent (0 percent per capita) during 1999-2002. Fiscal imbalances and financial sector difficulties weakened macroeconomic stability, reducing job creation and poverty reduction. Bolivia today remains one of the poorest and most unequal countries in the region.

3.   In this context, the Bank in collaboration with Social and Economic Policy Unit (*Unidad de Analisis de Politicas Sociales y Economicas*, UDAPE) and the National Institute of Statistics (*Instituto Nacional de Estadísticas*, INE) started the preparation of the Bolivia Poverty Assessment. Following the Government's request, the report focuses on selected knowledge gaps, identified with UDAPE and INE in consultation with other partners (IDB, UNDP), of the factors preventing more pro-poor growth in Bolivia, and public policies to address these factors.

4.   Since late 2003 the country situation changed dramatically. Discontent and social unrest over the economic situation and the gas export policy forced former President Gonzalo Sanchez de Lozada to step down. Since President Carlos Mesa took office, there have been some positive economic signs. However, political stability remains fragile. The upcoming constitutional assembly to reassess the economic policy framework and the implementation of the recent natural gas referendum pose serious challenges. There are concerns that social and political polarization may lead to diverging priorities that might be difficult to reconcile in Bolivia's multi-cultural population.

5.   While the new political situation imposes new challenges and short term priorities, the generation of income opportunities for the poor remains a critical issue. The findings and policy recommendations of this report aim to strengthen the analytical basis for the formulation of sound public policy for poverty reduction. To this end, the report examines the links between the evolution and determinants of poverty and inequality in the 1990s, the sources and patterns of growth, and persisting micro constraints to employment creation in Bolivia.

6.   This report is structured as follows:

- Chapter 1 examines the historical trends, characteristics, sources and determinants of economic growth, and the evolution of poverty, inequality and the MDGs in the 1990s
- Chapter 2 analyzes the determinants of changes in the income distribution in the 1990s, the profiles/determinants of self-rated and income poverty, and a detailed geographic characterization of poverty and inequality

- Chapter 3 discusses the characteristics of the labor market, the supply of labor, employment and earnings outcomes, with emphasis on the informal sector and internal migration
- Chapter 4 examines the micro constraints to employment creation, productivity and labor demand in the manufacturing sector
- Chapter 5 assesses the prospects for pro-poor growth in Bolivia, particularly policy lever simulations for achieving the MDG poverty target.

7.   The work builds on previous analyses of poverty issues in Bolivia and several strands of analytical work in and outside the Bank, including: (i) previous Bank reports on poverty in Bolivia (World Bank 2000, 1996) that analyze poverty profiles, human development, and access to social infrastructure, credit and land; (ii) the 2001 report on Microeconomic Constraints to Growth in Bolivia that thoroughly analyzes the constraints that Bolivia's investment climate pose to competitiveness; (iii) the 2004 Public Expenditure Review, which analyzes the fiscal sustainability of major reforms, including the pension, civil service and education and health reforms, as well as the efficiency and equity of social programs; (iv) Bolivia's national Rural and Agricultural Development Strategy focusing on farm and non-farm production and other rural development issues, with technical support of the Bank; (v) a recent Bank study on poverty and nutrition defining the nature and extent of the malnutrition problem in the country, the limitations of current interventions and actions to improve immediate and long-term nutritional results; (vi) recent economic and sector work on the reform of the health sector and education, including support to the development of Bolivia's new education strategy and recent technical analyses for the development of recent Bank operations in the social sectors ; (vii) several studies by the Bank, other partners and researchers, including recent regional studies (growth, indigenous people and poverty) and flagship reports (inequality, education and technology), IDB's 2003 Economic and Social Progress Report focused on employment in Latin America and UNDP's country Human Development and MDG Reports.

1. TRENDS IN POVERTY AND INEQUALITY

During the 1993-99 period of economic growth, urban poverty fell from 52 percent to 46 percent and its intensity and severity also feel moderately. Although hard data do not exist, there is also evidence that rural and national poverty may have also declined during this period. The economic shocks and growth stagnation after 1999 reversed any progress. During 1999-2002, poverty increased from 62 percent to 65 percent, and extreme poverty rose slightly. Poor urban households were particularly affected. Income inequality increased significantly, and Bolivia currently has a Gini coefficient of about 0.58, making it one of the most unequal countries in the region. Poverty rates are highest in the valleys and central highlands, although urban areas contain the largest numbers of poor due to their high populations. Unsatisfied Basic Needs and Millennium Development Goals (MDGs) indicators improved significantly during 1992-2001. Child and infant mortality rates declined by over 30 percent, net enrollment in primary education is approaching 100 percent, and households without safe water and adequate sanitation fell from 50 percent to 30 percent. There are some differences in income and self-rated poverty, particularly regarding ethnicity and location, which call attention to non-monetary determinants of well being. Bolivian Quechuas tend to self-rate poorer than suggested by income poverty profiles, while the converse is true for Aymaras.

1.1 Poverty in Bolivia is extremely high and has proved stubbornly difficult to reduce. In 2002, an estimated 65 percent of the Bolivian population were poor (with incomes insufficient to cover the basic food and non-food expenditures), while 41 percent lived in extreme poverty (incomes too low to afford the food basket of minimum caloric intake). Bolivia is also one of the most unequal countries in the world, with most of the population living on very low incomes and a small elite controlling much of the country's wealth. This chapter traces poverty and inequality through the growth in the 1990s and the recent economic slowdown, discussing both national and municipal-level trends. It examines non-income poverty measures and concludes with an analysis of the determinants of the Bolivian poor's attitudes toward poverty.

INCOME POVERTY AND INEQUALITY

1.2 *Poverty in the 1990s.* Available data (for departmental capital cities, Table 1.1) show that the growth episode in the 1990s led to a decline in income poverty from 52 percent in 1993 to 46 percent in 1999, while the fraction of the population in extreme poverty decreased from 24 percent to 21 percent.[1] A recent study (Klasen et al., 2004), based on improved demographic, education and living condition indicators, finds that poverty levels may have also improved in rural and small urban areas. However, due to fast population growth, the number of poor in large cities increased from 1.5 million in 1993 to 1.7 million in 1997 while the number of indigent rose from 700,000 to 730,000.

1.3 The poverty gap (PG), an indicator of the intensity of poverty, also improved very little. This represents the percentage by which the average poor person's income falls short of the poverty line. This gap is two times higher in rural areas than in urban areas, and four times

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1. Lack of consistent, nationally representative household surveys for the early 1990s precludes establishing a national trend in poverty and inequality. Annex 1.1 discusses methodological issues.

higher in the case of the extreme poverty gap. On average, the incomes of the rural poor cover less than half of the basic consumption basket, while the extreme poor fall 43 percent short of the cost of the minimum food basket in rural areas.

Table 1.1: Poverty Measures, 1993–2002

Income-based Estimates

		Poverty		Extreme Poverty	
		H	**PG**	**H**	**PG**
National	1997	63.6	33.7	36.5	18.9
	1999	63.5	36.0	40.7	22.2
	2002	65.2	36.7	41.3	22.3
Capital cities*	1993	52.0	22.2	23.7	8.4
	1997	50.7	21.0	21.3	7.5
	1999	46.4	18.8	20.7	7.02
	2002	51.0	22.1	23.5	8.8
Urban	1997	54.5	23.8	23.8	9.1
	1999	51.4	22.4	23.5	8.9
	2002	53.9	23.8	25.7	9.4
Rural	1997	78.0	49.4	59.0	34.4
	1999	84.0	59.4	69.9	45.1
	2002	83.5	57.6	67.0	43.3

Official Rates

		Poverty		Extreme Poverty	
		H	**PG**	**H**	**PG**
National	1999	62.0	30.7	35.8	15.0
	2000	65.5	33.7	39.2	17.2
	2001	64.4	31.8	37.3	19.6
	2002	64.6	31.2	36.8	14.4
Urban	1999	51.4	22.4	23.5	8.9
	2000	54.5	25.6	27.9	11.0
	2001	54.3	24.6	26.2	14.7
	2002	53.9	23.8	25.7	9.4
Rural	1999	80.1	44.8	56.7	25.4
	2000	84.5	47.7	58.7	28.0
	2001	81.1	43.6	55.6	27.8
	2002	82.2	43.4	54.8	22.6

Note: H: headcount (% of population), PG: poverty gap (% gap between average poor person's income and the poverty line). *Capital cities include: Sucre, La Paz, Cobija, Cochabamba, Oruro, Potosi, Tarija, Santa Cruz, Trinidad and El Alto
Source: UDAPE, based on household surveys, EIH (1993); ENE (1997); and MECOVI (1999-2002).

Note: Based on household per capita expenditures in rural areas and household per capita incomes for urban zones.

1.4 *Poverty since 1999.* The earlier improving trends in poverty have reversed since 1999. By 2002 poverty levels in the departmental capital cities went back to the level of the early 1990s. Rural poverty, particularly extreme rural poverty, showed a more positive trend between 1999 and 2002. Official poverty rates that rely on household expenditures for rural areas showed a slight increase in total rural poverty, and a two percentage-point decline in extreme rural poverty (Table 1.1). This may partly reflect rural-urban movements and within-rural migration to areas with expanding agricultural production (e.g., soy beans, livestock).

1.5 In terms of absolute numbers, most poor people live in urban centers. Over half the poor (2.9 million) and 43 percent of the extreme poor (1.4 million) lived in urban areas in 2002, up from one third (1.8 million) and one fourth (800 thousands) in 1997, respectively. On a percentage basis, however, poverty remains significantly higher in rural areas. In 2002 about 84 percent of rural inhabitants were income-poor (2.7 million) and 67 percent (1.8 million) were in extreme poverty, compared to 78 percent (3.3 million) and 59 percent (2.3 million) in 1997.

1.6 The recent economic slowdown put further stress on the employment and incomes of the poorest families, particularly in urban areas. The open unemployment rate in capital cities went up from 6 percent in 1999 to 9 percent in 2002, with a larger increase among women (Figure 1.1). The rise in unemployment affects more urban workers from the poorest families, who are twice as likely to be unemployed and take longer to find a job than the average worker. In 2002,

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**Figure 1.1: Open Unemployment Rates
in Bolivian Capital Cities, 1999-2002**
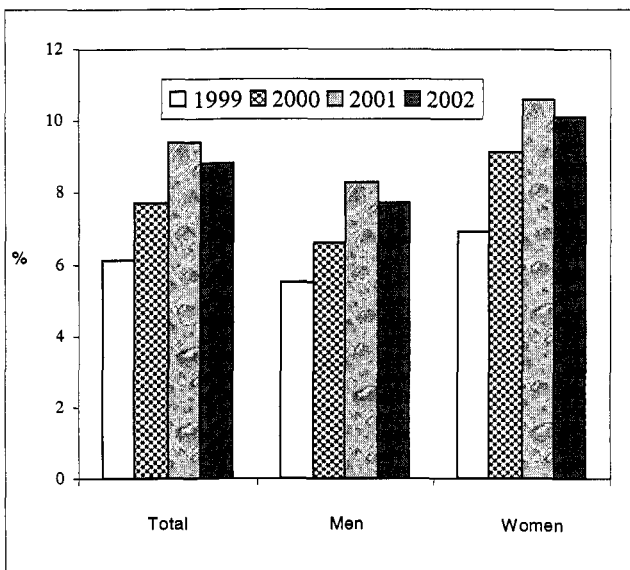
Source: UDAPE and INE, based on MECOVI survey data,

60 percent of workers from the poorest 20 percent of families took at least two months to find a job, compared to 40 percent in 2000. An increasing fraction of workers cite factors related to the economic downturn (e.g., being fired, lack of sales or providers) as the main reasons for being unemployed during 1999-2002. There is also evidence of discouraged workers leaving the labor force (the participation rate declined from 68 percent to 65 percent). Underemployment has also become more prevalent. Informality comprises over 80 percent of jobs in the poorest quintiles, and over one third of those employed in 2002 were willing and available to work longer hours – up from one fourth in 2000.

1.7 The negative impacts on household incomes have been uneven. Very poor households had the largest income fall in percentage terms. This is behind the recent rise in poverty. Real income (expenditure) per capita fell roughly 2 percent per year for urban households throughout the income distribution (except for the richest decile). For rural households, it stayed flat or improved slightly for the poorer half of households and show declines of 2-3 percent per year for the upper deciles (Figure 1.2). There is also evidence that the higher vulnerability led an increasing number of poor households to draw down family assets. The fraction of households among the poorest 40 percent of families that report a loss in both their regular income and assets doubled from 2000 to 2002.

1.8 *Inequality*. Bolivia is among the most unequal countries in the most unequal region of the world. Over 90 percent of Bolivians consider the current income distribution "unfair" or "very unfair" (Latinobarómetro, 2001). The standard measure of inequality is the Gini coefficient, which compares the actual distribution of income to a hypothetically equal distribution. It ranges in value from zero (complete equality of income) to one (when all income is concentrated by only 1 person). Figure 1.3 shows the Gini coefficients for several countries in the LAC region around the year 2000. They range from .42 to .57, with Bolivia near the top of the range, only below Brazil and Chile, countries that nevertheless have an

Figure 1.2: Change in Household Income Per Capita by Income Decile and Area, 1999-2002
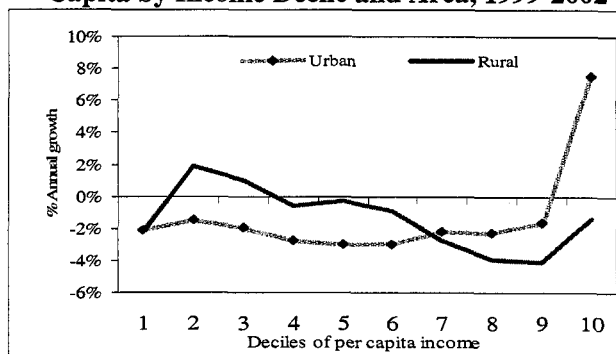
Note: Based on household per capita expenditures in rural areas and household per capita incomes for urban zones.

Source: Author's estimates based on household survey data.

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income per capita four to five times higher. A recent Bank regional study of inequality in LAC finds that this high income inequality reflects significant disparities in assets (education, land, housing), household size, and earnings differentials by gender, ethnicity, sector and type of employment (De Ferranti et al., 2003).

Figure 1.3: Gini coefficients in LAC Distribution of Equivalized Household Income, Circa 2000
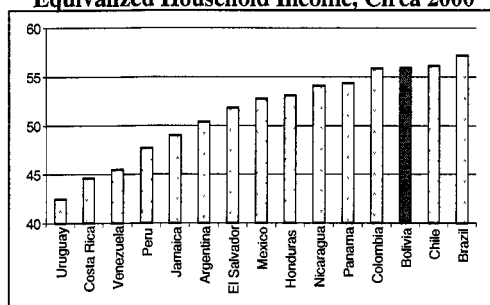
•*Source:* Gasparini et. al.(2004).

Table 1.2: Inequality has Increased in Bolivia, as Shown by Gini coefficients

	Equivalized Income	Earnings	Hourly Wages
Capital Cities*			
1993	50.34	51.89	54.01
1996	49.05	52.18	54.28
1997	50.37	52.58	54.27
2002	53.94	55.40	57.00
Urban			
1997	50.52	52.64	54.25
2002	52.59	54.48	56.13
National			
1997	56.85	56.28	58.07
2002	58.80	58.40	59.24

Note: * Capital cities include the capitals of the nine *departamentos* and El Alto City.
•*Source:* Authors' estimates based on household surveys.

1.9 Income inequality increased since the late 1990s. While there are different bases and measures of inequality, this result holds regardless the indicator used. For example, Table 1.2 presents the Gini coefficient based on equivalized household income (which adjusts for differences in the composition and size of households), total earnings (labor sources) and for hourly wages. The Ginis remained constant between 1993 and 1997 in the main urban areas then increased from 1997 to 2002.[2] The increase in income inequality mainly results from a less equal distribution of earnings (labor income represents around 90 percent of total income – cf. Chapter 3).

POVERTY AND THE INDIGENOUS POPULATION

1.10 Poverty is linked to the situation of the indigenous population. Despite progress in political representation and some social indicators, the Bolivian indigenous people are still severely affected by poverty and exclusion (see Box 1.1). In 2002 there were 1.4 poor indigenous for each non-indigenous poor—up from 1.3 in 1997.

1.11 Low education levels are a principal factor behind the high incidence of poverty among the indigenous. However, even with the same level of education, indigenous people are less likely to exit poverty, in part because their returns to education are lower than for the rest of the population. The indigenous tend to be overrepresented in low productivity jobs both in the formal and informal sector. They are also concentrated in the disadvantaged central highlands and the valleys. The slow pace of improvement in this situation has contributed to recent social tensions.

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2. The differences are statistically significant. See the background paper by Gasparini et al. (2004) for details.

Box 1.1: Indigenous Populations and Poverty

In the last 50 years, the indigenous population (defined by spoken language) has grown from 1.7 to 3.9 million, and now represents half of the country's population. Their economic and political influence increased, as shown in the last general elections, when parties representing the indigenous obtained 26 percent of the seats in the parliament. The reforms of the last decade, especially the Law of Popular Participation and the Administrative Decentralization, recognized the juridical representation of the indigenous community and made resources available for social investment in municipalities with majority of indigenous population. Despite changes favoring them, the findings of a recent study by Jimenez and Landa (2004), summarized below, show that indigenous people are still severely affected by poverty and exclusion.

Despite recent improvements, educational opportunities are less favorable for the indigenous population. The average education of Bolivians (over 15 years old) is 7.5, but only 5.9 years for the indigenous population compared to 9.6 years of education for the non-indigenous. The rate of illiteracy for indigenous people between 15 and 69 years old is 8 percent in urban areas and 25 percent in rural areas. Non-indigenous participation in secondary and tertiary education is double that of indigenous people. In terms of health, the indigenous population has disproportionately higher mortality rates and endemic diseases.

Low educational attainment is related to child work. Child labor is more common in poor indigenous households than in non-indigenous ones. In 2002, 31 percent of indigenous children aged 9-11 were working, four times more than non-indigenous children. The probability of deserting school and working is higher for indigenous children, but household education (particularly, mother's education) and income levels tend to reduce this.

Non-indigenous labor income in 2002 was 2.2 times higher than that of indigenous workers (for women, this ratio was 2.4). Analysis of the determinants of these wage differentials can be largely explained (up to 70 percent) by the lower human capital of indigenous workers. Returns to education are also lower for indigenous people. Labor market participation rates in 2002 were higher and unemployment lower among indigenous workers, probably due to their concentration in rural areas and traditional agriculture. About 84 percent of indigenous workers have an informal job compared to 67 percent for non-indigenous workers. About 80 percent of indigenous women were self-employed while self-employment among non-indigenous women is 53 percent. Being indigenous limits the chances of obtaining paid work, particularly in entry-level jobs.

Source: Based on Jimenez and Landa (2004a).

THE GEOGRAPHY OF POVERTY AND INEQUALITY[3]

1.12   UDAPE and INE, with the support of the World Bank, recently developed a consumption-based poverty map that provides poverty and inequality measures for disaggregated geographic units, including municipalities. This allows identification of the areas with the highest concentration of poverty and inequality, using techniques that combine information from the 2001 Census and MECOVI household surveys 1999-2001 to generate new data on poverty-based consumption expenditures and three alternative poverty lines (see Annex 1.1 for methodological details).

1.13   While poverty is widespread, patterns differ. The complete results are described in Annex 1.2 to this chapter, and they may be summarized thus:

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3. This section summarizes the results of the report _Pobreza y Desigualdad en Municipios de Bolivia: Estimación del Gasto de Consumo Combinando el Censo 2001 y las Encuestas de Hogares_ (2003) led by UDAPE and INE and from the World Bank by Quentin Wodon (AFTPM), Werner Hernani (consultant), and Peter Lanjouw (DECRG).

- Potosi and Chuquisaca have the largest poverty incidence, followed by Beni, La Paz and Oruro, regardless of the poverty line used. The *departamentos* of Santa Cruz, Pando, and Cochabamba are the least poor in percentage terms at any poverty line, although even in Santa Cruz 40 percent of the population is poor. However, the *departamentos* with lower poverty incidence concentrate the largest number of poor in absolute terms owing to their higher population density.

- The urban conglomerates of Beni and La Paz present the highest levels of poverty (over 50 percent for the low poverty line) while Cochabamba and Santa Cruz are among the least poor (just under a quarter of the population). Urban development in these two cities has created broad-based income opportunities.

- Rural areas all over the country are overwhelmingly poor (with no significant difference between low and high poverty lines), and incidence of extreme poverty almost as high as total poverty. Rural areas of Cochabamba and Santa Cruz have a poverty incidence as high as that of rural Potosi and Chuquisaca.

- Poverty is widespread in a large number of municipalities, both in terms of magnitude and intensity and regardless of the poverty line. Many municipalities exhibit poverty above the national levels: a significant fraction above 80 percent. Poverty is particularly concentrated in the valleys and the central highlands. In at least 20 municipalities with dispersed populations (e.g. Morochala, San Pedro Buena Vista, Ravelo), most residents are unable to cover basic food needs.

- Bolivia also exhibits high levels of inequality in consumption at the local level. While in the more egalitarian departments (Tarija, Pando, and Beni) inequality is mainly due to rural-urban disparities, in the most unequal (Potosi, Cochabamba, and Chuquisaca) inequality is also pervasive within urban and/or rural localities.

- The current system of inter-municipal transfers based on UBN poverty targeting tends to be less responsive to municipalities with entrenched pockets of income poverty.

1.14   The results highlight the core connection between increases in average consumption (such as would occur with growth), poverty and inequality at the local level: poverty declines as consumption increases, but the association is mediated by inequality. Municipalities with an average consumption far below the national average register poverty above the national level (Figure 1.4). These are typically located in more economically dynamic urban areas. At high levels of consumption, very few municipalities have poverty above the national average. However, just below the average per capita expenditure level, several municipalities perform below and above national poverty levels. This reflects differences in inequality and particularly in poverty intensity among localities. In municipalities with a smaller poverty gap an increase in per capita consumption leads to a larger reduction in poverty, while in those with high poverty intensity a significant rise in per capita consumption makes a smaller headway towards reducing poverty.

1.15   Many localities may be caught in poverty traps (Azariadis (2004). The largest group of localities comprises municipalities with very high poverty and low inequality which are mostly sparcely-populated, remote indigenous communities living in subsistence. The second largest group includes those with both high poverty and inequality where small wealthier groups coexist with large poverty pockets and comprise larger urban localities with better resource endowments

and small cities dedicated to mineral exploitation or border trade with Brazil and Argentina. In many of these localities poor basic infrastructure, costly access to markets, harsh natural resource endowments, low returns to human capital, and ineffective protection from natural and idiosyncratic risks, can all prevent very poor households from engaging in higher yield economic activities and long term investments in human capital. Low incomes also limit the demand of local goods and services. Raising consumption levels through growth alone may be insufficient and targeted interventions may be needed to increase the incomes of the poor in these areas.

Figure 1.4: Consumption Expenditure and Poverty in Bolivia, 2001

(a) Low poverty line
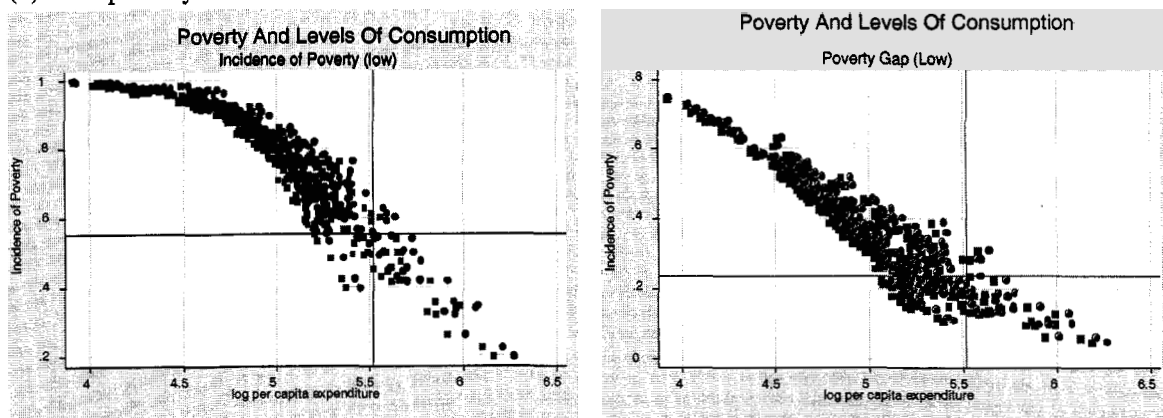
(b) Extreme poverty line
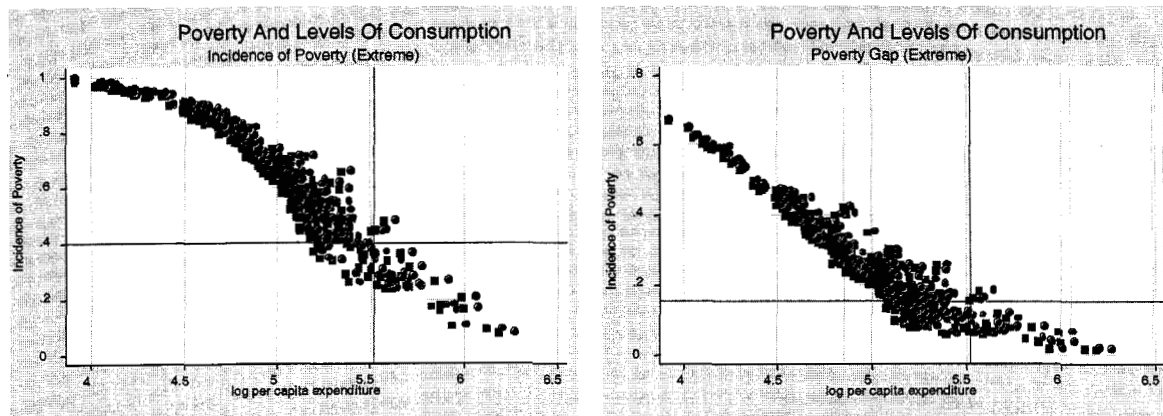
Source: Based on data from the 2001 Census and Household Surveys 1999-2001.

POVERTY BEYOND INCOME

1.16 A complementary approach to income poverty measures is to monitor the fraction of population with unsatisfied basic needs (UBN) and progress in human development outcomes. In the past decade, Bolivia made substantial progress in living conditions, access to basic social services and social indicators. As a result, the fraction of population with UBN fell significantly from 1992 to 2001 (Table 1.3). However, large gaps in UBN remain in rural areas and many municipalities.

Table 1.3: Poverty According to Unsatisfied Basic Needs (% individuals)

	1992			2001		
	National	Urban	Rural	National	Urban	Rural
Overall Index	*70.9*	*53.1*	*95.3*	*58.6*	*39.0*	*90.8*
Housing Materials	48.2	22.5	83.6	39.6	15.6	75.7
Housing Crowding	80.0	76.3	85.1	70.8	68.9	76.3
Sanitary Services	75.9	60.0	97.6	58.0	44.3	78.9
Energy Services	51.8	21.2	93.8	43.7	14.1	91.2
Education	69.1	53.9	90.1	52.5	36.5	70.9
Healthcare	53.6	44.2	66.6	37.9	31.0	54.5

Note: The Unsatisfied Basic Needs index is computed as the average of four indices for housing, sanitation, education, and health.
Source: INE, based on 1992 and 2001 Census data.

Table 1.4: Bolivia's Progress Toward Key Millennium Development Goals

MDG Indicators	Observations		MDG Goal			MDG target 2015
	Year	Data	2004	2007	2015	
Objective 1: Eradicate extreme poverty and hunger						
Goal 1.1 Extreme Poverty Incidence (% of population)	2002	36.8	33.7	29.6	20	19.2
Goal 1.2. Moderate Poverty Incidence (% of population)	2002	64.6	60.6	55	41	NA
Objective 2: Achieve universal primary education						
Goal 2.1. Primary completion rate (8th grade)	2001	71.5	75.3	80.7	88.8	100
Objective 3: Promote gender equality and empower women						
Goal 3.1. Ratio of girls to boys in primary, secondary, and tertiary education	2001	5.1	2.5	0	0	0
Objective 4: Reduce child mortality						
Goal 4.1. Infant mortality rate (per 1000 live births)	1998	67	58.8	55.2	45.1	NA
Objective 5: Improve maternal health						
Goal 5.1. Maternal mortality ratio (per 100.000 live births)	1994	390	317	279	200	104
Objective 6: Combat HIV/AIDS, malaria, and other diseases						
Goal 6.2. Municipalities w/Chagas infestation >3% of population	2002	48	38	10	0	NA
Objective 7: Ensure environmental sustainability						
Goal 7.1. Potable water coverage (% of households)	2001	72.5	76.3	81	84.5	78.6
Goal 7.2. Basic sanitation coverage (% of households)	2001	41.9	45.0	55.5	64	NA

Source: UDAPE, 2003.

1.17 There was also significant improvement in education, health and other social indicators linked to the Millennium Development Goals (Table 1.4). National child and infant mortality rates declined by 30 percent, net enrollment rates in primary education reached almost 100 percent and households without safe water and improved sanitation fell from 50 percent to 30 percent over the decade. However, malnutrition, and maternal and infant mortality rates remain

among the highest in the region and there are high levels of malaria, chagas, and tuberculosis. Bolivia still ranks low in coverage of basic services such as water, sanitation, and electricity. The country is not making sufficient progress to meet the MDG of universal completion of basic education, and progress in some indicators has been uneven. For example, infant mortality rates fell by 27 percent for the richest households and only a 5 percent for the poorest (WDI, 2003). Access to health services across socio-economic groups and indigenous and non-indigenous populations is very unequal.

Box 1.2: Bolivian Social Protection Programs

Social protection programs, designed to help the extremely poor cope with risks associated with a drop in income (such as disease, financial crises, or natural disasters), have grown in size and in number in Bolivia in recent years. As a percentage of GDP, spending on social protection has tripled since 1999, rising from just under 1 percent of GDP to 3 percent in 2003. A good portion of this increase is attributable to the BONOSOL program of cash transfers to all Bolivians over 65. Not including BONOSOL, public social protection spending stands at 1.7 percent of GDP in 2003. Among the many programs forming part of the Bolivian social protection network are those aimed at literacy, childhood development, health insurance, preventable disease, vulnerable groups (particularly indigenous people and women), poor neighborhood improvement, and provision of drinking water.

Evolution of Social Protection Expenditure
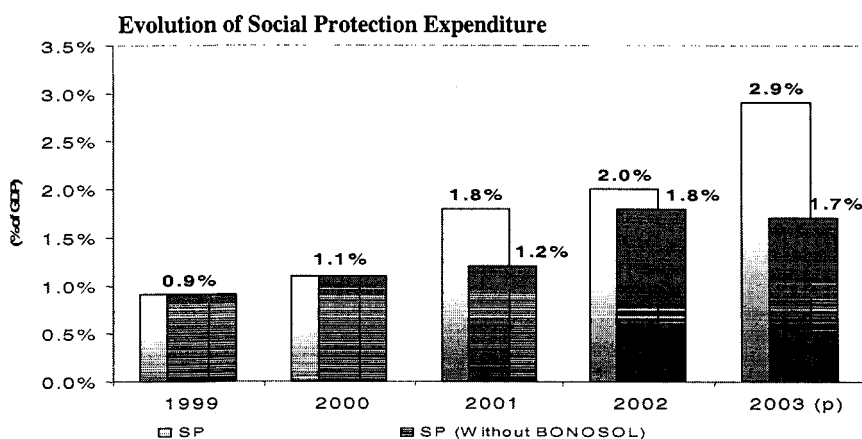
The public sector plays a key role in the provision of social protection programs for the vast majority of the population. Approximately 60 to 70 percent of SP programs (without the BONOSOL program) are funded through external credits, which raise concerns on the sustainability of the Bolivian SP system. With the exception of the BONOSOL and the temporary employment program PLANE, municipalities administer the expenditures of most programs, meaning that municipalities have a critical role to play in program implementation and in coordinating intergovernmental transfers. See Bolivia-Public Expenditure Review (PER) for a catalogue of Bolivia's social protection programs.

Although the amount of fiscal resources spent on social protection is not excessive in a regional context and considering the needs of the Bolivian population, social protection programs are generally not well-managed or targeted to make the most of scarce funding. Furthermore, major risk groups are not covered, for example youth and adults without health insurance and the vulnerable agriculture producers. As well, social protection spending shows an imbalance between the high spending for certain groups and limited resources destined to bigger groups facing higher risks. For example, BONOSOL expenditures are very high compared to the low funding directed toward the very successful SUMI mother-child health insurance program and the PAN childhood development program. Following the recommendations of the 2004 PER, the Government is developing a social protection system that will embody the vast variety of current programs backed by different sectors of government and different funding sources. The aim is to improve coordination, to standardize information an uniform criteria to implement and evaluate programs, and most importantly to increase efficiency.

Source: UDAPE, UPF, INE and VIPFE

1.18   Improvements in social indicators in part result from increased social expenditures and improved service delivery linked to decentralization (see Box 1.2). Expenditure decentralization started in late 1994 with the transfer of primary responsibility for planning and implementation of public investment to the prefectures and municipalities, and expanded with the 2001 *National Dialogue Law*. Social spending reached 18.5 percent of GDP (second-highest in LAC) in 2001 from 2.5 percent in 1986. Decentralization, backed by growing tax revenues, led to greater human capital and social investments in localities with high illiteracy and malnutrition and low water and sewerage connection.[4]

1.19   However, the recent economic stagnation may compromise improvements in social indicators and the achievement of MDGs. While both school enrollment and attendance rates have risen overall, they fell for children of the poorest families (Table 1.5).

1.20   The increase in the use of trained personnel and health facilities for infant and maternal care during the 1990s slowed down in recent years, and remains low despite free access to the poor given through the publicly provided basic health insurance program (*Seguro Universal Materno Infantil*—SUMI).

WHO ARE THE POOR? INCOME POVERTY AND SUBJECTIVE PERCEPTIONS

Table 1.5: Enrollment and Attendance Rates of Bolivian Children (% of those age 5-12)

	Enrollment			Attendance		
Quintile	2000	2001	2002	2000	2001	2002
Poorest	83.9	82.9	80.1	83.5	81.9	79.2
2nd	84.6	86.1	88.7	83.6	85.5	87.9
3rd	86.6	88.4	88.3	85.6	87.4	87.6
4th	90.8	89.2	91.5	89.8	88.2	90.8
Richest	94.1	95.6	95.4	93.3	94.6	95.4
Total	87.1	87.5	87.8	86.3	86.6	87.2

Source: INE, using MECOVI 1999-2002.

1.21   While measuring poverty through income and expenditure poverty lines is widely accepted, a complementary approach is to examine people' own subjective perceptions of their poverty. Since monetary poverty indicators are imperfect proxies of welfare, the priorities of the population with regards to improvements in their well-being may not match those arising from income/expenditure poverty profiles. The determinants of people' self-rated poverty are valid considerations for public policy, and understanding them may shed light on factors underlying recent social demonstrations and lead to a more widely accepted poverty reduction strategy. A background study for this report (Arias and Sosa, 2004) analyzes these issues going beyond income/expenditure poverty profiles to examine the determinants of Bolivians' subjective perceptions of well-being. The results are discussed in Annex 1.3 of this chapter and are summarized below.

1.22   The study finds that subjective poverty perceptions in Bolivia are consistent with income metrics and lead to similar conclusions on who the poor are and the main determinants of poverty. Employment, education, access to assets and basic services, ethnicity and location are core determinants of both income poverty and self-rated poverty. Bolivians tend to have a greater likelihood of falling into income poverty or to consider themselves poor when they are younger, have low education, are unemployed or underemployed, have an indigenous heritage, live in rural areas, and lack basic services. Education and employment carry a greater weight in the poverty perceptions of Bolivians who are more leaning towards self-rating poor, which suggests

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4. See World Bank (2004), Faguet, J. (2004) and Bossert (2000).

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that idiosyncratic factors are less important in the poverty perceptions of the less educated and the unemployed. Indigenous populations weigh unemployment more heavily than the non-indigenous in their self-rated poverty. This implies that actions to increase incomes and employment go hand-in-hand with those that affect Bolivians' own perceptions of well-being.

1.23 Some differences in income and self-rated poverty rankings call attention to non-monetary determinants of well-being. Bolivian Quechuas tend to self-rate poorer than suggested by income poverty profiles while the converse is true for Aymaras. The self-employed report themselves less poor than salaried workers with similar characteristics, while individuals out of the labor force self-rate as poorer than those employed, despite their similar income poverty. Rural residents no longer self-rate poorer than urban inhabitants if they have equal access to basic services and similar socio-economic conditions, but remain more likely to be income-poor. Although Chuquisaca is the second income-poorest region, its residents self-rate the least poor in the country. Thus, exclusion and/or cultural factors (e.g., sense of empowerment or identity), job flexibility, as well as location-specific characteristics (e.g., inequality, social capital, crime) may have meaningful effects on Bolivians' poverty perceptions.

1.24 All in all, income emerges as a sensible proxy measure of welfare and its determinants. Bolivians of all ethnic backgrounds care about education, employment and living conditions, and the self-rated poor place an even higher priority on improvements in these factors. Programs to train, educate, or generate employment among the poor not only bring important income gains but are also valued by these populations. Nonetheless, the differences in subjective welfare rankings for various segments of the Bolivian population should remind policy makers of the significance of non-monetary aspects of welfare for these groups.

2. GROWTH, POVERTY AND INEQUALITY

The growth spell of the 1990s reduced poverty and improved social indicators. During 1993-98, growth averaged 4.7 percent per year (2.2 percent in per capita terms), surpassing other Andean countries for the first time in 40 years. Sound stabilization and structural policies accounted for much of this growth spurt, aided by an expansion of the labor force and increases in productivity. As noted in Chapter 1, this led to a reduction in poverty, but this reduction was insufficient to pull large numbers of the poor above the poverty line because of the large initial poverty gap. As well, growth was greater in capital- and skill-intensive sectors, with limited spillovers to agriculture and manufacturing, which employ over 60 percent of the labor force. As such, the impact of growth on poverty was reduced. A key factor limiting development of more labor-intensive economic activity was low productivity, particularly labor productivity. Productivity, in turn, was held back by factors impacting: (i) the ability of firms to adopt new technologies, train workers, and actively develop new products and markets—i.e., the demand for labor; and (ii) the ability of the poor to develop human capital and effectively utilize it in labor markets—i.e., the supply of labor.

2.1   Over the last 40 years growth in Bolivia has been slow and did not have a significant impact on poverty and inequality. Even during the boom of the 1990s, growth was faster in sectors with lower direct job generation and small spillovers to the rest of the economy. The weak improvement in growth-enabling factors prevented Bolivia from realizing greater benefits from policy reforms. With the growth deceleration of the early 2000s, poverty gains were reversed, inequality rose, and social gains slipped.

2.2   This chapter examines the trends and determinants of economic growth and its implications for the evolution of poverty and inequality. It characterizes the patterns of growth in the 1990s and early 2000s, disaggregated by sector and region. It performs a simple growth accounting to assess the contributions of capital accumulation, labor force expansion, and total factor productivity to growth in Bolivia.

PATTERNS OF GROWTH

2.3   After macroeconomic stabilization in the mid-1980s, Bolivia adopted numerous market reforms to increase private sector participation, align prices with market forces and increase integration into the global economy. The Bolivian economy recovered from the contraction of most of the 1980s, and expanded at an average annual rate of 4.7 percent (2.2 percent per capita) during 1993-98 on the basis of far-reaching reforms and abundant external capital (Figure 2.1).

Figure 2.1: GDP Growth in Bolivia, 1984-2003 (%)

Source: Based on data from INE.

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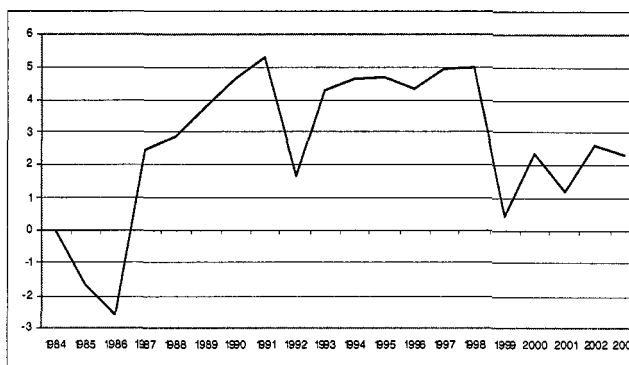
2.4   However, due to negative external and internal shocks, the economy decelerated to an average rate of only 1.9 percent (close to 0 percent in per capita terms) during 1999-2003. The Russian financial crisis of 1998 and the international capital markets' subsequent turmoil led to a sudden drop in external financing to Bolivia and many of its trading partners, with a consequent deceleration of regional growth. In addition, the Brazilian and Argentine currency devaluations and ensuing crises in 1999 and 2001, respectively, caused a decline in both the competitiveness and demand for Bolivian exports. Internally, the coca eradication reduced incomes, and it was only partly compensated by the increase in soy production and new gas reserves exploitation. These factors, combined with the 2002 elections and social unrest, resulted in production disruptions, fiscal imbalances, financial sector troubles, capital outflows, and growth deceleration.[1]

2.5   Bolivia's growth has trailed the average of the rest of the world (Table 2.1). GDP growth per capita was below LAC's regional average during the 1960s and 1970s and declined further during the 1980s. It followed the regional trend in recovery during the 1990s, but still remained 0.5 percentage points below the LAC average during the decade. Bolivia has had lower growth than the other Andean countries on average, except during the 1990s when its economy grew twice as fast.

Table 2.1: GDP Per Capita Growth in Bolivia, LAC and the World, 1960-2002 (%)

	1961-70	1971-80	1981-90	1991-99	2000-2002
Bolivia	0.35	1.67	-1.95	1.53	-0.20
Andean Region*	1.51	2.09	-1.18	0.77	0.06
LAC**	2.71	3.44	-0.74	2.05	0.26
World***	4.15	2.68	2.29	1.72	2.70

Note: *Simple average, own calculations; **weighted average, n = 26; ***weighted average, n = 109. GDP measured at $1995 purchasing power parity. 2002 preliminary estimates.
Source: Based on Loayza, Fajnzylber and Calderon, 2002 and data from WDI (2003).

Figure 2.2: GDP Growth by Sector and Selected Sub-sectors, Bolivia, 1993-2002 (%)
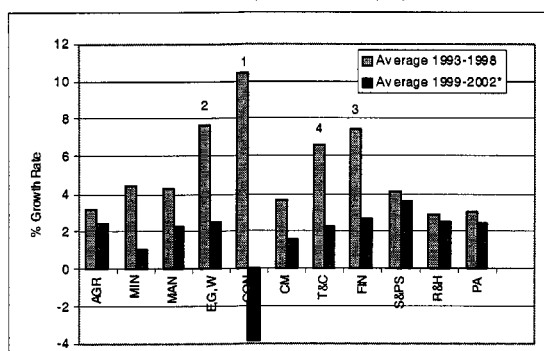
Figure 2.3: Bolivia's Sector Composition of GDP, 1990-2003
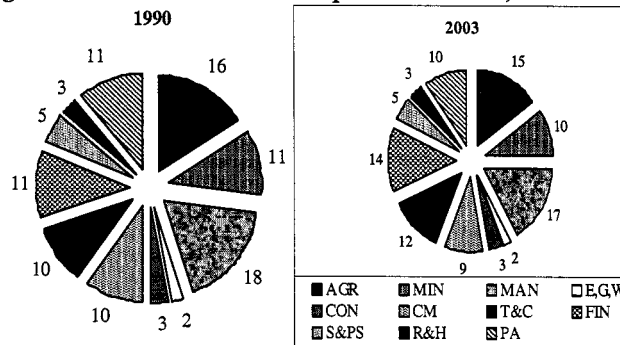
Note: See definitions in Figure 2.2
Source: Based on data from INE.

* Preliminary.
Note: AGR: agriculture; MIN: mining; MAN: manufacture; E.G.W: electricity, gas, and water; CON: construction; CM: commerce; T&C: transport & communication; FIN: finance; S&PS: social and personal services; R&H: restaurants & hotels; PA: public administrative services.
Source: Based on data from INE.

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1. See World Bank (2004b) for a detailed discussion of Bolivia's macroeconomic evolution.

2.6   Capital and skill intensive sectors grew faster, with limited spillovers to agriculture and manufacturing (which employ over 60 percent of labor). The fastest growing sectors were construction, utilities, minerals (including hydrocarbons and natural gas), financial services, transport and communication, which expanded over 6 percent annually. Agriculture and manufacturing grew below the pace of the economy (Figure 2.2). In particular, the coca eradication program reduced production by 80 percent, hurting many Bolivian farmers. Agricultural expansion in other crops—led by soybeans—was insufficient to absorb the displaced agricultural laborers.

2.7   The composition of the economy shifted moderately towards services (Figure 2.3). Financial, business and real estate services increased their GDP share from 10 to 13 percent between 1990 and 2003. Agriculture remained at 15 percent of GDP. Industrial agricultural products grew over 10 percent per year but account for only 18 percent of agricultural GDP. Hydrocarbons and minerals remained at around 10 percent of GDP: exports of natural gas to Brazil rose, but that only served to offset production declines in other minerals. The share of manufacturing fell slightly from 18 percent in 1990 to 17 percent in 2003, led by food processing industries which account for more than half of manufacturing output.

2.8   Exports, as a percentage of GDP, had little change, although their composition shifted. The share of minerals and hydrocarbons in total exports dropped from about 95 percent in 1985 to about 50 percent in 2002, while non-traditional products (e.g., soybeans, coffee, sugar, wood) rose to 46 percent, largely due to the significant increase in soybeans. This structural shift was facilitated by intra-regional trade pacts (e.g., the Andean Pact and Mercosur) during the mid-1990s. Thus, exports diversification has not ignited a dynamic export oriented model that can add value to natural resource sectors.

2.9   Economic growth did not affect all regions equally. The *departamentos* that began with the highest per capita GDP generally grew faster (Figure 2.4). An exception is Pando, which began as number five in GDP per capita, but grew the fastest during 1993–98. The poorest departments had below-average growth and remain below the national income per capita.

2.10   In sum, the growth spur of the 1990s was unbalanced and not sustained. The growth in natural resource sectors—in the lowlands around Santa Cruz—did not spread sufficiently to subsistence agriculture—in the Altiplano—and low productivity artisans. A dynamic export model that adds value to natural resource sectors has not yet ignited.

Figure 2.4: Average Growth by _Departamento_, Bolivia 1990–98 (percent)
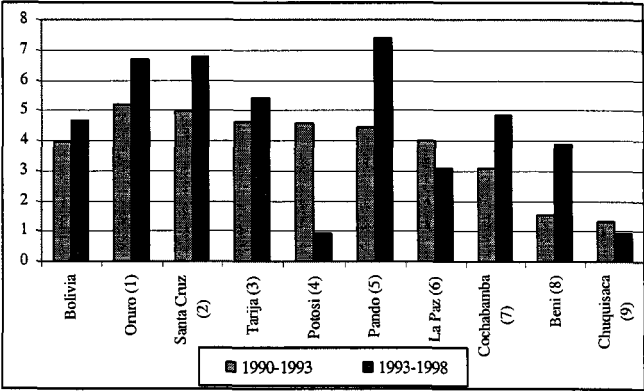
Note: Numbers in parentheses refer to each department's GDP per capita ranking during the 1990-1993 period.
Source: Based on data from INE.

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SOURCES AND DETERMINANTS OF GROWTH

2.11   Bolivia was a leader in economic reforms among the Andean countries during the 1980-90s. Reforms took place in two stages.[2] The first began in 1985 and aimed to stabilize the economy and develop the private sector. The public sector was reduced and monetary expansion was eliminated as a source of government financing, paving the way for the greater market-determination of prices. The second stage of reforms took place in the early 1990s and emphasized policies to attract foreign direct investment (FDI), improve the efficiency and efficacy of social programs and public services, strengthen the financial sector and promote decentralization to strengthen the country's governance and institutions. These reforms were accompanied by a large amount of external financing.

2.12   The evidence from a recent study (Loayza, Fajnzylber and Calderon, 2002) suggests that the growth spur of the 1990s was mostly driven by structural rather than by cyclical factors. First, Bolivia registered an acceleration of the long-term (trend) component of GDP per capita, coupled with relatively smaller short-term fluctuations around this trend (that is, lower volatility and persistence of shocks). Second, total factor productivity increased significantly. And third, regression results from the study indicate that improved structural and stabilization policies explain a significant fraction of the growth during the 1990s.

2.13   For the entire 1960–90 period, Bolivia's growth rate of long–term (trend) per capita output is close to actual growth rates, and also below that of the world, LAC and the Andean region. But during the 1990s it matches LAC's average and doubles that of the Andean countries. The volatility of Bolivian per capita output during the past two decades was below the LAC region and the world. While economic shocks were common during the 1970s and 1980s, the persistency of growth fluctuations was lower than that of LAC and the world during the 1990s (Table 2.2).

Table 2.2: Growth Rate of Trend, Volatility[1] and Persistency[2] of Output per Capita, in Bolivia, LAC and the World 1960–99

	1960–99	1960–70	1971–80	1981–90	1991–99
Growth of Trend					
Bolivia	0.27%	0.45%	1.20%	−1.97%	1.54%
Andean Region*	0.75%	1.50%	1.85%	−1.04%	0.76%
LAC**	1.42%	2.61%	1.62%	0.07%	1.51%
World***	2.35%	3.31%	2.51%	1.64%	2.00%
Volatility					
Bolivia	0.0220	0.0384	0.0127	0.0147	0.0106
LAC**	0.0290	0.0208	0.0356	0.0314	0.0167
World***	0.0224	0.0195	0.0263	0.0213	0.0149
Persistence					
Bolivia	0.1911	−0.0406	0.7852[3]	0.3392[4]	0.0256
LAC	0.1985[3]	0.0354	0.1641	0.2316[3]	0.2725[3]
World****	0.1611[3]	0.1800[3]	0.1358[3]	0.1760[3]	0.1493[3]

Note: * Simple average, own calculations; **weighted average, n = 26; *** weighted average, n = 106;   **** weighted average, n=136.
[1] Standard deviation of cyclical component of log output per capita.
[2] AR(1) coefficient of persistency; [3] significant at 5%; [4] significant at 10%.
Source: Based on Loayza, Fajnzylber and Calderon, 2002.

2.14   The significant increase in total factor productivity (TFP) also corroborates that growth in the 1990s cannot be attributed to cyclical factors. The growth rate of TFP in Bolivia surpassed LAC's average in the 1990s (Table 2.3).

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2.   World Bank (2004b).

**Table 2.3: Factor Contributions to GDP Per Capita Growth,
in Bolivia and selected LAC countries, 1971–2000**

Period	Country	GDP growth	Method 1			Method 2			Method 3		
			Labor	Capital	TFP1	Labor	Capital	TFP2	Labor	Capital	TFP3
1971–80	Bolivia	4.15%	1.61	1.93	0.61	1.53	1.93	0.69	NA	NA	NA
	Honduras*	*5.39%*	*2.2*	*2.16*	*1.04*	*2.93*	*2.16*	*0.3*	*2.05*	*2.12*	*1.22*
1981–90	Bolivia	0.10%	1.59	–0.26	–1.23	1.81	–0.26	–1.45	1.41	–0.31	–1.00
	Brazil*	*1.55%*	*1.67*	*1.31*	*–1.43*	*2.39*	*1.31*	*–2.15*	*2.7*	*1.38*	*–2.53*
1991–2000	Bolivia	3.83%	1.72	0.46	1.66	2.14	0.46	1.23	1.76	0.45	1.62
	Mexico*	*3.50%*	*1.52*	*1.57*	*0.42*	*1.87*	*1.57*	*0.06*	*1.79*	*1.59*	*0.11*

Note: * Countries shown had the decade median annual TFP growth rate in the LAC region. TFP1 assumes that capital growth is investment minus depreciation and the growth rate of the labor force. TFP2 adjusts for the educational attainment of the labor force. TFP3 adjusts for capital and labor utilization (employment rate, population employed and total hours). NA: Not Available.
Source: Based on Loayza, Fajnzylber and Calderon, 2002.

2.15   Results of cross–country growth regressions indicate that Bolivia's growth acceleration in the 1990s is largely attributed to better policies (Loayza et al. 2002). Improved structural and stabilization policies account for over 80 percent of growth in Bolivia in the past decade (see Annex 2.1 for details). Rebounds from past negative shocks (cyclical reversion) and external conditions had a smaller role.

2.16   Remaining weaknesses in the policy framework as well as Bolivia's distinctive barriers to growth in good measure explain why Bolivia has been a growth under–performer. When comparing the growth drivers of Bolivia and high–growth LAC countries, Bolivia was outperformed in per capita growth on the basis of better policy performance of the other countries (see Annex 2.1 for details). In fact, being a much poorer country Bolivia should have grew over 1 percent faster than most of these countries, according to transitional convergence theory. Country–specific characteristics explain from 0.7 to 2.4 percentage points of Bolivia's growth underperformance. These relate to factors such as natural resources, geography, the quality of the investment climate and political institutions, all of which limit the Bolivian economy's ability to reap greater benefits from structural and macro policy reforms. While these traits are challenging they can be circumvented with good policies.[3] In particular, despite recent progress, the institutions governing the investment climate in Bolivia fare behind most LAC countries. Bolivia's idiosyncratic characteristics cause it to grow 0.7–0.9 percentage points slower than Colombia and Peru, countries with their share of natural hurdles and social conflict but with better and improving business regulations.

2.17   The international evidence concurs that sound business regulations, including those for the entry–exit and expansion of firms and labor laws, are essential for productivity growth. They set the incentives for firms' learning and innovation, and enable the reallocation of resources to more productive uses. In fact, Bolivia's productivity gains of the 1990s largely reflect the

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3.   See Sachs (2003), Rodrik and Hausman (2003).

improved allocation of resources ensuing from economic reforms but little technological upgrading or innovation. Capital accumulation (that often accompanies adoption of new technologies) contributed little to growth, while labor productivity (GDP per worker) rose barely 0.5 percent per year during the growth boom. Chapters 3–4 discuss how a difficult investment climate, particularly weak business and labor regulations, constrain growth in Bolivia.

THE IMPACT OF GROWTH ON POVERTY AND INEQUALITY

2.18 Several factors dimmed the impact of growth on poverty in the 1990s. Bolivia's large income gap separating the poor from the non–poor (partly a result of past low growth) is primarily responsible for the limited poverty reduction. This results in a low growth–poverty elasticity such that growth does not have a large, immediate impact on poverty. Moreover, the slower growth in the labor–intensive sectors and in the worse–off regions, as well as scant labor productivity gains, prevented larger increases in employment and earnings. The improvements in education and other social indicators, though certainly positive trends, take longer to translate into better income generation in an environment that is not conducive to productivity growth. Altogether this led to modest absolute income gains for the poor.

2.19 Growth in the largest urban centers was not biased against the poor. Per capita incomes of the metropolitan poor increased at a similar rate than average incomes (around 3 percent), although the richest 20 percent saw their incomes rise slightly faster. Figure 2.5 shows curves depicting the average annual growth rate of each income percentile during 1993–97 for capital cities and for national, urban and rural areas during 1999–2002. The fact that the poor benefited equally in relative terms from average growth is reflected in the curve lying over the horizontal line in the top figure. While lack of comparable household survey data for rural areas precludes definite assessments, the study by Klasen et al. (2004) suggests that growth did not bypass the poor in rural and small urban localities.

2.20 Note, however, that the resulting income gains for the poor are much smaller in absolute terms since they start from very low incomes. As a result, 1 percent growth in per capita income lifts less than half a percent of Bolivians out of poverty (poverty–growth elasticities are 0.3–0.5, compared to an average elasticity of 1 for LAC). With the large number of poor people and the severity of poverty, the 13 percent cumulative per capita income growth of 1993–97 improved incomes, but was unable to pull a larger number of people in major urban areas below or even closer to the poverty line. About 37 percent of the population in 1997 still fell half way short of the income required to escape poverty, and 59 percent in rural areas could not even afford the basic food basket.

2.21 The results also corroborate that the economic slowdown led to large and relatively constant income declines (except for the richest 10 percent) in urban areas and slight relative income gains for the poorest rural households. Accounting for the recent real income declines, the incomes of the urban poor fell –0.8 percent per year during 1993–2002

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Figure 2.5: Growth Incidence Curves, 1993–2002
(% change in household per capita income, by percentile)
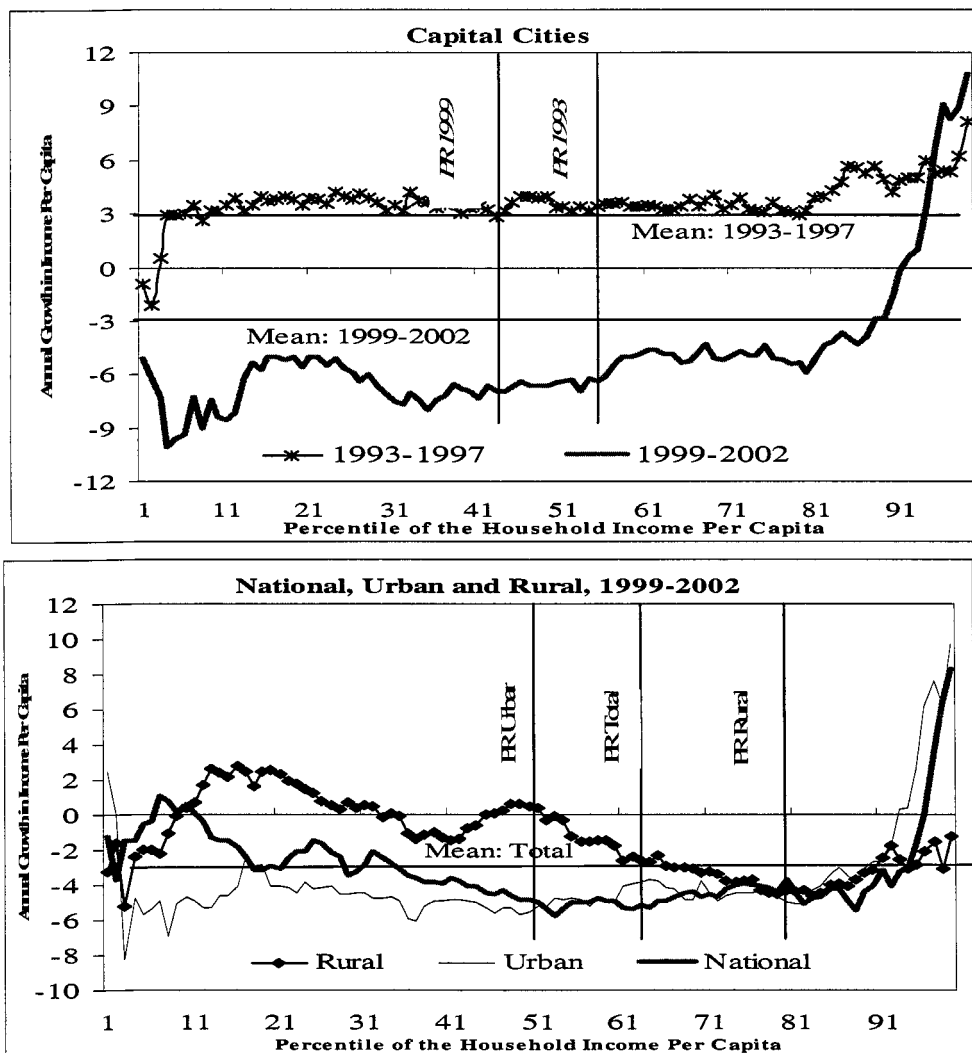
Note: Based on household per capita expenditures in rural areas and per capita incomes in the main occupation for urban zones to enhance the comparability across surveys of the 1990s–2000s.
Source: Authors' estimates based on household survey data.

FACTORS DRIVING CHANGES IN INCOME DISTRIBUTION

2.22   Several demographic and micro forces can be behind the increase in income inequality during the 1990s: the restructuring of employment across economic activities and occupations, changes in the level of education, the size and composition (gender, age, ethnic) of the workforce and households, and variations in the earnings premium attached to these characteristics. A companion study for this report (Gasparini et al. 2004) assesses the relative importance of these factors for changes in the distribution of earnings in Bolivia (which represent 90 percent of total

income, see Annex 2.1 for the methodology). Specific results are detailed in Chapter 3, but the main findings point to the following forces as drivers of distributional change during the 1990s:

- A sizeable increase in the dispersion (i.e., inequality) of unmeasured or unobserved wage determinants (such as education quality, labor market connections, or unmeasured personal skills) is the main factor behind the increase in earnings inequality. These factors have played a very significant unequalizing role over the last ten years, especially in urban areas.

- Changes in the returns to education were an equalizing factor during the early 1990s in urban areas and an unequalizing factor thereafter.

- Changes in the education structure of the work force have been mildly unequalizing, mostly in urban areas.

- Changes in regional earnings gaps have played a moderately equalizing role, particularly in rural areas.

- Changes in the gender and ethnicity earnings gaps had little effect on earnings inequality, while the widening gap in hours of work between skilled and unskilled workers was mildly unequalizing.

2.23   Although some of the dispersion in unmeasured earnings determinants likely reflects measurement errors, the magnitude of the results and short time span suggests that unmeasured factors like school quality, labor market connections, and/or unmeasured skills (both cognitive and non–cognitive) have become more important determinants of earnings performance in Bolivia over the last decade, for instance through their impact on returns to education.[4] These factors alone account for an increase of more than three points in the Gini coefficient of inequality in the distribution of wages between 1993 and 1997 in capital cities, three points between 1997 and 2002 in urban areas, and two points in rural areas during that period. The impact on the equivalized household income distribution is smaller but still significant.

2.24   Contrary to the findings for other countries, there is no evidence that rising returns to higher education increased earnings inequality between 1993 and 1997. On the contrary, wages grew faster for workers with primary education and reduced the Gini coefficient by over one point. In contrast, unskilled earnings lagged behind with the deceleration of growth in the last five years. The change in average returns between 1997 and 2002 was unequalizing, although of smaller magnitude than in the earlier period.

2.25   The effect of education returns on earnings inequality is magnified by the uneven change in the returns among workers (Gasparini et al. 2004). The estimated fall in income inequality in capital cities during 1993–97 is 2.5 Gini points when we account for the relatively faster decline in the unskilled wage gap for workers at the bottom of the adjusted earnings scale whom tend to come from poor families. The contribution to the rising wage and household income inequality during 1997–2002 is also higher, since the increase in the skilled wage premium benefited only workers in the best–paid jobs, while returns declined for most workers in the bottom of the

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4. The evidence from the background studies (Gasparini et al. (2004), Tannuri-Pianto, Pianto and Arias (2004a, 2004b) is consistent with this interpretation of the residual wage dispersion to the extent that there are important differences in the returns to observed characteristics (cf. the returns to education) along the earnings distribution. See Chapter 3 and Lemieux (2004).

adjusted earnings scale. These results highlight the increasing importance of unmeasured worker skills that affect the productivity of measured human capital (years of education) for labor market performance in Bolivia. It could be that workers from better quality schools and/or with less favorable family background have borne the earnings erosion of the sluggish economy and rising unemployment. Further research is needed to ascertain the significance of these factors to guide the design of public policies.

2.26   The unequalizing effect of the moderate educational upgrading of the workforce is becoming visible in recent years. The impact of a better–educated work force was modest in capital cities between 1993 and 1997, large in urban areas between 1997 and 2002, and negligible in rural areas during that period.

2.27   The results point to reductions in the earnings differentials between several *departamentos* and Santa Cruz, particularly between 1997 and 2002 in rural areas. These changes are reflected in a relatively large equalizing effect on the income distribution in rural areas, since Santa Cruz is one of the richest regions. This convergence largely reflects the performance of Cochabamba, La Paz, and Oruro and it bypassed some poor regions such as Beni and Chuquisaca. Nevertheless, given that the latter are less densely populated, the overall effect has been equalizing.

2.28   Changes in labor supply and the gender wage gap have played a smaller role in the distributional changes. The gap in hours of work per week between skilled and unskilled workers widened over the last decade. While college graduates worked an average of three more hours per week in 2002 than in 1997, those who completed primary school worked an average of two hours less in 2002 than in 1997. This had an unequalizing effect on the distribution. Meanwhile, the gender wage gap shrunk between 1993 and 1997 and increased thereafter, resulting in an equalizing change in the first period and an unequalizing force in the second. However, all of these impacts seem to be modest: the Gini increases are less than half a point.

2.29   Summing up, changes in income inequality in capital cities over the last 10 years result from several forces, some of which offset each other. Much of the change cannot be explained because it is attributed to unobserved worker characteristics, and further research would be required to pinpoint specific factors. During 1993–97 the unobserved and educational upgrading acted to increase inequality, but these factors were overcome by the equalizing impacts of the decline in the earnings gaps between more and less educated workers and the better–off and relatively worse–off regions. In contrast, several factors acted to increase inequality in the last five years, mainly the continuing rise in the returns to unobserved characteristics and the educational upgrading of the labor force, coupled with a moderate increase in the education wage premium. Changes in regional wage gaps were equalizing, especially in rural areas, while changes in the gender wage gap have not affected income inequality significantly. Some of the associated policy levers of many of these factors are examined in chapters 4 and 5.

3. CONSTRAINTS TO EMPLOYMENT CREATION—THE DEMAND OF LABOR

Bolivia's weak business environment limits investment, reduces productivity, and hampers job creation. Capital accumulation (tied to the adoption of new technologies) contributed little to growth, while labor productivity (GDP per worker) declined 2 percent per year over the 1990s. Total productivity gains of the 1990s largely reflected the improved resource allocation from economic reforms, rather than technology upgrading or innovation. This led to low job creation. Firms cite a small sales market, burdensome labor and business regulations, limited and costly credit and transport infrastructure as binding constraints to their operation. These factors affect capacity utilization rates and firm size, and thus employment creation. Regulatory constraints such as registration and operating licenses, high collateral, and skilled labor bottlenecks are the most binding for small firms. Input costs and credit constraints bind the most for larger firms. Faced with few incentives to comply with regulations to start and run a business, many micro and small firms remain in the informal sector and cannot grow through capitalizing on productivity gains from innovation and economies of scale.

To increase productivity, and thereby raise employment and income levels and reduce poverty, the Government should consider a number of policy measures to improve the business environment. Two broad types of actions are required: measures to (i) encourage productivity increases through greater participation in world markets, changing rules to ease access to credit and promoting worker training and technology adoption; and (ii) modernize labor regulations and promote formal-sector participation by simplifying business registration, easing over-restrictive labor regulations, providing incentives for smaller firms to join the formal sector, and working to create business associations to achieve economies of scale.

3.1   This chapter adopts a labor demand perspective to analyze the firms' obstacles to expansion and job creation, complementing the next chapter's focus on labor regulations and the characteristics of labor supply, employment and earnings. The analysis focuses on the main constraints to job creation and productivity improvement in manufacturing firms, with particular attention to small and medium enterprises (SMEs). The specific focus is on the dynamics of job creation and destruction, the characteristics of labor demand, sectoral patterns of manufacturing productivity, and the microeconomic factors affecting manufacturing capacity utilization and firm size. The results are used to assess the prospects for job creation, particularly for unskilled workers, and to identify policy actions that can alleviate these constraints.

3.2   The focus on manufacturing is due both to data limitation and the importance of this sector as a source of labor intensive growth. The analysis is based on a 2000 investment climate survey (FACS) of formal manufacturing firms and a newly developed panel data from INE's surveys of manufacturing activities (See Annex 3.1). The FACS's and INE's manufacturing surveys are useful for analyzing firms' potential for job creation, but there are no similar data for other sectors (e.g., services) or microenterprises (less than five employees). While this limits the analysis, manufacturing and non-manufacturing firms of all sizes are likely to share similarities in the business environment constraints. The chapter also draws from a field study, companion to the FACS survey that identifies compliance costs and legal requirements small firms face in starting and running a business.

3.3   Currently existing preferential trade opportunities to the U.S. market through the Andean Trade Promotion and Drug Eradication Act (ATPDEA), and potentially even more far-reaching access if Bolivia joins in negotiations on the FTA with the U.S., offer increased potential for export-led growth to boost employment and earnings. The Bolivian Government can take policy actions that could leverage improved export potential to boost job creation. A variety of economic incentives have been considered to increase exports of textiles and wood products under the ATPDEA initiative, including tax incentives, the creation of manufacturing conglomerates linking large, small, and medium manufacturers (*maquicentros*), working capital financing and training. SMEs can play a crucial role in promoting more labor-intensive growth. Further reforms to business and labor regulations could reduce obstacles and increase incentives for small firms to participate in formal sector institutions and to scale up. The following analysis aims to inform these public policy options.

EMPLOYMENT CREATION: CHALLENGES AND OPPORTUNITIES

3.4   The limited employment opportunities to escape poverty rank at the top of Bolivians' concerns, especially the poor, as the demand for labor in the formal sector has not absorbed the increasing numbers—between 80,000 and 100,000—joining the work force each year. The job displacement caused by the coca eradication program, the predominance of subsistence agriculture, weak investments by formal domestic firms, and the low labor demand in hydrocarbons and telecommunications have all played a role in limiting job creation. Few small firms grow into medium-size firms, with the result that a few large firms produce roughly 65 percent of GDP and only 9 percent of employment, while numerous small firms (of 10 or fewer employees) account for 83 percent of employment and only 25 percent of GDP.

3.5   Manufacturing is labor-intensive and is a major source of demand for agricultural products and small artisans. It generated 18 percent of urban employment during the 1990s (third behind commerce and services, which generated 31 percent and 27 percent respectively) and contributed roughly 17 percent of GDP (the largest single sector). Over 300,000 people work in manufacturing in urban areas, of whom 60 percent work in family businesses or micro enterprises, 18 percent in small firms (five to 14 employees), 8 percent in medium-size firms (15-49 employees) and 13 percent in firms with over 50 employees.

3.6   Bolivian manufacturing has barely kept up with the overall growth of the economy, and its 17 percent of GDP share is relatively small compared to regional standards (e.g., 21 and 24 percent in Ecuador and Peru, respectively). The sector has been particularly hit by the recent economic slowdown. Output growth is close to 2 percent, only half the rate of the 1990s.

3.7   The manufacturing sector, in particular SMEs, faces significant structural limitations. The combination of inadequate infrastructure, limited supply of skilled labor, restricted export growth, low capacity utilization, a small domestic market, high start up costs and burdensome red tape, high indebtedness and restricted access to credit markets all seriously hinder the sector, despite some recent improvements.

THE MANUFACTURING SECTOR: CHARACTERISTICS AND INVESTMENT CLIMATE

3.8   Overall, manufacturing firms did not increase their employment during 1995-1999 (Figure 3.1). The composition of the sector in terms of firm size remained relatively stable, except for 1998 when the number of SMEs fell. The largest number of firms was in the non-metallic minerals, food, and wood products sectors in this period.

3.9   Total employment changed little over the period, but there was a reallocation towards larger firms and the petroleum and food sectors (Figure 3.2).

Figure 3.1: The Majority of Bolivian Manufacturing Firms Employ Only 5-14 workers

Source: Authors' estimates based on EEAM survey data.

Approximately 50,000 employees work in the over 1,500 firms covered by the surveys. Employment in bigger firms expanded at an average annual rate of 3 percent, whereas it fell 0.5 percent and 2.5 percent in small and medium enterprises, respectively. Food and petroleum products showed steady increases in employment between 1995 and 1999, while employment in wood-related activities contracted. About 70 percent of formal manufacturing employment was concentrated in firms with 50 or more workers, and over half of it was generated in the food, textiles, and mining sectors.

Figure 3.2: Evolution and Distribution of Employment in Manufacturing, Bolivia, 1995–99

By Firm Size
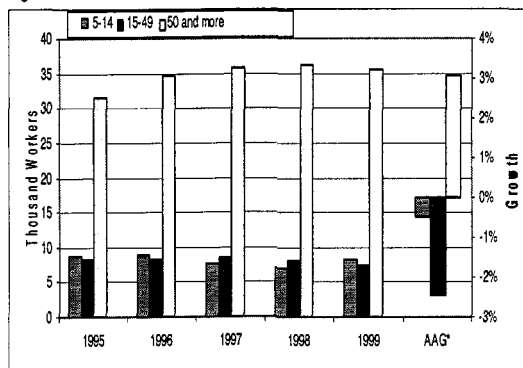
By Activity Type
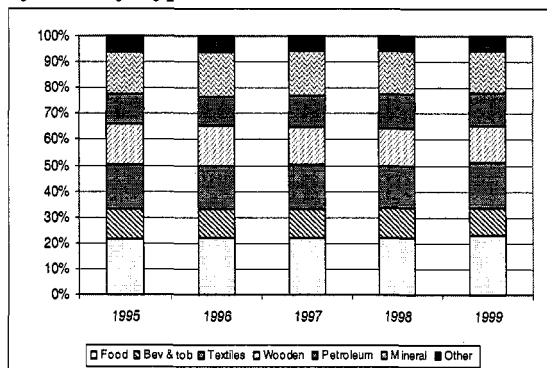
Note: *AAG: Average Annual Growth.
Source: Authors' estimates based on EEAM survey data.

3.10   Manufacturing output expanded faster and was mainly generated in larger firms and in capital-intensive sectors (Figure 3.3). Value added grew at an average annual rate of 5.5 percent for larger enterprises, 3.8 percent for small firms and stagnated for medium-sized firms. Petroleum refinery activities generated over 50 percent of manufacturing output.

Figure 3.3: Evolution and Distribution of Manufacturing Output, Bolivia, 1995–99, $Bs 1995

By Firm Size   By Activity Type
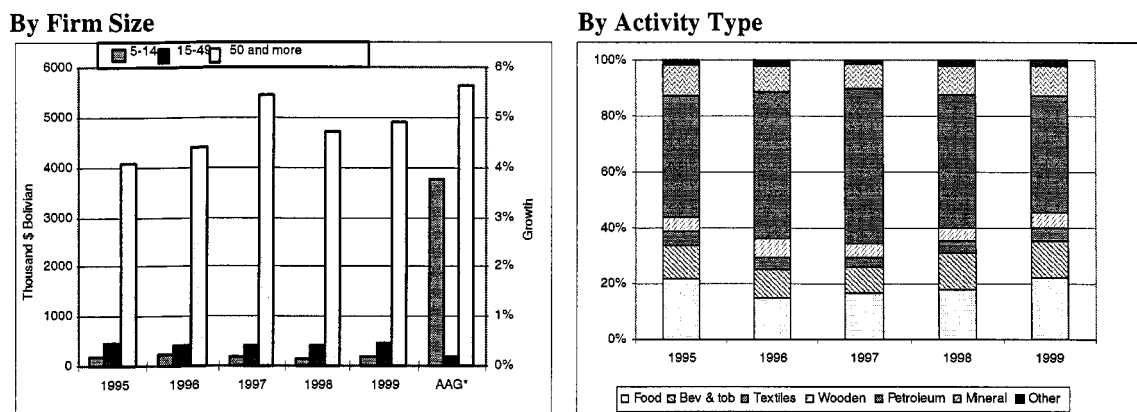
Note: *AAG: Average Annual Growth.
Source: Authors' estimates based on EEAM survey data.

3.11   Overall, there were limited gains in average labor productivity (measured as the ratio of value added to total employment) over the period, and the gains were concentrated in the most productive subsectors (Figure 3.4). Labor productivity increased relatively evenly among firms, with average annual growth rates between 2.5 percent (large) and 3 percent (medium-size). On average, large firm productivity is two to six times higher than that of small and medium-size firms in the panel, respectively. These differentials are larger than those in the FACS survey. Labor productivity increased in the petroleum, food, beverages and tobacco industries (sectors where labor was already more productive), while textiles, wood and mining production did not gain. These comparisons are only partial indicators of overall productivity differences among sectors and they ignore the intensity of use of both capital and labor (analyzed further below).

Figure 3.4: Average Labor Productivity in the Manufacturing Sector, Bolivia, 1995–99 (Value Added per worker, $Bs 1995)

By Firm Size   By Sector
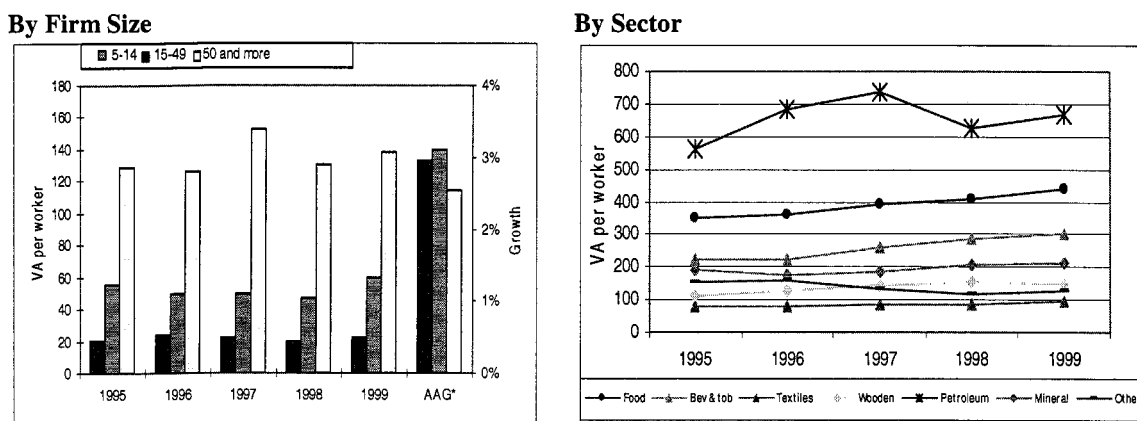
Note: *AAG: Average Annual Growth.
Source: Authors' estimates based on EEAM survey data.

3.12   The weak and uneven performance of the manufacturing sector is symptomatic of Bolivia's economy and poor investment climate. A recent Bank study concluded that a small sales market, institutional limitations, restricted and costly credit, high operational costs, and poor and costly transport infrastructure constrain competitiveness (World Bank, 2001). Despite recent progress, a comparison of Bolivia with other countries reveals many opportunities for improvement (Table 3.1). The study identifies the following key limitations faced by the manufacturing sector:

- <u>A thin, localized market faced with stiff informal competition</u>. The majority of domestic trade is intra-regional, and inter-regional trade is highly concentrated among La Paz, Cochabamba and Santa Cruz, which account for close to 90 percent of domestic sales. In many sectors at least one third of the market is supplied by lower cost informal producers and contraband. Less than 10 percent of firms (almost half of large firms and 20 percent of medium enterprises) overcome domestic markets constraints by exporting. Existing export promotion programs can be improved to help overcome market and information barriers.

- <u>Limited capital finance and stringent credit access</u>. Lending is highly concentrated in a few local banks, very costly, and carries stringent collateral requirements. The institutional underpinnings for leverage—transparency, auditing, judiciary security, an asset registry, and a secondary market for capital goods—are lacking.

- <u>An expensive and inflexible environment for business</u>. The structure of supply chains, high inventory levels, high labor costs, scarcity of skilled labor, and poor infrastructure makes Bolivia a high cost and inflexible environment for business. Despite trade liberalization and improvements in customs administration, many firms report long delays and high costs of clearing customs. Costly and unreliable transportation services are one of the most severe constraints. Although wages are low, the share of non-wage benefits (e.g., bonuses, subsidies, social security and pension) in total labor costs are among the highest in the LAC region, ranging from 42 percent for small firms to 52 percent for large firms. Firms have difficulties filling highly skilled vacancies.

- <u>Burdensome and costly licensing requirements and weak institutions</u>. In 2004 a prospective entrepreneur needed to complete 15 procedures at a cost of 1.7 times Bolivia's average per capita income to start a business (Table 3.1). This is an improvement from 1997 when the country had the largest number of procedures in the world and the cost stood at 2.6 times GDP per capita (Djankov et al, 2000), but still fares behind neighbor and similarly poor countries. Fixed costs remain prohibitive for smaller firms, and the ensuing barriers to entry hamper the economy's productivity, investments and growth. President Carlos Mesa has made simplification of procedures a national priority. The IFC has supported simplification in La Paz and is extending its work to other municipalities (Box 3.1). But fixed costs remain prohibitive for smaller firms and are likely to continue to contribute to the high rate of informality (Box 3.2). Property rights and contracts enforcement is weak, with lengthy court cases and lack of other effective channels for dispute resolution.

Table 3.1: Investment Climate Indicators of Bolivia and Selected LAC Countries

Country		Bolivia	Chile	Peru	Colombia	Ecuador	Honduras	Nicaragua
Starting a Business	Number of Procedures	15	9	10	14	14	13	9
	Time (days)	59	27	98	43	92	62	45
	Cost (% income pc)	173.9	10	36.4	27.4	47.4	72.9	170.1
Hiring and Firing Workers	Difficulty of Hiring Index [a]	61	17	44	72	44	22	22
	Difficulty of Firing Index [a]	0	20	60	20	70	30	50
	Rigidity Employment Index [b]	40	19	55	51	51	31	51
	Firing Costs (weeks)	98	51	56	49	131	46	24
Registering Property	Number of Procedures	7	6	5	7	12	7	7
	Time (days)	92	31	31	23	21	36	65
	Cost (% property value)	5.1	1.4	3.2	3.6	16	8.8	6.5
Getting Credit	Cost to Create Collateral (% income pc)	51	5.3	16	38.9	10.8	36.6	2
	Legal Rights Index [c]	3	4	2	4	3	5	4
	Credit Information Index [d]	4	6	6	4	5	3	5
Protecting Investors	Disclosure Index [e]	2	6	4	2	1	0	1
Enforcing Contracts	Number of Procedures	47	28	35	37	41	36	18
	Time (days)	591	305	441	363	388	545	155
	Cost (% of debt)	10.6	10.4	34.7	18.6	15.3	33.1	16.3
Closing a Business	Time (years)	1.8	5.6	3.1	3	4.3	3.7	2.2
	Cost (% of estate)	18	18	8	1	18	8	8
	Recovery Rate (cents on the dollar)	32.5	19.3	31.1	54.6	18.1	21.5	38.1

Note: [a]0-100, 0=least difficult; 100=most difficult; [b]simple average of the Difficulty of Hiring, Rigidity of Hours and Difficulty of Firing indices; 0=least rigid; 100=most rigid. [c] 0-10, 0=less legal rights; 10=more legal rights. [d]0-6, 0=least credit information; 6=most credit information. [e]0-7, 0=least disclosure requirements; 7=most disclosure requirements.

Source: World Bank (2004a) and Djankov et al (2002).

Box 3.1: Simplifying Business Registration in La Paz

With the support of IFC and FUNDES International, Bolivia is simplifying business regulations to make it easier for SMEs to do business. Bolivia is simplifying municipal business regulations for the primary reason that the municipality is often the starting point for new businesses. SMEs deal more with municipal authorities rather than national state agencies. Decentralization policies will give further power to the subnational level.

A business registration simplification project was successfully implemented in the municipality of La Paz. This municipality was chosen because 33 percent of Bolivia's private sector is located in La Paz; it has a high degree of bureaucracy; business simplification was included in the Municipal Development Plan; and more important, there was support from both the local General Secretariat and the national Ministry of Economic Development. Success in the project in La Paz was due to close collaboration with municipal authorities and private businesses. During implementation, the project (i) identified and built up the client commitment to reforms; (ii) made diagnostics of the current situation; (iii) designed the simplification program; (iv) developed needed regulations and procedures; (v) trained municipal officials; (vi) conducted information campaign for private sector; (vii) launched a new simplified business regulations; and (viii) adjusted the system based on the feedback from businesses and public officials.

Project challenges

The challenges that were encountered were mainly legal in nature. The legal foundation was so weak that the Municipal Resolution was the only resolution approved to support the procedures manual. Other challenges included personnel issues, such as high turnover and no clear definition of assigned duties or qualifications, the inability to comply with the time frames forecast in the design; and difficulties developing a Municipal Toolkit for business simplification.

Results

(i) A 91 percent decrease in the number of days to obtain a operating license; (ii) 32 percent decrease in the cost of compliance for business; (iii) 68 percent decrease in the number of required steps; (iv) creation of a "one-stop shop" for the operating license; (v) 20 percent increase in the number of registered businesses; (vi) 70 percent increase of income generated by the business simplification process done in the Municipality; (vii) elimination of unnecessary requirements of about 50 percent; (viii) public disclosure of requirements and procedures; training and sensitization of municipal employees; (ix) new legal foundation; (x) entrepreneurs visits reduced from six to two; (xi) other red tape reduction applied by the municipality in another 30 procedures; and (xii) design of support software for business registration and authorization procedures developed by the municipality itself (www.ci-lapaz.gov.bo).

Next steps

The next steps to provide a sound investment climate in other municipalities are: to identify a municipality with minimum conditions for intervention, such as economic activity, bureaucratic barriers, political will, and institutional capacity; to reach consensus for the design and strategy implementation; to develop joint ventures with municipalities to generate positive experiences; to replicate results in other important municipalities, such as red tape reduction; and finally to ensure the sustainability of reform efforts insulating them from political changes.

Box 3.2: Constraints for Businesses to Become and Remain Formal in Bolivia

A companion field study to the 2001 FACS report identified the excessively high costs of complying with most legal requirements to start and run a business among the main causes of informality in Bolivia (World Bank, 2001). Some of these are being addressed by ongoing reforms but the following are remaining barriers to formality in Bolivia:

- High costs to registration and business expansion. Despite recent improvements, Bolivian entrepreneurs incur prohibitively high costs through government fees (1.7 times income per capita) to acquire the necessary permits to operate. Registration requirements are higher for the incorporation of partnerships. Since most business projects require a minimum scale of operations for capital ventures, this situation hampers the realization of economies of scale and imposes fixed costs to business expansion. Small firms can not afford trained lawyers to deal with these procedures. Moreover, in order to export, firms have to register in the *Registro Único de Exportadores* (National Register of Exporters, RUE), which entails a down payment of US$200 and US$20 monthly payments.

- Centralization and burdensome requirements. Excessive concentration of agencies running registers and licenses in La Paz and archaic documentation requirements (e.g., notarization) also increase the red tape cost for micro and SMEs. The operating license and the *patente municipal* are more difficult to obtain than the tax registration for the smaller enterprises. This underscores the importance of ongoing efforts to strengthen the capacity of municipalities to enforce registration rather than on centralized entities.

- Negative tax incentives and low benefits. The Simplified Regime of Bolivia's Internal Revenue Service does not allow extending invoices granting tax credits on purchases. This is a major handicap for a small business trying to sell its products to a formal business because the latter needs a formal receipt in order to deduct its taxes. The costs of registering in the General Regime for a small establishment are 20 times higher than for the Simplified Regime. Moreover, firms see little benefits of being formal. Smaller firms often have limited access to procurements of government purchases and subcontracting activities. Given the poor performance of the judiciary and public services, they lack property rights on their assets, have no legal protection in case of theft or expropriation, cannot used them as collateral for a loan or easily transfer them. Many entrepreneurs do decide to register in some entities and not in others, which reveals their willingness to pay for some degree of formality if there are positive net benefits. For instance, while tax registration of small firms declined in relative and absolute terms between 1988 and 1997 compliance with municipal registration remained high.

- High costs of labor regulations. Mandate labor benefits imply a 42 percent increase in labor costs (8 percent of a small firm's annual sales) which are fully the responsibility of firms. The compliance costs of labor regulations are far higher than the recurrent costs of compliance with municipal licenses or tax registration. Insofar as workers are unwilling to accept lower nominal wages to indirectly pay for these benefits, current labor regulations also discourage firms from becoming formal.

CREATION AND TURNOVER OF MANUFACTURING EMPLOYMENT[1]

3.13 Changes in employment levels take place either through changes in the size of existing firms, or the entry or exit of firms from the market. Migration of formal jobs or firms to the informal economy is another important source of job reallocation. Understanding these job flows is important for more pro-poor growth for two reasons.

3.14 First, job reallocation is an important source of productivity growth. The movement towards a more productive economy is intrinsically a trial and error process where new

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1. Job creation and turnover was investigated using the EEAM manufacturing panel, given that changes in employment measured by household survey data fail to reveal the actual levels of labor mobility or intra-sectoral employment reallocation. The methodology used is described in detail in Annex 3.2

technologies displace obsolete ones and employment destruction gives way to higher wage jobs. Productivity gains come from existing firms becoming more productive, the exit of less productive firms, and the reshuffling of employment from less productive to more productive firms. Recent studies find that the job reallocation process contributes with 15 to 50 percent of the growth in aggregate productivity (IDB, 2003).

3.15   Second, excessive job reallocation can be inefficient where, for example, informal firms or SMEs could destroy jobs if underdeveloped financial markets prevent them from adjusting to negative shocks. Excessive bureaucratic burdens and rigid labor laws increase start up and adjustments costs for firms and push many to informality, and thus can lead to inefficient job reallocation and high firm mortality.

3.16   Overall, manufacturing added few jobs directly during the second half of the 1990s (Figure 3.5). Remunerated jobs were created at a rate of 20 percent, but the turnover of existing jobs was 18 percent, so that there were only 2.2 percent net additions. Employment creation and turnover was rather volatile: the rates of gross destruction fluctuated between 10 percent and 18 percent, while gross creation rates oscillated between 10 percent and 20 percent. There is no evidence of a bias against unskilled labor in jobs reallocation.

Figure 3.5: Gross Employment Flows in the Manufacturing Industry, Bolivia, 1996-1999 (% Jobs)
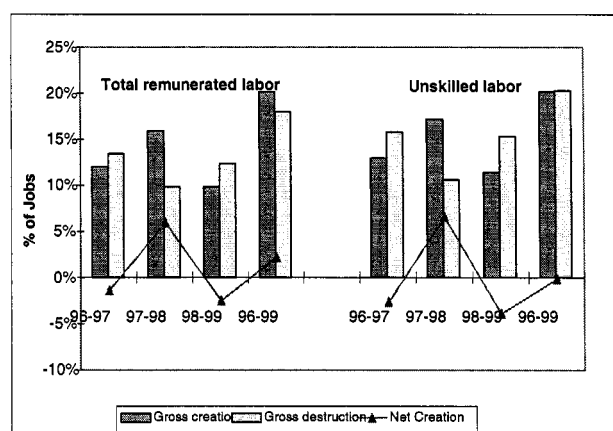
Source: Authors' estimates based on EEAM survey data.

3.17   About four out of 10 jobs were reallocated among manufacturing workers over the period, a high rate compared with other developing countries. Figure 3.6 compares gross employment flows among selected countries. Although reference periods are different this offer useful benchmarks, and illustrates the high level of job reallocation in Bolivia according to international standards.

3.18   These levels of reallocation likely reflect the utilization of temporary employment and unpaid family labor, as well as migration of workers and/or firms to the informal sector. Permanent employees tend to enjoy more stability and represent larger labor costs for employers, whereas temporary and family help can be substituted more cheaply.

3.19   This is consistent with the finding that both the creation and destruction of jobs is larger in smaller enterprises (Figure 3.7). This might reflect the flow of jobs from SMEs to the informal sector. However, evidence from other countries clearly shows that employment reallocation among medium and large enterprises typically reflect changes in payrolls while in smaller enterprises it occurs mainly through the exit and entry of firms. The high level of attrition of small firms in the EEAM panel is consistent with this. Unfortunately, we cannot directly confirm this hypothesis since it is not possible to determine whether firms that drop from the sample also exit the market. The only sectors that added new jobs were food, petroleum refinery and mining.

Figure 3.6: Bolivia has High Rates of Job Creation, Destruction, and Reallocation by International Standards
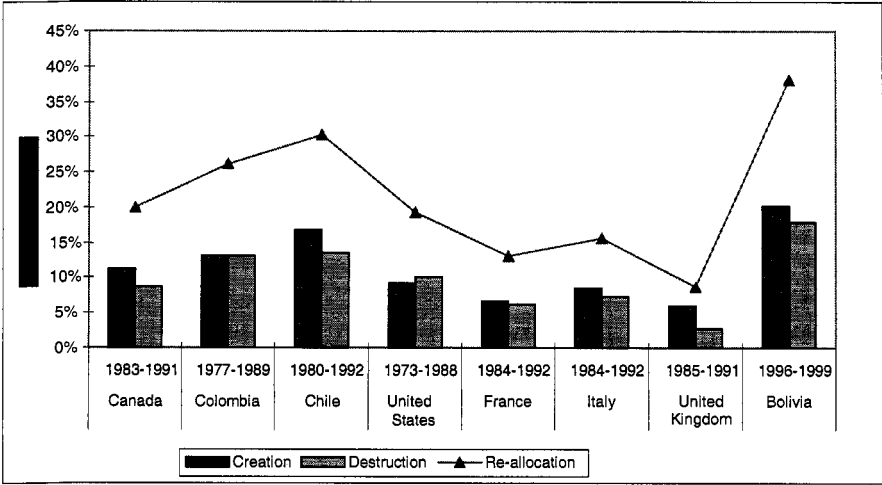
Source: Based on Camhi, Micco and Engel (1997).

Figure 3.7: Job Creation and Destruction in Bolivia's Manufacturing Industry is Larger in Small Firms (1996–99, % Jobs)

By Firm Size

By Sector
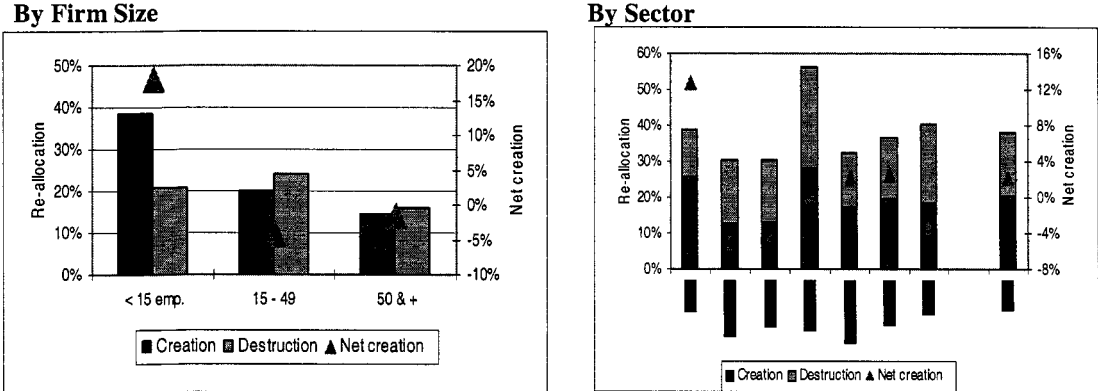
Source: Authors' estimates based on EEAM survey data.

3.20   The results presented above suggest that an inefficiently high level of job reallocation is behind Bolivia's sluggish net job creation. The combination of a poor investment climate, high levels of informality and constrained credit markets mean that: (i) many firms adjust to negative shocks through significant job churning; (ii) there is likely an inefficiently high mortality of firms that negatively impacts productivity growth, as SMEs operating in the informal sector are prevented from achieving economies of scale, learning and adaptation of new technologies and productive processes; and (iii) Bolivian manufacturing workers face a volatile labor market, with limited insurance to facilitate efficiently matching their skills with available jobs.

PRODUCTIVITY AND TECHNICAL EFFICIENCY

3.21   Employment is linked to firms' economic performance. The rate of utilization and mix of inputs depends on their cost and contribution to the generation of output. The latter is captured by the output-labor elasticity: the percentage increase in output relative to a percentage increase in labor inputs. The background study by Jimenez and Landa (2004c) estimated output elasticities with respect to capital, skilled and unskilled labor in Bolivia's manufacturing sector using the manufacturing panel data for 1995 to 1999. Their results can be used to assess: (i) whether existing technologies or economic fundamentals favor the use of unskilled labor; (ii) which subsectors are more likely to generate labor-intensive growth; and (iii) the efficiency (or total productivity) with which firms operate.

3.22   Their results are presented in Annex 3.3, and can be summarized as follows:

- On average, expansion of capital leads to greater increases in output compared to labor. This reflects the relative scarcity and high cost of capital in Bolivia.
- Manufacturing growth in labor-intensive sub-sectors would tend to favor the creation of unskilled jobs.
- Growth would favor the use of unskilled labor in the beverages and textiles sectors and would favor capital in mining and wood production.
- There is suggestive evidence of a high degree of substitution between capital and unskilled labor, moderate substitution between labor types, and little complementarity of skilled labor to capital.[2]
- There is significant room for expanding manufacturing output by a more intensive use of the installed capacity of firms.
- Firms in the lowlands, in the petroleum, wood products and/or other industries sectors, show the highest levels of productivity.
- There were no significant overall productivity gains during the period.

3.23   Note that these results refer to the relation between *marginal* changes in output and input utilization *within* manufacturing. How many jobs would be created in the economy depends on the capital/labor ratio in each subsector and on indirect employment effects on other sectors of the economy.

3.24   The results also point to low levels efficiency in manufacturing firms. Many firms produce less than would be expected given their inputs and capacity utilization, age, location and sector. Inefficiency seems pervasive across firms, although beverages and tobacco and petroleum are relatively more efficient.

3.25   Altogether the results suggest that innovation is stifled in Bolivian manufacturing. The mixtures in the use of skilled and unskilled labor are symptomatic of production processes that do not make intensive use of information technologies or modern management practices. Firms do not achieve sufficient productivity gains as they mature, reflect weak incentives to innovate, a high cost environment, limited sales and credit markets, and barriers to entry.

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2.   The proper assessment of the degree of complementarity between inputs should rely on cross-elasticities of input use, which were not estimated by Jimenez and Landa (2004c).

3.26   The large variability in firm performance hampers the ability of targeted industrial policy (such as subsidized credit or tax exemptions) to promote the expansion of businesses and employment. The manufacturing sector is composed of many efficient and inefficient firms, making it difficult to predict the final impacts of policies on any specific firm or subsector. There are likely to be higher returns to policies that improve the overall investment climate, including addressing infrastructure bottlenecks and barriers to market entry and exit, deepening of financial markets, and support to research and innovation.

THE DEMAND FOR LABOR

3.27   The study by Jimenez and Landa (2004c) assesses manufacturing employment's response to changing economic conditions taking into account direct labor costs (real wages) through estimation of demand equations for unskilled labor. The main findings are discussed below; Annex 3.4 presents the methodology and results in more detail.

3.28   Firms and workers face a relatively high long run trade-off between higher wages and increasing unskilled employment. The long run demand wage elasticity for unskilled labor is – 0.64, meaning that for every 10 percent increase in real wages labor demand declines in 6.4 percent (keeping output constant). This is twice as high as the average international estimate of –0.3 (Hamermesh, 2003) and on the high end of estimates for other LAC countries, for example, Brazil (-0.4), Chile (-0.37), Colombia (-0.49), Mexico (-0.2), Peru (-0.2), and Uruguay (-0.69). Moreover, although the estimated elasticity does not account for indirect labor costs (e.g., mandated benefits) evidence for other countries shows that the elasticity of these labor cost components can be as high as the own wage employment elasticities (Saavedra and Torero, 2000; Mondino and Montoya, 2000).

3.29   Employment tends to adjust slowly in response to cost or output shocks. The estimated (half-life) speed of adjustment of labor demand is 1.3 years, which again is above international estimates (half a year) but aligned with those for Latin America (1 year in Brazil, 1.2 years in Chile, 0.4 years in Colombia, 0.8 years in Mexico, 1.3 years in Peru, 1.5 years in Uruguay). This suggests that it takes a relatively long time before fluctuations in the demand for labor adjust to changes in economic conditions.

3.30   Labor demand is dominated by an inertial employment component. Firms rely solely on past employment decisions to adjust their payrolls (not on past wage and output changes). This is consistent with idle capacity in which case employers can utilize the existing labor force more (less) intensely when faced with higher output demand (wages).

3.31   The long-term response of employment to changes in output seems low, although it is not inconsistent with constant economies of scale. The long-run employment-output elasticity is 0.47, implying that a 10 percent increase in long-term manufacturing output results in an increase of 4.7 percent in unskilled employment.

3.32   These results suggest that Bolivia's manufacturing employment is quite flexible with respect to changes in wages (and very likely changes in non-wage costs also), but adjusts slowly in response to shocks. This, in turn, implies that policies which reduce the cost of labor by increasing labor productivity or reducing non-wage costs could be very effective in increasing employment levels. Moreover, the slow speed of adjustment of employment to shocks is likely related to several factors affecting firms' adjustment costs (underdeveloped financial markets,

firing/hiring regulations, supply bottlenecks), macroeconomic volatility (real exchange depreciation, external shocks) and the degree of competition (entry-exit barriers).

MICRO CONSTRAINTS TO CAPACITY UTILIZATION AND FIRM SIZE

3.33   Labor utilization can take the form of a more intensive use of the existing pool of workers or new hires. These relate to a heavier utilization of idle capacity and to the expansion of firms. Capacity utilization (CU) is a short-term measure of the intensity of labor use. Low CU levels are symptomatic of production inefficiencies, which can result from economic downturns, tight credit, obsolete technologies and/or capital investments far exceeding the optimal plant size (e.g., due to stiff collateral requirements). Meanwhile, the number of workers can be used to track the scaling up of firms in so far as many firms do take on larger payrolls over the long run. In fact, two thirds of the growth in the developed world industries during the 1980s comes from the growth in size of existing firms rather than from new entry (Rajan and Zingales, 1998).

3.34   Low capacity utilization and the distribution of firm size are of particular interest in Bolivia. The average capacity use for manufacturing firm was only about 56 hours per week in 1999, which is consistent with 1.5 shifts of operation, far below other developing countries (World Bank, 2001).[3] Smaller and non-exporting firms had the lowest capacity utilization. Firms cited lack of demand as the predominant cause, followed by maintenance. Most manufacturing firms in Bolivia remain small: almost half the firms in the sample are small (4–15 workers), only 15 percent are relatively large (over 100 workers) and the average number of workers per firm is 18.

3.35   In a companion study, Muñoz, Palma and Arias (2004) use the FACS data to analyze how investment climate factors affect the distribution of firm size and capacity utilization in Bolivia. They address three main issues: (i) main constraints to the growth of manufacturing firms; (ii) principal bottlenecks affecting capacity utilization; (iii) types of policy changes that can potentially improve capacity utilization and firm sizes. The main findings are highlighted below; Annex 3.5 describes the methodology and regression results.

3.36   The results show that capacity utilization rates are higher, on average, among firms that are younger, capital-intensive, pay lower wages, use higher quality inputs, and in the petroleum and food and tobacco sectors. Capacity utilization is restricted by financial and credit constraints, and government requirements affecting the production process (although relevant to only 10 percent of firms). Membership in a business association (_gremio_) has a positive and significant effect on capacity utilization. Proxies of sales markets have a positive effect on CU but are not statistically significant, which reflects the pervasiveness of demand constraints for Bolivian firms. The following effects are worth emphasizing:

- The age and capital intensity effects suggest that firms with more modern technologies have higher capacity utilization. Firms with a capital intensive production process are likely to enjoy economies of scale and better management efficiency and face a higher cost of leaving the capital stock idle.

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3.   Alternatively, firms reported that they were using 57 percent of their installed capacity (down from 61 percent in 1998). This alternative measure of CU for the most part yielded qualitatively similar results.

- Firms that use more costly inputs have higher capacity utilization. This is consistent with firms' reports of input quality as an important factor affecting their performance.
- Textiles and wood products had low capacity utilization, while petroleum production had capacity utilization twice as high as most other sectors.
- High collateral to obtain credit constitutes a major obstacle for increasing capacity utilization.
- Debt defaults show a significant negative correlation with capacity utilization, suggesting that debt default can become a lasting constraint to secure credit.
- Firms mentioned several benefits of being in a *gremio*: access to credit, key inputs, and technical information; help with resolving disputes; information on foreign and domestic markets; and accreditation.

3.37   While there is not clear cut prescription of what optimal firm size should be, the results indicate that Bolivian firms are constrained to grow by a weak business climate.[4] Bigger firms are older, have access to larger markets, including external markets, are less capital-intensive, and are in the petroleum, and food and tobacco sectors. Difficulty in hiring skilled workers and the inability to sign contracts with suppliers also tend to reduce firm sizes. These signal the following points:

- The effect of a firm's age highlights the importance of the learning and adaptation process that allows firms to exploit economies of scale as they age.
- Larger markets go hand in hand with firms' capacity to grow. In particular, export orientation is correlated with larger firm size. This is consistent with two causal hypotheses: that larger firms tend to get access to external markets and/or that exporting facilitates firm growth.
- The lack of skilled labor prevents firms from reaching larger scales of operation through the adoption of new technologies and management practices. The existence of contracts between the firm and its providers helps reduce transaction costs of expanding businesses.
- The petroleum, chemical and glass/ceramics, and food and tobacco sectors contain Bolivia's largest firms, which suggest that particular conditions in these sectors have allowed firms to exploit economies of scale.

3.38   The results underscore that micro factors bind firms differently depending on their scale of operation. For firms operating at comparatively lower scales regulatory constraints are most binding. Regulatory constraints such as registration and operating licenses, high collateral, and skilled labor bottlenecks are most binding for firms operating at scales (CU or size) lower than expected for their characteristics (the underperformers). Input costs and credit constraints bind the most for firms operating at larger than expected scales (the overperformers). Belonging to a business association impacts CU positively only for firms with outperforming CU rates. Thus, policies to improve institutional and credit constraints are of first order for underperformer enterprises relative to those related to firm characteristics and their operational costs.

3.39   The models are used to run policy simulations, with some noteworthy results:

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4. Financial variables effects on firm size were not robust due to the reversed causality between size and credit constraints (e.g., small firms are riskier clients and thus face more costly, limited financing).

- An expansion in market size increases firm size, with a more pronounced effect in relatively larger firms. The implication is that, as the economy grows firms that were already relatively big will grow much more than smaller ones.
- Policy interventions to encourage greater use and enforcement of contracts between firms can help all firms to grow. The simulations indicated that improved contract use and enforcement could lead to an increase in the average number of workers per firm by 20 to 50 percent.
- Increasing access to international markets could also have the largest impact on firm size, especially for smaller firms. For example, tripling the fraction of exporters (from 17 to 55 percent) could double the number of workers in relatively smaller firms.

POLICY INTERVENTIONS TO INCREASE THE DEMAND FOR LABOR

3.40   The results emphasize that an integrated public policy to improve labor markets cannot be restricted to traditional labor market policies (see the next chapter), and should include interventions to improve the investment climate in which firms operate. As agents of job creation, firms are key players for a well functioning labor market.

3.41   The Bank report *Bolivia: Microeconomic Constraints and Higher Opportunities for Higher Growth* provides comprehensive recommendations to improve the investment climate. These include actions to reduce red tape; to strengthen property and creditor rights, contract enforcement, registering of property, and collateral law; to put in place mechanisms to increase access to prudent financing for SMEs; and to improve judiciary and public services, trade logistics and supply chains. These recommendations would also increase the demand for labor and thereby reduce the level of poverty and improve the lives of Bolivia's poor.

3.42   Here we focus on selected policy options that can improve the productivity of the Bolivian economy, particularly of smaller firms. The essence of development is getting more output from the country's resources. This is particularly important for Bolivia to overcome its low growth inertia and forge closer ties of natural resource based sectors to production and employment in non-tradable sectors. They would strengthen Bolivia's integration into world markets and new investment opportunities.

3.43   Productivity growth requires an environment where resources (capital, labor) can move to their more efficient and firms are able to find more efficient ways to operate. This rests on the creation of new firms and the restructuring (expansion, exit) and innovation of existing firms. In turn this requires focusing on sustained improvements in business environment regulations as well as specific policies to foster innovation and give smaller firms more incentives to participate in formal sector institutions.

3.44   **Accelerate the reform of business regulations.** It is critical to accelerate and expand the ongoing revamping of business regulations particularly those related to reduce the red tape and costs to start and close a business.[5] The Government has already taken steps in this direction. IFC-supported initiatives have helped to simplify business registration in La Paz and other municipalities. Steps are also being taken with Bank support to the Government's

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5. This is one of the top actions to accelerate economic development in developing countries highlighted by a recent panel of Nobel Laureates. See Copenhagen Consensus (2004), www.copenhagenconsensus.com.

Regulatory and Corporate Restructuring Program, learning from international reform experiences such as Colombia's and Peru's. In the short term, the following actions merit priority:

- *Cutting by at least one half the cost of registration (to 85 percent of GDP per capita) and business expansion for micro and SMEs*, particularly the cost of incorporation of partnerships, registration in the General Tax Regime and export licensing, by further lowering government fees, eliminating unessential requirements (notarization), and streamlining one-stop business on-line registration and licensing in municipal government offices. The Peruvian and Colombian reforms offer valuable lessons.

- *Streamline labor regulations in line with international standards*, which are currently a limitation on the ability of firms to expand and contract along with the economic cycles and their own competitiveness, and thus in the long run hurt employment and wage levels (see Chapter 4 for details).

3.45   Foster increases in the efficiency of firms by supporting innovation. Productivity growth should be the cornerstone of policies for the productive sector. This means taking full advantage of information technologies, modern management practices, new production and quality control processes, and piloting small scale rural technology and crop varieties. A focus on innovation would greatly enhance the dividends of government support to firms and rural producers through the National Dialogue "productive pacts" embedded in municipal "Estrategias Productivas Integrales".

- Short-to-midterm actions may include *incentives for technology adaptation, piloting technology service centers for SMEs and innovation networks* (linking the productive sector, national and international universities and research centers in R&D activities), and gradually strengthening the national training system.

- The *longer term calls for a gradual consolidation of a national innovation system as the country exhausts first order innovation and learning gains.* Donor support can help develop specific policy options in a national innovation strategy drawing lessons from relevant experiences in the region (e.g., Brazil, Mexico, and Central America) and East Asia.

3.46   Implement policies to increase the benefits of formality for smaller firms. Besides general improvements in business regulations and the investment climate, smaller firms would benefit from complementary interventions that enable them to achieve economies of scale and productivity gains. These may include:

- Establishing *pilot initiatives that provide small firms incentives to become formal*, encouraging small firms and producers to bid for government contracts (the Presidential Decree No. 27328 "Compro Boliviano" lays the legal basis), extend partial credits of value added taxes for eligible firms, and offer business development services (access to market credit, judicial services, management and accounting practices) with special emphasis on supporting innovation initiatives and export production. The country could try to tap Millennium Account resources and learn from the successes of the U.S. Small Business Program and others like Italy and Chile. These incentives should be phased out gradually as firms grow in size and articulated, for example, requiring compliance with

minimum tax and labor regulations to obtain bidding rights and access to business development programs.

- *Facilitating small businesses and producers to achieve economies of scale*, for example through trade or professional associations, in production and/or contracting of services, reforming government policies or other interventions to overcome constraints in access to credit, technology, inputs, quality certification, accreditation, disputes resolution, or purchasing of health plan benefits.

- *Institutional strengthening (staffing, training, technical assistance) of the Superintendence of Enterprises* and coordination with relevant public agencies so that these can assume their increasingly more complex role.[6]

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6. A recent workshop to learn from the ongoing reform experience of Colombia in corporate restructuring should help identify priorities and capacity building needs.

4. CONSTRAINTS TO HUMAN CAPITAL ACCUMULATION—THE SUPPLY OF LABOR

Although improving, the public education system—especially in rural areas where poverty is most extreme—offers low quality education. Further, poor families face difficult choices and are often unable to afford to keep their children in school long enough, instead needing them to help the family, either through income-generating activities or domestic and agricultural chores. Returns to education are low—six out of ten workers graduating from high school are at risk of poverty. In rural areas, only a post-secondary education offers a significant boost to earnings. As well, education tends to have lower returns for workers from poor families. The employment gap faced by women, young and poorly education workers, and the earnings disparities solely related to gender, ethnicity and location are above regional averages. While workers in the informal sector tend to have lower productivity, the self-employed may have no alternative options for work. Informal salaried workers do face an earnings disadvantage when compared to salaried formal sector workers, which could be improved if formal participation increased. Migration—in particular, rural to urban migration—is a useful tool for many poor people to improve their earnings. However, migration has been relatively small, limiting its scope to reduce poverty among the rural poor.

To improve the ability of the labor market to efficiently match workers and jobs, and hence, improve incomes and reduce poverty, policy actions are required to (i) strengthen the education system, particularly for the poor in rural areas; and (ii) improve labor market equity. Education improvements should focus on filling gaps in universal basic education; improving secondary education; addressing low education quality and inequalities in achievement; improving private higher education access for low income students; and implementing a conditional cash transfer program, similar to Bolsa Familia in Brazil or Oportunidades in Mexico. Measures to increase labor market equity could include expanding pre-school facilities and child care centers to facilitate women's and migrants' labor force participation, and offering training in high schools and colleges on job search techniques.

4.1   Labor is the source of most of the income of the poor. Thus, the labor market and the institutions that govern it can play a central role in reducing poverty and inequality. The results of Chapter 2 point to disparities in labor market performance. This chapter examines the characteristics of Bolivia's labor market, the supply of labor, employment and earnings outcomes. It characterizes the profiles of workers entering the labor market; taking jobs in the growing sectors, and lagging behind in the economy's slow down. A comparison of Bolivia's labor indicators and labor regulations with other countries concludes that these regulations are excessively restrictive and work against increased earnings and employment for both workers and employers.

4.2   The chapter has a particular focus on informal employment and internal migration given their central role in balancing the labor surplus. The informal sector is often seen as a haven for less-advantage workers who are denied superior formal sector jobs, mainly due to stiff labor regulations. However, the chapter finds that labor market segmentation is a second-order source of low earnings relative to overall low labor productivity, and highlights differences among types of informal employment. Moreover, rural migrants coming to urban areas during the 1990s did better than expected had they stayed in rural areas, particularly those at relatively low pay jobs

for their skills set. However, migration has remained relatively small, limiting its scope to reduce poverty among the rural poor.

4.3   The chapter identifies interventions to improve labor markets and to better integrate informal and migrant workers into the economic mainstream. The creation of better-quality jobs requires making formality more competitive, with regulations that better balance the conditions for productivity growth and the protection of workers against job loss and their basic rights. Also needed are income generation investments for lagging regions and actions to ease internal migration costs so that the poor are better able to benefit from locations and productive endeavors with better economic prospects.

EMPLOYMENT AND EARNINGS: TRENDS AND DISPARITIES

4.4   This section provides a comparative snapshot of Bolivia's labor market outcomes and examines recent trends in labor supply, employment, and earnings. It identifies the profile of workers that benefited during the 1993–97 boom, and those hurt the most with the recent slowdown. Bolivia's labor markets share many characteristics with other poor countries in the region, but Bolivia stands out for its low overall labor force participation rates, high informal employment, low returns to education (particularly secondary), and large disparities in labor market outcomes. After improvements in the 1990s, employment and earnings disparities widened during the economic slowdown.

Labor Force Participation, Unemployment, and Informal Employment

4.5   Bolivia has one of the highest female labor force participation rates in the region (over 55 percent) but one of the lowest among men (below 80 percent) which results in one of the lowest gender gaps (Figure 4.1). Overall labor force participation has remained around 65 percent since the mid 1990s, increasing only slightly during 1997-2002 (Figure 4.2). The number of Bolivians in the labor market rose from 3.6 million to 4 million. Participation increased in urban areas especially in the main cities among women, and shows an apparent recent decline in rural areas. Participation rates remain much lower in urban areas (around 60 percent, 2.3 million workers) than in rural areas (76 percent, 1.7 million workers), especially among men.

4.6   After remaining steady during most of the 1990s, open urban unemployment rose almost 3 percentage points with the economic slowdown (see Chapter 1), putting the number of jobless Bolivians in 2002 in 222,000.[1] Unemployment duration and involuntary underemployment are above the regional average[2] and have increased since 1999. The overall unemployment rate in 2002 was similar among the poor and non-poor (about 5.5 percent). The poor represent 61 percent of the unemployed. This reflects the fact that they cannot afford labor idleness. Urban workers with primary education, particularly the young and women, were more affected by increasing unemployment (4–6 percentage points increase) than those with secondary and college educations (3–4 percentage points increase). In 2002, 16 percent of urban workers 15–24 years old were unemployed compared to 7 percent among prime-age workers. The high

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1. It should be noted that these numbers do not consider the many Bolivians who are working only a few hours a week or who are discouraged workers.
2. IDB (2003).

unemployment among women, young, and low-educated workers stresses the importance of stronger safety nets, particularly the emergency employment program (PLANE).

Figure 4.1: Labor Market Indicators in Bolivia and Latin America

Labor Force Participation Rates in LAC, Circa 2000* | Share of Informal Urban Employment, Circa 2000
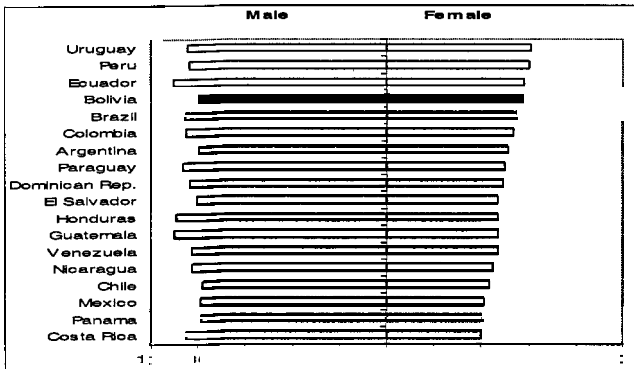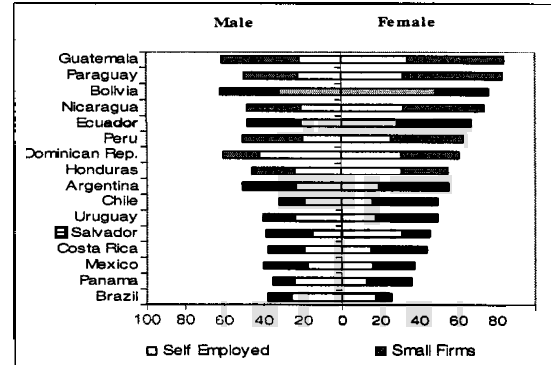
Marginal Returns to Education, Urban Areas 1990s** | Gender Wage Gap in Urban Areas, Circa 2000
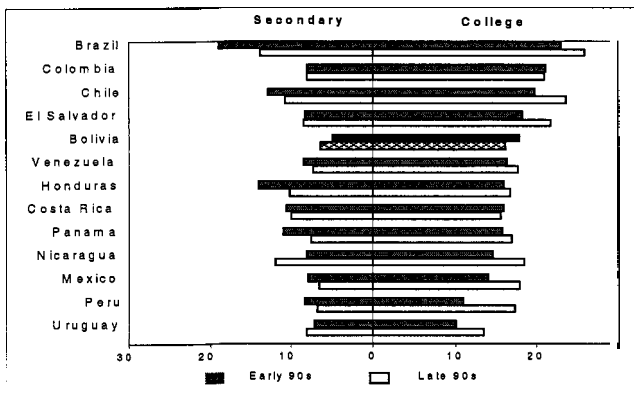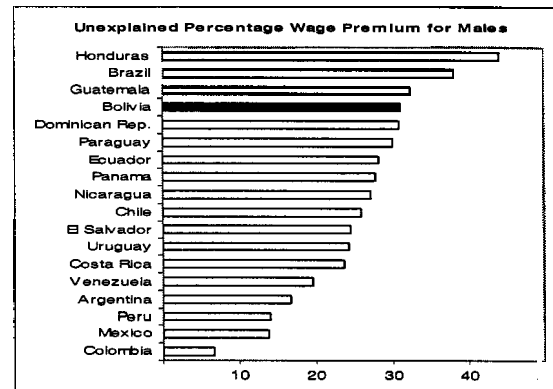
*National data except for Argentina, Bolivia, Mexico, and Uruguay. **Percentage annual return assuming degree completion.
Source: Based on IDB 2003.

4.7   Informal employment is pervasive, accounting for the bulk of employment created in the 1990s, over two thirds of total employment in 2002 and 80 percent of jobs in the poorest quintiles. This comprises a mix of incipient entrepreneurs (self-employed, small firm owners), salaried workers in small firms and unpaid family labor. Bolivia has the highest rate of urban informal employment in the region, the highest for men (over 60 percent) and only below Guatemala and Paraguay for women (over 75 percent). Informal salaried employment is less attractive for Bolivian women than in other LAC countries.

Figure 4.2: Trends in Labor Force Participation in Bolivia, 1989–2002
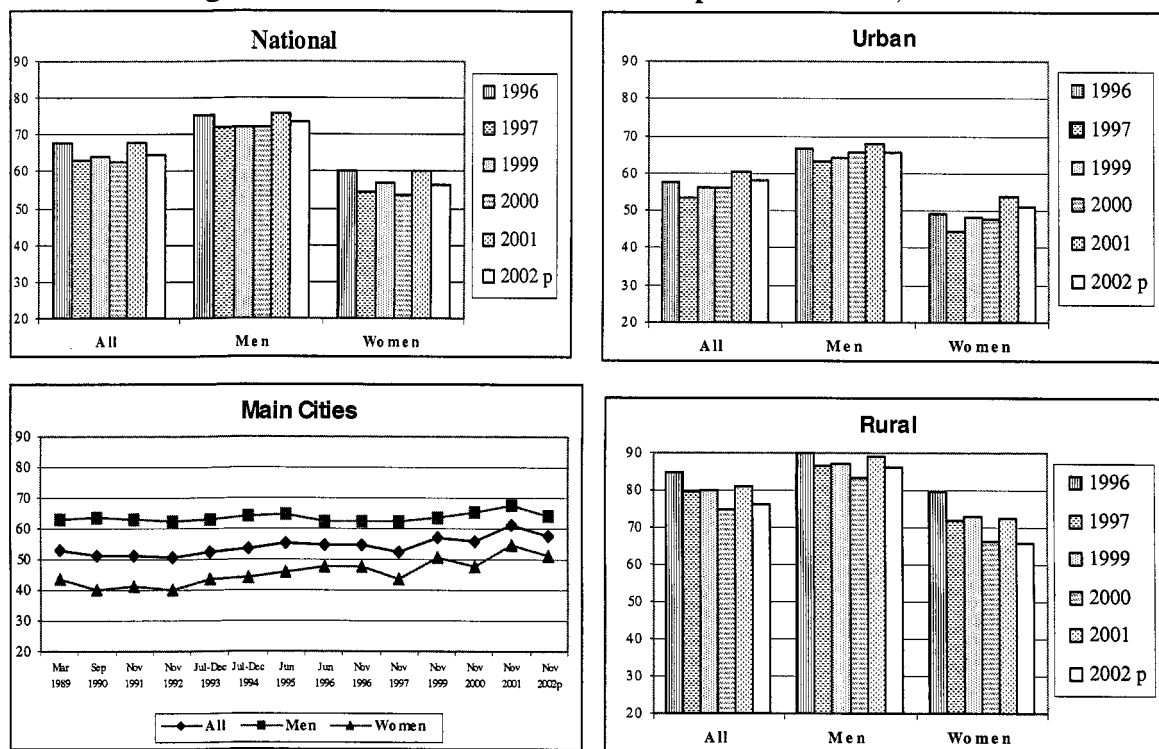
Note: P: Preliminary.
Source: INE based on household survey data for 1989-2002.

Earnings Differentials and Returns to Education[3]

4.8   Bolivia's labor market is characterized by wide differences in earnings. The earnings gaps solely related to gender, ethnicity, sector, location and type of employment are larger than LAC averages. Men earn on average over 30 percent more than women; indigenous salaried workers on average earn 25 percent less than non-indigenous; and average urban earnings differentials range from 20 to 55 percent across economic sectors, firm size and region.

4.9   Earnings growth was unbalanced. During the economic boom earnings grew relatively faster for women, self-employed and heads of households living in poor main urban centers (except for the poorest Beni and Chuquisaca) and working in utilities (including hydrocarbons), transport, construction, commerce and financial services. Earnings of indigenous heads and the informal salaried and workers in agriculture, mining and the manufacturing sector lagged. Regional earnings differentials narrowed further during the slowdown except for Cochabamba and urban Chuquisaca, while agricultural and manufacturing earnings continued sluggish.

4.10   Education does not yield equally high returns for all workers. The urban earnings premiums range from 0 to 60 percent for the workers with primary education, around 20 to 30 percent for workers with a secondary education, and from 50 to 150 percent for college educated workers. Average returns to secondary education for urban workers remain among the lowest (around 6 percent per year of education) in the region. The average returns to higher education

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3.   See Annex 4.1 for supporting information on this section.

are close to the regional average (over 15 percent per year). The returns to schooling are lower in rural areas, and only a college education offers significantly higher rural earnings. Less educated urban workers accrued the largest wage gains during the growth of the 1990s together with the college educated, while those with secondary lagged behind. The primary educated and rural workers with some high school were the hardest hit in the slowdown, while the college educated posted minor average earnings gains.

4.11   Despite the significant earnings gaps, the lion's share of low paid jobs and thus poverty in Bolivia largely reflects low productivity levels in the economy as a whole. Simulations show that reducing labor market disparities would have a larger direct impact on inequality than on poverty (Chapter 5 and Gasparini et al., 2004). This again reflects the pervasive low base earnings of most workers. About 60 percent of workers with complete secondary education are at risk of poverty (with wages yielding below $2/day PPP).[4] Only a college education ensures a sufficient level of earnings to escape poverty. Thus, although education is a major source of earnings differentials, it does not fully account for low-paying jobs.

4.12   Yet the low and skewed returns to education can lead to "poverty traps." Faced with low returns or dim prospects to complete a full course of secondary or higher education children from poor families drop out of school. Addressing the sources of low returns to secondary education and labor market inequities can contribute to accelerate primary to secondary transitions and unleash Bolivia's potential for productivity growth.

The Demographic Opportunity

4.13   Demographic forces offer Bolivia an opportunity to reduce poverty. Apart from Haiti, Bolivia is the only LAC country entering the stage of demographic transition where the "dependency ratio" (the fraction of the population who is too young or too old to work) will decline for the next two decades (Figure 4.3). As Bolivia goes through this transition, labor force participation is expected to rise. This can reduce poverty if the economy generates sufficient quality jobs on the basis of higher labor productivity.

4.14   The demographic transition also allows the translation of the human capital accumulation of young cohorts into a more productive labor force. Bolivia's labor force has uneven educational accomplishments (Figure 4.3) with the main gap at the secondary level. Bolivia has a relatively high fraction of workers with some college education (only below Argentina, Panama, Chile and Costa Rica) but a large majority with primary or less (only lower than Nicaragua and Honduras). As the share of younger cohorts in the working age population will rise faster, older and poorly educated workers are replaced with younger workers who could have basic and secondary education. This is a gradual transition and it would take more than a decade for skill investments to translate into a more productive labor force and improvements in national and family incomes.

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4.   IDB (2003).

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Figure 4.3: Bolivia's Demographic Transition and Human Capital Accumulation

Window of Opportunity (dependency ratio)
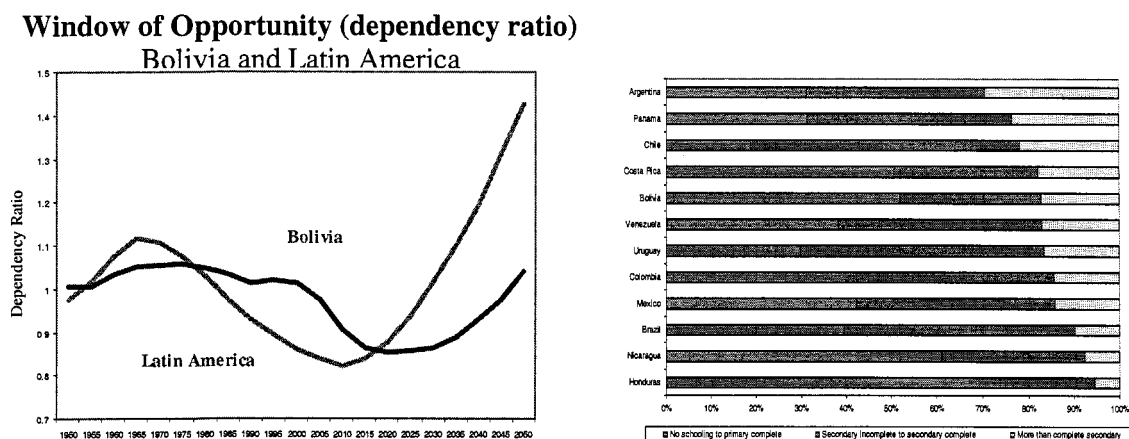
Note: Dependency ratio=(population age 65 and older or 15 and under)/population age 15 to 64.
Source: IDB (2003).

THE INSTITUTIONS AND PERFORMANCE OF BOLIVIA'S LABOR MARKET

4.15   This section describes Bolivian labor regulations and compares the performance of the labor market with other countries. The analysis draws heavily on the recent IDB publication on regional labor markets (IDB 2003).[5]

4.16   Bolivia has overly protective labor regulations. Figure 4.4 shows the results of a recent study of labor legislation worldwide. The index captures the strictness in regulations for hours of work, night shifts, leaves, and maternity benefits.[6] On a scale ranging from 0 (least restrictive) to 1 (most restrictive) Bolivia scores around 0.9, placing Bolivia at the top of LAC and even above some countries in Eastern Europe, the region with the most restrictive labor laws.

4.17   Bolivia's labor legislation (dating from 1943) restricts firms' abilities to adjust to economic conditions, both prosperity and downturns. Bolivia is the only Latin American country with no cap on the severance payment for dismissal (one month salary for every year of service), resulting in firing costs two or three times higher than most Andean neighbors and poor LAC countries. Dismissal regulations do not provide partial indemnities under justifiable voluntary resignation. Lay-offs due to deteriorating economic conditions for the firm and seasonal work are not allowed, and overtime has to be approved by the labor authority. The intended protection from dismissal discourages firms from hiring new employees. Bolivia fares well with regards to minimum wage regulations. The minimum wage is relatively low compared to average wages and has a relatively high level of compliance (Figure 4.5).

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5.   We thank Carmen Pagés for facilitating the figures from the IDB report reproduced here.
6.   See Djankov et al (2003) for more details on the methodology.

Figure 4.4: Legislated Employment Conditions in Bolivia and Latin America (Index, 0–1)
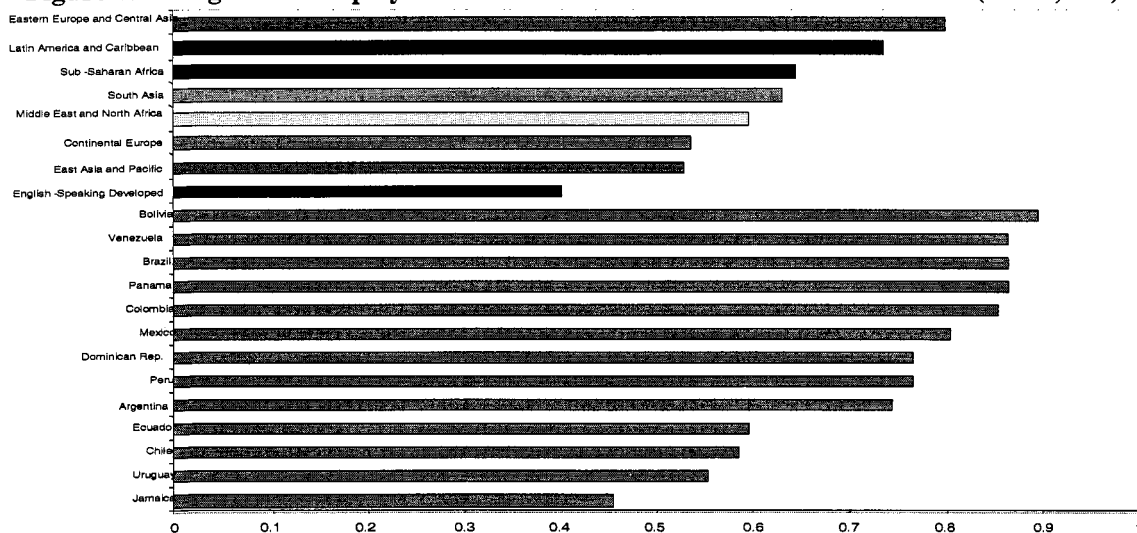
Source: Based on Djankov et al. (2003), taken from IDB (2003).

Figure 4.5: Minimum Wage Levels in Bolivia and Latin America (as proportion of wages of the median worker, 1996–2001)
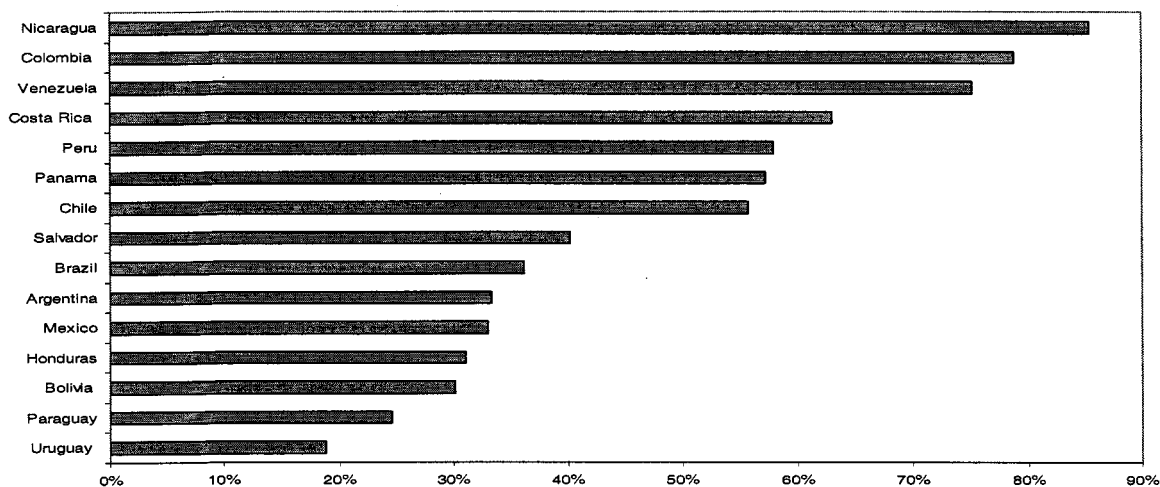
Note: The wage used for comparison is the median wage for workers beween 26 and 40 years old that work for more than 30 hours in the reference period of the surveys.
Source: IDB based on official country data.

4.18   Labor laws include provisions that discourage employers from hiring women and hinder effective enforcement. Women face a shorter work week, night work prohibition, weak domestic work regulations (e.g., irregular work hours) and employer-paid maternity benefits that can not be shared by husbands. Provisions against discrimination in remuneration and merit promotion are weakly enforced. Enforcement and labor conflicts resolution are too centralized in the underfunded and stretched labor ministry (e.g., conflict settlement councils are to be presided by the labor authority in La Paz). Incentives to evade stiff regulations make enforcement a daunting

task. In terms of the degree of cooperation in labor relations, Bolivia ranks low according to employers' perceptions (below only Venezuela, Uruguay and Paraguay) and around the LAC average according to the opinions of the urban population.[7]

4.19   Because so few workers are hired in the formal sector where labor laws potentially apply, most Bolivians do not enjoy their protections. About 64 percent of workers in main urban centers were self-employed or worked in micro-enterprises in 2002, up from 58 percent in 1993. A small fraction of the poor and extreme poor hold formal employment. Despite its heavy fiscal burden, social security coverage rates (aside from the Bonosol minimum pension) are only 11 percent for blue collar employees, 45 percent for white collar workers, and less than 10 percent among micro-firms workers. The fraction with the full benefits of regulated contracts is likely lower given the laxity and high costs of law enforcement (via courts or settlement).

4.20   The one-size-fits-all approach to labor regulations is misaligned with productivity levels of micro-firms and many SMEs. Figure 4.6 shows that dismissal costs are among the highest in LAC. Mandatory non-wage benefits (primarily social security) can amount up to 8 percent of a small firm's sales. Firms with a small scale of operations and low productivity cannot afford a wage plus these additional benefits at a manageable cost, and this drives them towards unregulated employment. Some small firms register to operate and report taxes, but do not comply with labor laws. The international evidence shows that non-salary costs are largely borne by employees through lower wages, and they can reduce total employment levels. Given low income levels and the poor quality of public services, many workers opt for more suitable alternatives to regulated benefits, including universal support systems (such as the infant-maternal health care and minimum Bonosol pension), that grant a minimum level of protection.

Figure 4.6: The Cost of Job Security, Bolivia and Latin America, 1987 and 1999

Cost of benefits measured in multiples of wages
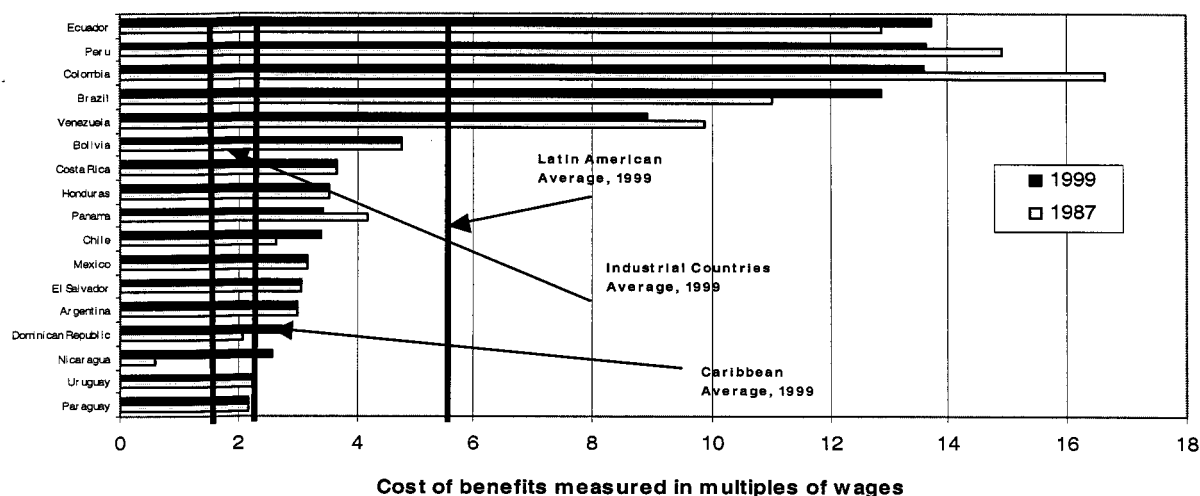
Source: Heckman and Pagés (2003).

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7.   Based on the results of cross-country surveys of employers' perceptions by the World Economic Forum (2001) and the Latinobarómetro (1997) opinion polls in LAC as reported in IDB (2003).

4.21   Informality can trap labor and other resources in low productivity activities.[8]   Many micro and small enterprises lack access to financing which would allow them to invest and innovate and thus increase labor productivity and wages.   At larger scales of operation productivity is higher, there are benefits from participation in formal institutions (e.g., access to credit and external markets), and regulatory costs become more manageable.   Many small firms may be trapped in a bad equilibrium: while low productivity and hence low earnings mean they cannot afford onerous business and labor regulations, informality limits the potential for productivity growth.

Figure 4.7: Performance of the Labor Market in Bolivia Compared to Latin America (circa 2000)

Summary Efficiency Allocation of Incomes   Summary Index of Equity in Allocation of Incomes

Summary Ranking of Insurance   Summary Measure of Overall Efficiency in Labor Market Performance

Source: IDB (2003).

4.22   A look at labor market outcomes confirms that Bolivia's labor regulations are hampering economic growth and, at the end of the day, the ability of workers to earn a better living and have job security.   Figure 4.7 provides some regional comparisons.[9]   The income efficiency index captures the earnings differentials between workers of seemingly equal productivity (i.e., across gender, firm size, and sector of activity) and the equity index adds the differentials due to endowments (i.e., education).   The insurance index captures the statutory benefits for job loss and social security and the percentage of workers actually covered by those benefits.   Finally, the

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8.   De Soto (2000).
9.   See IDB (2003) for a more detailed discussion of the methodology and results.

index of overall efficiency factors in unemployment indicators and the cooperation in labor relations. Except for the insurance index, higher values imply a better functioning labor market. By these measures, Bolivia ranks among the LAC countries with the least efficient and equitable labor markets.

4.23   In sum, Bolivia's labor regulations are among the least effective in protecting workers in LAC. The legislation imposes excessive regulatory costs that encourage informality. As a result, many viable small firms have a limited ability to scale up productivity and employment through investment and innovation. Thus, not only are Bolivia's labor regulations ineffective in protecting workers, but they also hinder the country's long-term productivity growth.

INFORMAL EMPLOYMENT AND EARNINGS

4.24   This section analyzes the ability of informal employment to create quality jobs and thus alleviate poverty in Bolivia. The informal sector has often been portrayed as a source of jobs for workers who cannot obtain employment in the formal sector. It is seen as an obstacle to greater productivity in the economy and to increased per capita incomes for workers. Mounting research has questioned this monolithic view (for example, Maloney, 2004). Many informal jobs may reflect the voluntary choice of workers given their preferences, skills, and competing earnings prospects. In Bolivia, about 44 percent of workers in the top earnings quintile are informal salaried or self-employed, many of whom conform to the characteristics of an entrepreneurial sector.

4.25   Given our focus on job creation, we distinguish three groups of workers:[10] informal salaried workers (workers in establishments with one-to-four employees plus domestic employees), formal workers (workers in establishments with five or more employees), and the self-employed (those who self classify as *cuenta propia*, employers of micro enterprises and cooperative workers). With these definitions, 41 percent of employed individuals 15–65 years old in urban Bolivia were self-employed in 2002 and 50 percent were salaried workers (the rest includes unpaid family workers), of which 14 percent were informal.

4.26   The results indicate that to a great extent informal employment reflects the low opportunity costs and non-wage benefits of informality. For many Bolivians it offers a competitive alternative to low-productivity formal sector jobs or no work at all. Self-employment is particularly attractive for certain sectors of the poorer population, such as women seeking flexible work hours to balance their work and family obligations, or the indigenous who may face less discrimination as independent workers than they might as salaried employees. The fact that the self-employed subjectively rate themselves as less poor than salaried workers with similar characteristics is consistent with non-monetary benefits of self-employment. However, most informal salaried workers do appear to face an earnings disadvantage when compared to formal sector workers with similar characteristics, reflecting the comparatively low productivity of smaller firms.

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10. The definition of the informal sector depends on the aspect of the labor market that is the main focus of analysis (Lay 2001). A focus in social protection uses an alternative definition based on legal protections and benefits that informal workers lack. This is strongly correlated with firm size in Bolivia.

Profiling the informal salaried and self-employed

4.27   As in most of LAC, there are many similarities but also some important differences between the informal salaried and self-employed. These are summarized thus:

- The Bolivian self-employed are heterogeneous—from street vendors to small artisans under subcontracting production arrangements. They tend to have higher potential experience, the longest tenure in occupation, and a higher fraction wanting to work more hours.
- The informal salaried sector mostly comprises workers in small shops (mainly in commerce or transport) with no contractual arrangement or benefits such as pensions and health insurance. On average, they are four to nine years younger than formal workers and the self-employed, have eight years of schooling, shorter occupation tenures, and are more likely to live with their parents.
- Both groups work more hours than the formal sector employees and are disproportionately female (about half) and indigenous (44 percent of the informal and 61 percent of the self-employed in 2002).
- Despite similar average education, educational achievements are more diverse among the self-employed than among the informal salaried. While a higher fraction of the self-employed have not completed basic education (23 percent versus 16 percent in 2002) the share with university education is twice as high as among the informal salaried (8 percent and 3 percent in 2002).

Is there informal-formal labor market segmentation?

4.28   Median hourly earnings in 2002 were 70 to 90 percent higher in the formal sector than for the self-employed and informal salaried. Total earnings are also lower for the informal (despite working an average of 5 hours more per week). During the boom (1993 to 1997) the self-employed did relatively better than the informal salaried, but this pattern reverted during the recession (1998 to 2002). In 1997, the formal salaried earned on average 2.2 times above the income poverty threshold while this ratio was 1.6 for the self-employed and 1.2 for the informal salaried, an improvement relative to 1993 ratios of 2.6, 2.1 and 1.3. With the growth deceleration these earnings ratios became 3.3, 2.0 and 1.9, respectively.

4.29   Yet the gaps in average hourly earnings among these three groups cannot be taken as evidence of the superiority of formal sector jobs. While the informal are relatively poorer this may have little to do with informality per se. Lower informal earnings may reflect the lower skills of workers (both observed and unobserved) rather than the characteristics of informal jobs. Most importantly, monetary earnings gaps do not account for quality differences in job characteristics such as flexible work schedules or benefits such as health insurance or training. Moreover, gaps in average earnings may mask the differential situation faced by workers whose unobserved characteristics place them at jobs with below or above average earnings for their skills sets.

4.30   We address these issues in two ways. First, we examine whether workers are "pulled in" or "pushed out" of the formal sector by examining the evolution of the relative size and earnings of the three sectors. Second, we conduct a multivariate analysis to compute earnings gaps at different levels of pay adjusting by differences in sector participation and productivity-related

characteristics of workers. Below we discuss the key findings (see Annex 4.2 and Tannuri-Pianto et al. 2004 for more details).

4.31 The trend data do not support the existence of segmentation for the informal salaried, but suggest that some workers may have been pushed out to self-employment with the crisis. Table 4.1 compares employment shares of the three sectors over 1993-2002 in metropolitan areas with relative earnings at different points of the earnings distribution, that is at low (10th percentile), moderate (50th) and high paying (90th) jobs. For example, in 2002 median earnings of the informal salaried were 59 percent those of the formal salaried. The view of informal employment as inferior implies that the relative size of informal employment should move anti-cyclically with earnings (Maloney, 2004). The noteworthy findings are:

- Informal jobs offered competitive earnings during the 1993-97 boom, but faltered with the slow down. During the 1990s earnings grew faster for the self-employed, particularly at the lower pay jobs, and almost as fast for the informal salaried. Meanwhile the share of formal employment increased from 40 percent to 44 percent, self-employment rose slightly, and informal salaried employment fell from 22 percent to 16 percent.

- With the growth deceleration during 1997-2002, however, both the informal salaried and self-employed sectors expanded (to 21 and 47 percent, respectively) at the expense of formal employment (32 percent). Meanwhile, the informal salaried performed relatively better throughout the earnings distribution than formal workers. However, self-employed earnings fell at the lower pay jobs as the sector expanded.

Table 4.1: Employment and Earnings Ratios by Sector, Metropolitan areas

Sector/Year	1993	1997	2002
Formal (in percent)	40.03	44.23	32.13
Informal (in percent)	21.45	15.85	21.27
Self-Employed (in percent)	38.52	39.92	46.60
Quantile/Sectors	Informal/Formal		
10 percent	0.43	0.44	0.64
50 percent	0.40	0.37	0.59
90 percent	0.33	0.30	0.41
Quantile/Sectors	Self-Employed/Formal		
10 percent	0.45	0.64	0.37
50 percent	0.60	0.72	0.64
90 percent	0.75	0.72	0.74

Source: Authors' estimates based on household survey data.

4.32 The results suggest that during the economic boom, businesses expanded and absorbed many unskilled workers. This resulted in relative gains in low-paid, self-employed earnings while the size of the sector remained constant. As the economy decelerated many small businesses may have failed or laid off least productive workers, pushing many to self-employment as wages at low pay jobs lagged.

4.33 The earnings regressions results suggest that informal employment to a great extent reflects the low opportunity costs and non-wage benefits of informality for many Bolivians. The main findings are:

- Lower skills (e.g., 3 fewer years of schooling on average) explain almost the entire earnings disadvantage of the urban self-employed and about two-thirds of the gap for the informal salaried. The urban self-employed enjoyed returns to skills similar to the formal sector.

- Despite being overrepresented in the informal sector, the indigenous and many women find in self-employment more mobility and flexibility in working conditions than in the patronage-tenured-based formal sector. This is consistent with the result from the subjective poverty analysis that the self-employed report themselves less poor than salaried workers with similar characteristics.

- However, informal salaried workers, particularly those at the bottom of the salary scale for their skills set, face quite large earnings penalties and may appear to be rationed out of formal jobs. Workers at the best pay jobs for their skills set can voluntarily become informal without significant wage penalties.

- During the economic boom workers seemed capable of moving freely between the formal and self-employed sectors without any wage penalties. By 2002 the earnings opportunity cost of informality increased for workers in lowest pay jobs, including the low pay self-employed, who endured the brunt of the slowdown and rising unemployment. The lowest productivity workers might have been pushed out of the formal sector.

- The largest earnings penalties for poor households from non-formal work are associated with being female. Penalties for ethnicity are quite small, though correlated with poverty. Low educated (male) workers do not receive large penalties from participating in the informal sector, while for those few poor workers with higher education the penalty of non-formal work is quite high.

4.34   In sum, as in the rest of LAC, the informal urban sector in Bolivia is very heterogeneous, comprising an upward tier of largely voluntarily informal workers and a lower tier for which the sector may function as a safety net. For many workers, especially the self-employed indigenous and women, informality offers more flexibility and mobility opportunities than the rigid formal sector. However, the majority of informal salaried workers seem to be at a substantial earnings disadvantage, reflecting the comparatively lower productivity of smaller enterprises. This low productivity is directly related to their condition as informal, which limits their access to credit, to associations with other producers in their sector, worker training, innovation, or other kinds of productivity-enhancing interventions.

4.35   The findings highlight that policy makers should not simply seek to reduce informal employment. The sizeable informal sector is largely a reflection of voluntary choice given the overall low productivity of the Bolivian economy and inflexible and costly regulations. Broad productivity gains are needed to improve the quality of both formal and informal jobs through appropriate incentives and better business and labor regulations (addressed in the policy recommendations section of this chapter and the previous chapter).

RURAL-URBAN MIGRANTS IN THE LABOR MARKET

4.36   Internal migration serves to balance labor markets. Migrants leave the regions with fewer economic opportunities and move to the more dynamic regions. Individual migration decisions respond to economic opportunities and are affected by numerous factors: standards of living, unemployment rates, distances between origin and destination, family size, and the age and

education of individuals. Migration flows have consequences for labor markets in recipient regions, demand for public goods, public expenditure, investment, poverty and inequality.

4.37 In light of the variation of poverty and inequality across localities, particularly the marked urban-rural poverty gap, internal migration could be important for poverty reduction in Bolivia. Yet little is known about the relative socio-economic performance of migrants and the characteristics of those who integrate better to the urban economy. These issues are examined in the background work by Tannuri-Pianto et al. (2004) (Annex 4.3 summarizes the methodology). The analysis focuses on rural-urban migration since these workers are typically less skilled than the urban-metro ones, and thus may have a harder time integrating into the more developed urban labor markets. The focus is mostly on household heads that migrate since families usually either migrate together or leave the migration decision to the head of household.

4.38 Overall, the findings point at significant cross flow between urban and rural labor markets in Bolivia. Rural, urban and metropolitan areas are both sources and destinations, but metropolitan areas have recently become the principal destination of migrants. Rural-to-urban migrants did better than expected had they not migrated, particularly those getting jobs at the bottom of the earnings scale for their skills set.

Migration Flows and the Profile of Migrants

4.39 There are important differences in the dynamics of migration flows during the economic boom and recent slowdown. Figures 4.8 and 4.9 show the source and destination areas of migrants who migrated during 1993–97 and those who migrated during 1998-2002. Each bar depicts the fraction of migrants coming (top graphs) and going (bottom) to rural areas, small urban centers and large cities. The main findings are:

- Up to 1997, the rural areas were the largest source of migration and the main attraction poles were urban areas (Over 60 percent of migrants went to small cities or metropolitan destinations). However, there was also significant migration to rural areas on the order of rural-metropolitan migration. Migrants coming from rural areas preferred to go to other rural areas while those leaving small urban and metro areas were mainly attracted to other urban areas.
- Migration to main urban centers has accentuated since the late 1990s, especially from small cities. Urban migration flows increased by about half from 1997 to 2002. The metro areas were the main attraction pole for migrants coming from all three regions. Yet there remains significant migration to rural areas, including an increase in urban-to-rural migration.

4.40 Overall, this suggests that urban and rural labor markets are interlinked with significant cross flow. The significant migration to rural areas may be linked to family networks that help reduce migration costs or provide a safety net for migrants that do not exist in urban areas. Also, these migrants maybe filling niches in the labor market at destination. A relatively low-skilled migrant in the metro areas could be relatively highly skilled in rural areas, compensating his migration.

Figure 4.8: Migration Flows in Bolivia by Origin and Destination, 1997 and 2002 (Heads of Household only)

Main source areas of migration and destinations

Main attraction poles and origin of migrants
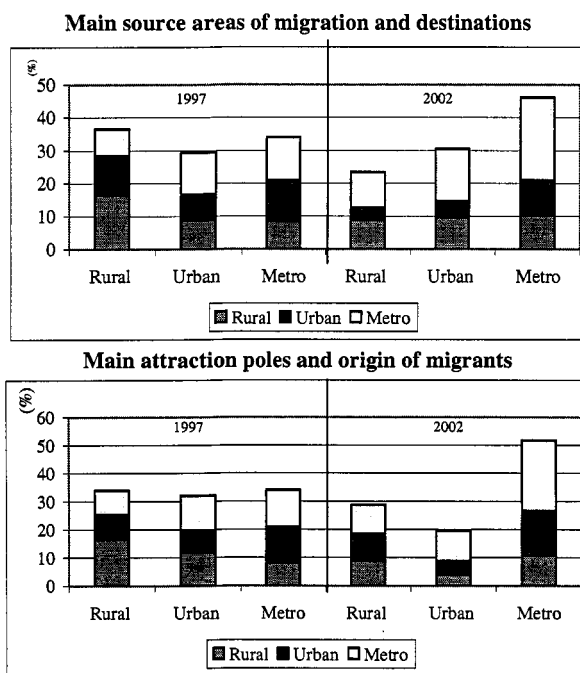
Source: Own estimates based on household survey data

Figure 4.9: Migration Flows in Bolivia by Origin and Destination, 1997 and 2002 (Heads and Non-Heads of Household)

Main source areas of migration and destinations

Main attraction poles and origin of migrants
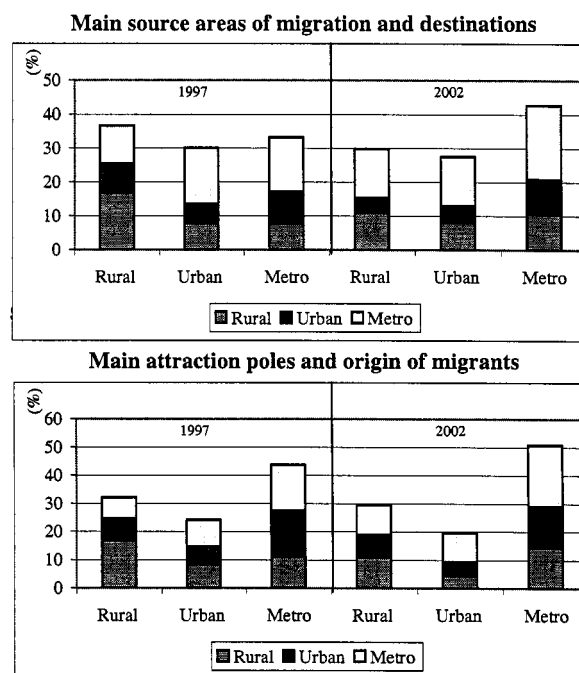
Source: Own estimates based on household survey data.

4.41   However, absolute migration flows remain small. About 350,000 people had migrated in the five years previous to the 1997 household survey sample and only 69,000 were rural-to-urban migrants. The figures are similar for 2002. This partly reflects the high costs of migration and, as noted before, non-pecuniary factors that affect settlement decisions.

4.42   In terms of characteristics, a striking difference between migrant and non-migrant household heads is the overrepresentation of women: 36 percent of the rural-urban migrants were female in 2002. Migrants are younger by about six years compared to non-migrants, and typically have smaller families. In 2002, rural migrants had on average 7.3 years of education, while rural non-migrants had only 4.5 years, and urban non-migrants 9.2 years. Participation in the formal, informal, and self-employed sectors in 2002 was similar for migrants and non-migrants. Younger people, whose gains are increased by the longer expected payoff period, are more likely to migrate. The more skilled and better educated workers are also more likely to migrate.

4.43   The results indicate that rural to urban migration in 1993–97 was led by younger and better educated heads of household with smaller families seeking work in more developed areas who probably face less credit constraints and higher expected earnings gains. Rural migrants do not come from the poorest or relatively least developed areas (as measured by the HDI-income and the infant mortality rates) and communities with higher levels of education have less migration, maybe because of the positive externalities generated by education. Individuals from the poorest locations and indigenous household heads are more prone to rural-to-rural migration.

Earnings of migrants

4.44   Rural migrants to urban areas during the 1990s did better than would have been expected had they stayed in rural areas, particularly those getting jobs at the bottom of the earnings scale for their skills. The returns to education are higher for migrant heads than for non-migrants (except at the college level) in 2002. There is relatively large heterogeneity in rural areas, allowing the less skilled (for the urban labor market) migrants to benefit (in absolute terms) from migration. Despite potential obstacles such as lack of contacts, "urban know how" or skills that are demanded in the urban economy, migrants readily found competitive economic opportunities.

4.45   However, migration is advantageous only for those with migrant-like characteristics. If a person has observable characteristics that do not conform to the typical migrant profile (described above) but still migrates, she will earn less than expected at destination. Thus, when individuals with large families coming from very poor localities migrate they tend to earn less in the urban/metro sector than what their skills would predict.

4.46   Migrant earnings lagged with the economic slowdown. In particular, the performance of female heads of household and indigenous individuals in the urban labor markets changed considerably from 1993 to 2002. Female migrants fared worse than their urban counterparts in 1993 and 1997, but there was a premium for female migrants at jobs with lower pay for their skill sets in 2002. On the other hand, indigenous migrant heads getting jobs at the bottom of the earnings scale lost ground relative to non-migrant indigenous heads in 2002.

4.47   The results are consistent with the change in the direction of migration flows over the 1990s to early 2000s. There is little evidence of crowding out of low performing migrants in main urban centers during the growth boom. But with the growth stagnation, there was some reversion of migration flows towards rural areas.

4.48   Although migrants do not come from the poorest rural areas, rural-urban migration likely had a direct (and, through remittances, indirect) contribution to reduce rural poverty. However, the potential for rural residents to escape poverty through migration is limited by the high costs of migration, the fact that the poorest people do not migrate to the urban areas, and by non-pecuniary aspects of resettlement decisions.

WHICH POLICY INTERVENTIONS CAN ENHANCE THE LABOR MARKET'S ROLE IN REDUCING POVERTY IN BOLIVIA?

4.49   The poverty and inequality impacts of growth can be enhanced by removing a number of obstacles faced by the poor to improve their productivity and market their labor. This includes steady support to their accumulation of human capital in future years, and actions to improve equity in the labor market and income generation investments for lagging regions (including easing internal migration costs). Below are selected short-to-medium-term actions.

4.50   **Strengthening human capital and social protection of the poor.** To help address inequities that limit the ability of many poor Bolivians to access and benefit from entry into the labor market, the Government should continue and improve efforts to raise human capital, particularly in education and health. Given the fact that Bolivia's social spending is already relatively high as a percentage of GDP, social spending policy actions should focus on targeting

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worse-off localities, improving expenditure accountability and efficiency through close monitoring and results management, and finding creative ways to tap private sector participation. Two specific areas of attention should be:

- Implementing a "smart" conditional cash transfer program targeted to the poorest families with at-risk children, to offer minimum income support to the poorest families made conditional on their participation in health and nutrition interventions (pregnant women and children age 0-6) and on school attendance (children age 7–12). Bolivia can learn from the very successful Mexico's Oportunidades, Brazil's Bolsa Familia, and similar programs in Honduras, Nicaragua, Colombia and Ecuador. The program can be piloted on high priority groups and grow gradually over time. Financing from natural gas tax proceeds would channel the benefits of this enclave sector to improve the welfare and human capital of the Bolivian poor (regional cost norms range around 0.5–1 percent of GDP).

- The program would complement ongoing supply-side efforts to advance the health and nutrition related MDGs and social protection (with Bank support). These include extending coverage of primary health care in underserved areas, strengthening the municipal health service network, sustainable water and sanitation provision, and strengthening pro-poor community investments and the workfare program (PLANE).

- Developing the Bolivian Educational Strategy geared towards the development of basic cognitive skills and the productivity of the labor force, for which a Bank education sector study is to provide specific recommendations. Key issues for the mid-term implementation of the strategy include filling coverage gaps for universal basic education, improving secondary education transitions, addressing low quality and inequalities in achievement tapping on results-based management, improving private higher education access for low-income students, and developing labor market skills through computer and English-language instruction.

4.51 **Reform labor market regulations to promote formality and productivity increases.** The high rate of informal employment reflects the high costs and small benefits of employment in the formal sector. Labor regulations should allow for growth to generate more and better jobs for the poor, balancing workers' effective protection with productivity growth. There are many policy options which could encourage increasing the productivity of both formal and informal jobs. These include:

- Establishing a cap for severance pay to bring existing negative incentives for hiring below the regional average, while allowing workers to collect partial indemnities in some cases of voluntary resignation;
- Extending the use of term contracts tied to special provisions (minimum required training investments) to make high-rotation hiring less attractive;
- More flexible rules concerning dismissals for economic reasons and seasonal work, at the same time that effective anti-cyclical safety nets are strengthened;
- Incentives for worker training such as similar tax treatment to investment in human capital as that of capital investments, co-investments of workers, and mutually agreed post-training job assurance by workers and firms;
- Provisions to accommodate different non-wage costs for smaller firms, under mutual agreement between employers and employees, such as simplified health/pension plans;

- Leveling contracting conditions across gender and ethnicity (including domestic work), strengthening anti-discrimination provisions, equalizing the length of the work week/day and co-sharing maternity leave benefits; and
- Employing fair and timely out-of-court mechanisms to resolve labor disputes, possibly including neutral arbitration or mediation councils.
- Institutional strengthening (staffing, training, technical assistance) of the Labor Ministry and coordination of relevant public agencies is needed so that they can assume their important and increasingly more complex role.

4.52   As in much of the region, the labor market reform agenda has been stalled. There is a need for effective communication to workers, firms of all sizes, and central and municipal governments of the benefits from reforms, including higher productivity, more jobs with viable social benefits to more workers, potential higher fiscal revenues, and a more fluid labor market where rewards and mobility are based on skills and merit. The greater recognition of the importance of sound labor market regulations for productivity growth has recently motivated some important reforms in countries like Colombia, Chile and Peru and ongoing discussions in others like Ecuador.

4.53   **Improve labor market equity.** In order to increase labor market equity the government could also consider interventions to reduce earnings gaps that are not related to productivity. These would benefit from civil society and private sector sponsorship or support (learning from relevant experiences in the region, e.g., Peru, Chile), and they could include:

- Encouragement for expansion of pre-school facilities and child care centers to facilitate women's and migrants' participation, learning from successful experiences in the region (e.g., Peru, Chile);
- Training in high schools and colleges on job search techniques and strategies and promotion of privately-provided labor market intermediation services;
- Fostering community-led crime prevention and control in marginal urban neighborhoods that may prevent workers, especially women, from taking advantage of available (night) job opportunities;
- Considering moderate, productivity-driven increases in the minimum wage, as the economy resumes growth, closely monitoring for rising unemployment among the young and unskilled to avoid setting the level too high.

4.54   **Increase economic opportunities in worse-off regions.** Also needed are income generation investments for lagging regions and actions to ease internal migration costs so that the poor are better able to benefit from locations and productive endeavors with better economic prospects. Policy actions include:

- Improving urban and inter-regional transportation to reduce commuting costs that hinder job access;
- Using the newly developed consumption poverty map (UDAPE-INE) to guide the allocation of resources towards poor municipalities, particularly to target interventions aimed at income generation of the poor. This map could be considered for implementing the National Dialogue Law formula of inter-municipal transfers. Bolivia's geographic poverty profile calls for a wide range of interventions depending on local poverty and inequality levels,

location and resource endowments. These may include growth-enhancing investments, targeted programs to develop human capital, community assets and income generation, and investments that promote gradual integration of communities through migration. U.S. Millennium Account resources could be tapped to finance entrepreneurial and social activities for lagging localities.

4.55 It is important to emphasize that the actions noted above should be accompanied by complementary reforms to achieve general improvements in the investment climate and bundled interventions to align the incentives of micro and small firms to participate in formal institutions, as outlined in the previous chapter. This will allow capitalizing on the synergies of advancing multiple reforms.

5. PROSPECTS FOR GROWTH AND POVERTY REDUCTION

Although Bolivia's growth prospects remain vulnerable to external circumstances, the country can strongly improve its future growth potential through continued reforms. Simulations suggest that if the policy determinants of growth were to improve to that of the 75th percentile for the LAC region, GDP per capita growth could increase to over 4 percent per year, or over 5 percent a year if policy variables were to improve to the 75th percentile level of the world. Because of the large number of poor people in Bolivia and the skewed income distribution, high growth rates are necessary if the country's poverty level is to be significantly reduced. Considering the existing growth-poverty relation, annual per capita growth rates of 6.5 percent are required to meet the MDG goal of reducing poverty to 34 percent by 2015. The annual per capita growth rate required to achieve the alternative MDG target of reducing the incidence of extreme poverty by half by 2015 is about 1 percent lower. Simulations indicate that individual policy reforms will have relatively small impacts on growth and poverty by themselves, but can have a much larger impact when implemented as part of a more comprehensive strategy of mutually-reinforcing reforms.

5.1   This chapter builds on the results in previous chapters to assess the prospects for pro-poor growth. It discusses scenarios that would put the country back on a fast-growth path and simulates policy levers of factors driving the income distribution that can reduce poverty and income inequality.

GROWTH PROSPECTS

5.2   Bolivia's medium-run growth is tied to the natural gas sector development, including the ongoing hydrocarbon projects with Brazil and Argentina and possible exports of liquefied natural gas. Recent studies estimate that these projects could lead to at least a 6 percent growth rate if they reach full capacity by the end of this decade (IMF 2004, Klasen et al. 2004). As an enclave sector, the impact on the rest of the economy would be mainly through increased tax revenues, current account effects, and exchange rate appreciation. Klasen et al. estimate that growth would be somewhat larger if the government refrained from spending all the additional revenues in consumption, instead increasing public savings and avoiding the contraction of export-oriented sectors. Due to limited output and employment spillovers, the direct benefits for the poor would be modest.

5.3   Further progress in structural reforms can help Bolivia ignite shorter term growth and sustain it over the long run. The growth results discussed in Chapter 1 can be used to simulate orders of magnitudes (Figure 5.1). With growth determinants following the trends of the 1990s, Bolivia's average GDP per capita growth can be expected to be about 0.5 percentage points higher than its average rate of the 1990s (reaching 2 percent annual growth) during the next decade, compared with a 1.1 percent per capita growth gain for LAC (total of 2.6 percent per year). If the policy determinants of growth were to improve to that of the 75th percentile for the LAC region, Bolivia's GDP per capita growth could increase 2.7 percentage points to over 4 percent per year (similar to other LAC countries). Finally, if policy variables were to improve to the 75th percentile level of the world, then growth in Bolivia could reach an average of 5.6 percent per year.

5.4 The simulations suggest that improvements in education, infrastructure, and trade integration could contribute the most to growth followed by improved governance and financial deepening. Larger spillovers to production and employment might occur if the gas projects are accompanied with policies and reforms in these areas. This requires a combination of economic policies and reforms to reduce macroeconomic vulnerabilities, boost private investment, and exploit natural endowments more efficiently.

Figure 5.1: GDP Per Capita Growth Projections, Bolivia and LAC Average, 2000-2010 (%)

Source: Based on Loayza, Fajnzylber and Calderon, 2002.

5.5 It is beyond the scope of this report to formulate a pro-growth reform agenda. In Chapter 3 we offer some policy recommendations to address key micro constraints to growth faced by Bolivian firms, which are discussed in more detail in the Bank's 2001 Bolivia Investment Climate Assessment. Growth constraints and trade issues will be further analyzed in the Bank's forthcoming Country Economic Memorandum. Sustainable mechanisms for funding public infrastructure should be pursued using standard benefit-cost criteria and where donor funding is not available the Government can seek viable domestic or external financing options (including public-private partnerships). A forthcoming Bank education sector study will provide specific recommendations to develop a new Bolivian Educational Strategy, but some recommendations are discussed in Chapter 4. The Bank's 2004 Public Expenditure Review offers recommendations to improve governance. The strengthening of the financial sector is being supported through the Bank's Programmatic and Corporate Restructuring adjustment loan to improve access to financing (particularly for small and medium enterprises) including collateral law reform and strengthening creditor rights.

5.6 Bolivia's growth in the 1990s in the midst of a favorable external environment (high growth of its main trading partners, significant capital inflows, the expansion of natural resource exports), and the subsequent decline demonstrate the country's vulnerability to external shocks and dependency on external capital. The growth projections above, based on deeper structural reforms, do not factor in possible shocks—either negative or positive. A large portion of government revenue comes from natural gas exports, and shocks in its price level could affect fiscal accounts. Andersen and Faris (2002a and 2002b) suggest a stabilization fund for the natural gas revenues in order to mitigate price volatility, although these may not be as effective when price shocks are non-permanent (Nina and Brooks de Alborta, 2001).

5.7 Bolivia relies on external resources for one-third of all public expenditure. As noted in the 2003 Bank CAS, forthcoming levels of foreign assistance, particularly from bilateral donors, are uncertain, and the availability of domestic and foreign private investment under the country's current circumstances may not be high enough to sustain growth. The Government should continue to pursue short-term aid conditional on good policy performance and advances in the aid harmonization agenda.

5.8 Investments in human capital, transportation and communications infrastructure, combined with an adequate institutional framework, can improve the prospects for and increase the impact of local and foreign direct investment. If local firms have access to technical assistance, credit, human resources, and information, spillovers from FDI are more likely. The
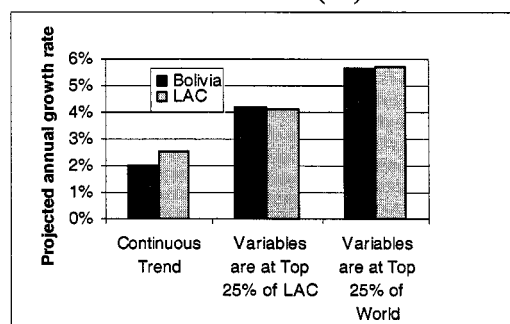
creation of distribution networks, adoption of new technologies and access to foreign markets could enable the poorer regions of the country to better enjoy the benefits of international trade.[1]

5.9   In summary, the results of growth regressions indicate that the structural reforms that Bolivia underwent during the 1980s and 1990s contributed positively to growth, especially during the 1990s. Future growth will be limited without further reforms. Moreover, lessons from past performance urge further actions to increase the impact of growth on poverty reduction.

PROSPECTS FOR POVERTY REDUCTION: ACHIEVING THE POVERTY MDG

5.10   Bolivia requires sustained growth to achieve substantial reductions in poverty. The income distributions are heavily skewed, particularly in rural areas, making it more difficult for distribution-neutral growth to bring about significant, immediate declines in poverty. This is illustrated by Figure 5.2, which shows estimates of the urban/rural per capita household income distributions for 2002 and the corresponding poverty lines. These show the fraction of individuals at each income level, the area under the curve to the left of the poverty line being the fraction of poor individuals.

Figure 5.2: Distribution of Log Household Per Capita Income, 2002, Urban and Rural
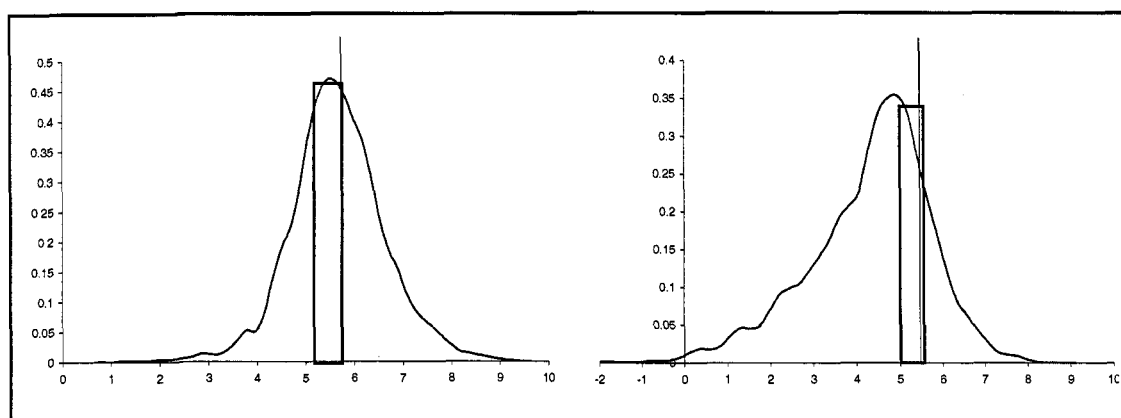
Note: the vertical lines in each graph represent an "average" poverty line for each area.
Source: Authors' estimates based on household survey data.

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1. For a more detailed discussion on the role of FDI in Bolivia, see the Institute for Socio-Economic Research (IISEC) and Overseas Development Institute (ODI) "Foreign Direct Investment and Development: The Case of Bolivia."

5.11   We conducted simulations to assess the impact of growth on poverty, in particular to assess the per capita growth rate required to achieve the Millennium Development Goal of reducing poverty to 34 percent by 2015 (Figure 5.3). Under alternative growth rates, assuming the income distribution does not change, the goal could be met if incomes grew at an annual rate of over 6.5 percent per capita for the next 11 years, which means more than doubling per capita income by 2015. The annual per capita growth rate required to achieve the alternative MDG target of reducing the incidence of extreme poverty by half by 2015 is about 1 percent lower. These growth rates are significantly higher than the growth rates in the 1990s. Poverty would decrease to 29 percent with an annual per capita income growth rate of 8 percent, but even in this unrealistic scenario, poverty in rural areas would remain very high (54 percent), not reaching the MDG of halving the headcount ratio. The large poverty gaps in rural areas represent a special challenge in extending the benefits of growth towards the rural poor.

Figure: 5.3: Impact of Per Capita Growth on Poverty in Bolivia
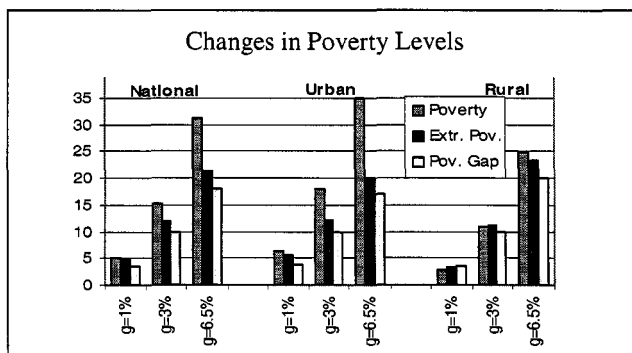
Note: g = Growth rate of survey income per capita.
Source: Authors' estimates based on household survey.

IMPACT OF POLICY REFORMS ON POVERTY AND INEQUALITY

5.12   We have made policy simulations that assess the impact of reforms to several of the principal causes of poverty and inequality identified in this report.   The simulations: (i) extrapolate trends in improvements of education of the 1990s to 2015 and accelerating the 90s trends; (ii) increase returns to education at different levels and for workers in different points of the earnings distributions; (iii) continue declines in fertility; (iv) reduce informal employment; (v) shift employment from primary activities to the manufacturing industry and/or skilled-labor intensive services; and (vi) eliminate gender, race and informality earnings gaps.   These simulations are limited and are not meant to be predictive, but merely to offer a sense of the potential orders of magnitude of alternative policies. Some results are illustrated in Figures 5.4 and 5.5 (see Gasparini et al (2004) for details).

5.13   The main findings of the policy simulations are:

- Because of the low level of total national income and the high number of poor people, poverty cannot be reduced much by purely redistributive policies.

- The distributional impact of a productivity-driven earnings increase would be greater if it took place in primary economic activities (e.g., agriculture) in rural areas. Generalized earnings growth is about neutral, but pro-poor if it took place in the sectors employing the poor (e.g., the unskilled labor sectors), and less pro-poor if it happens in the skilled-intensive sectors (Figure 5.5).

Figure: 5.4: Impact of Different Policies on Poverty and Income Inequality in Bolivia
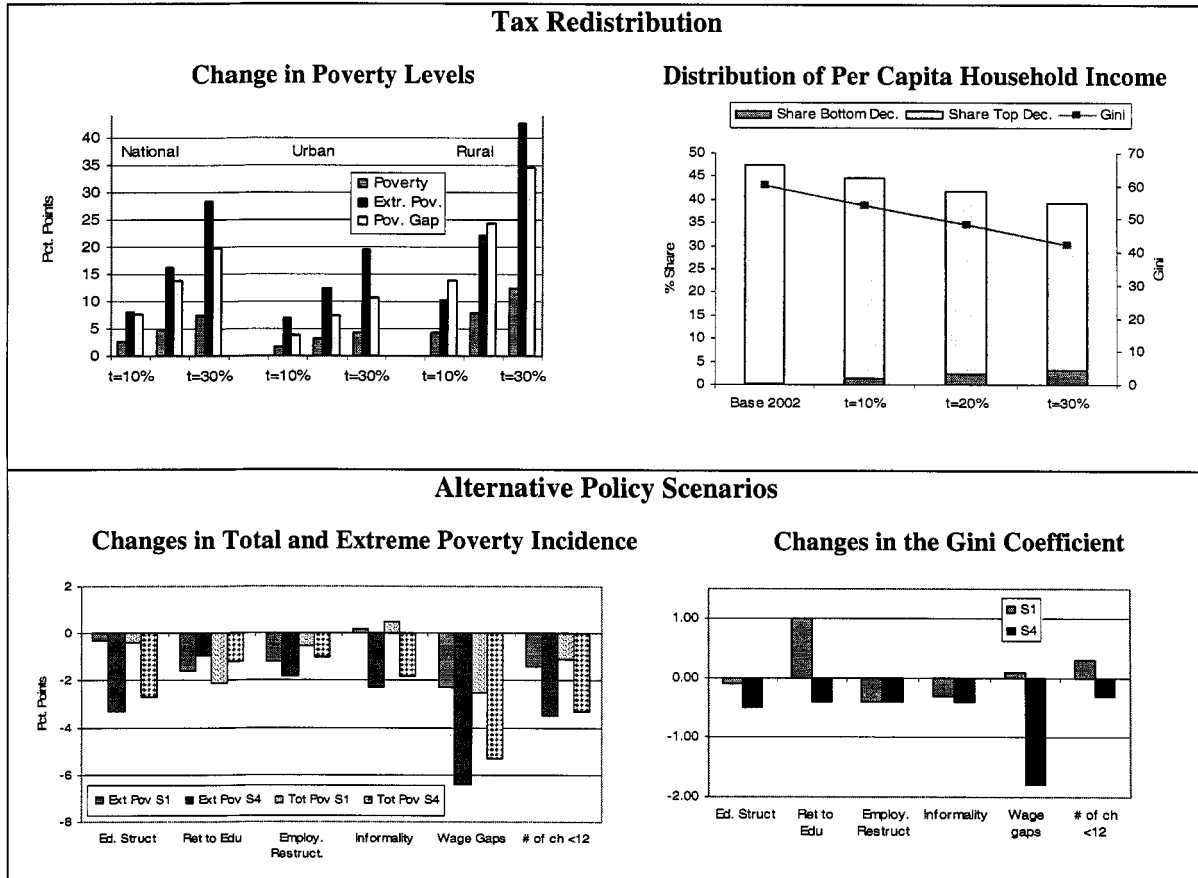
Note: Educational Structure: S1 extrapolates trends in the 90s to 2015. S4 simulates the simulation of illiteracy, increases in primary school completion, high school and college attendance. *Returns to Education:* S1 assumes increases of 20 percent in the returns to education. S4 equalizes the returns for workers with conditionally low wages to the returns of the median workers. *Employment Restructure:* S1 extrapolates trends in the 90s into the next decade. S4 simulates massive movements out of agriculture to manufacturing, commerce, and skilled-labor intensive services. *Informality:* S1 extrapolates trends in the late 90s to 2015. S4 assumes a 20 percentage points increase in the share of formal employment from reductions in informal salaried and self-employment. *Wage Gaps:* S1 eliminates the unexplained gender wage gap. S4 eliminates the informal salaried and self-employed unexplained earnings gaps. Number of Children <12 S1 extrapolates trends in the 90s to 2015. S4 assumes a decline in the proportion of households with more than three children.
Source: Authors' estimates based on simulations with 2002 MECOVI (Gasparini et al. (2004)).

- A 5 percent annual growth in earnings in urban areas has a considerable impact on poverty reduction (from 53 percent to 29 percent) while a similar earnings growth in rural areas would reduce poverty from 85 percent to 71 percent (cf. growth incidence curves in Figure 5.5).

- Considerably increasing the educational level of the working population does not change substantially the distribution of income directly, and leads modest reductions in poverty. The same is true, all else equal, for increases in the returns to education.

- Sectoral employment reallocations to manufacturing, commerce and the services sector yield modest impacts on income distribution and small effects on poverty.

- The impact of an increase in formal employment caused by reductions in informal salaried and self-employed workers would bring a reduction in the national poverty headcount ratio of less than 2 points.
- A decrease in fertility generates equalizing and poverty-reducing effects that are relatively larger than the above scenarios.
- Closing the unexplained wage gaps between non-indigenous and indigenous, and especially between formal and informal workers, would benefit the poor but again poverty and inequality fall little. Closing the gender earnings gap has a negligible impact on household inequality, largely because working women are more likely to be in the upper part of the household income distribution.

Figure 5.5: Growth-incidence Curves from Different Policy Scenarios

Annual 5% Growth in Earnings, By Sector

Annual 5% Growth in Earnings, By Area

Scenarios s1 and s4 for the Educational Structure

Closing the Wage Gap Due to Gender, Race and Informality
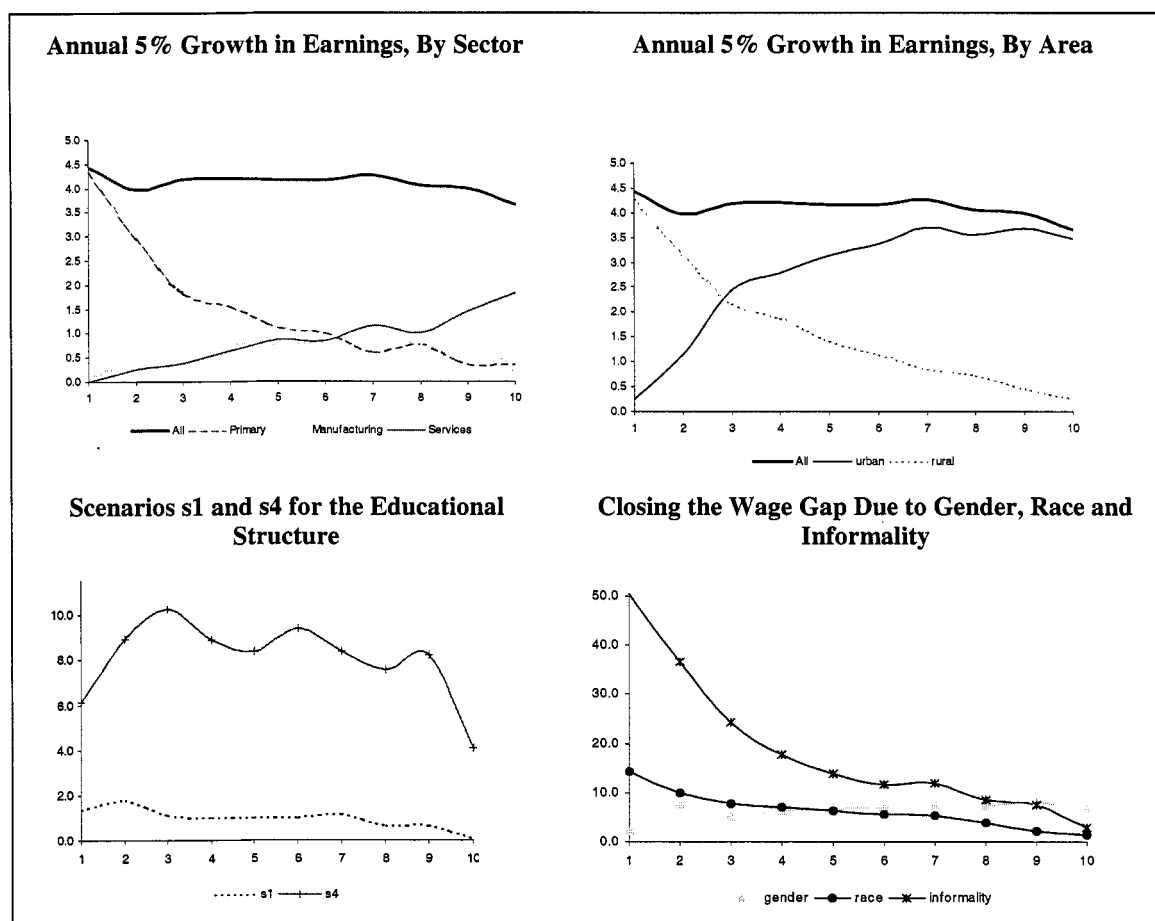
Source: Authors' estimations based on simulations with 2002 MECOVI. See Figure 5.4 for definitions of the simulation scenarios. See Gasparini et al (2003)

5.14   From these scenarios we conclude that, although all will help reduce poverty, the impacts of any single factor are small. Purely redistributive measures attained by fiscal policy seem to achieve higher short-term gains in poverty reduction but, unless these are moderate, they may have a negative impact on growth and this hinder poverty reduction in the medium and long term. While Bolivia is very unequal, it is foremost very poor. The low overall productivity

means a very low income base for the poor. Even after a sizeable change in the educational structure, or employment composition of the economy, the average wage just grows 8 percent and 2 percent respectively (Table 5.1). The impact is muted by the fact that the wage premium of finishing primary school is rather small for workers at the bottom of the earnings distribution.

Table 5.1: Impact of Educational Upgrading and Employment on Wages
(Wages and Number of Workers, Urban Areas)

	Average wage (i)	Number of workers Base 2002 (ii)	Simulation 4 (iii)		Average wage (i)	Number of workers Base 2002 (ii)	Simulation 4 (iii)
No education	3.1	90	0	Primary activities	4.6	218	23
Primary incomplete	4.2	834	113	Manufacturing	4.8	325	451
Primary complete	4.9	137	677	Utilities and transportatic	6.8	215	181
Secondary incomplete	5.3	331	226	Construction	4.7	213	135
Secondary complete	6.3	314	677	Commerce	5.8	639	790
Superior	13.7	551	564	Skilled-services	10.9	647	677
Total		2257	2257	Total		2257	2257
Average wage				*Average wage*			
Real	7.0			Real	7.0		
Simulated (s4)	7.5			Simulated (s4)	7.1		
Change (%)	8.0			Change (%)	1.9		

Source: Author's estimates based on household surveys.

5.15   The main lesson from the analysis is that sustainable growth, based on policies and reforms to enable the conditions for increasing productivity poor households, is essential to reduce poverty substantially in Bolivia. Given current productivity levels, pro-poor social policies alone can only achieve modest poverty declines. There is no magic bullet in a poor country like Bolivia. Actions on multiple fronts, as those discussed in Chapters 3 and 4 of this report, are needed to maximize the pro-poor characteristics of growth. These policies can also contribute to promoting growth in the long term and thus enable a virtuous cycle of growth and poverty reduction.

Annex 1.1 Data Sources for Monitoring Poverty and Living Conditions in Bolivia

There are two main data sources for monitoring recent trends in poverty in Bolivia: two national censuses and various household surveys (although of incomplete coverage and limited comparability).

<u>Census Data</u>

The censuses (Censo Nacional de Población y Vivienda) provide data on non-monetary indicators of well-being. The most recent are for 1992 and 2001. They are used for building poverty maps and targeting government interventions using indicators of Unsatisfied Basic Needs (Necesidades Básicas Insatisfechas). An updated NBI-based poverty map was recently prepared by INE-UDAPE with the 2001 Census.

<u>Household Surveys</u>

Nationally representative household surveys are unavailable for the early 1990s. Until 1996, INE's multi-purpose household surveys only covered large urban areas. This report relies on the following household surveys: Integrated Household Survey (implemented in capital cities up to 1995), National Employment Survey (national coverage; June & November 1996, and November 1997, the richest in terms of contents), Continuous Household Survey of Living Conditions (1999 through 2003). The coverage is national. These surveys have benefited from the support of MECOVI. The data is more comprehensive, including modules on health, education, occupation, income and expenditures.

These surveys present serious limitations in terms of comparability: changes over time in the questionnaires make comparison of even basic socioeconomic variables difficult (incomes, education), and surveys before 1999 did not capture household expenditures. We rely primarily on the 1993, 1997, and 1999-2002 surveys, paying meticulous attention to consistency and comparability issues. We use the official poverty lines derived from household surveys by INE for each department (Table A.1.1.1). Official poverty rates are based on household per capita expenditures in rural areas and household per capita incomes for urban zones given the high volatility and unreliability of rural income data.

Table A.1.1.1: Poverty Lines in Bolivia, 2002 Bs$ per person/month

Poverty		Extreme Poverty
Rural	233.39	133.03
Urban	321.8	170.9
Sucre	335.6	169.5
La Paz	327.0	181.8
Cochabamba	351.3	177.4
Oruro	297.4	165.3
Potosí	273.5	152.1
Tarija	351.3	177.4
Santa Cruz	343.9	174.7
Trinidad	343.9	174.7
El Alto	272.2	165.2

Source: INE

Since 1999, the Bank, through the MECOVI program, has supported INE on the development of nationally representative annual household surveys that have significantly improved the comparability of data for poverty monitoring and analysis. As the MECOVI program comes to an end, more funding from the government and donors is needed to continue strengthening the national statistical capacity and improving the use of surveys for poverty targeting and program evaluation. Currently, only 0.5 percent to 1 percent of the national poverty reduction budget from donors is allocated to improving the information system. The medium-term challenges for the overall institutional framework and governance of the statistical system remain considerable. The main objectives

are: (i) continue to produce nationally representative surveys implemented on an annual basis, covering social indicators and living conditions, access to basic infrastructure and other welfare indicators; (ii) improve survey questionnaires, fieldwork, and quality control in a range of survey activities; (iii) encourage wide access to and use of the survey data for policy analysis, and feed the design of public policy; (iv) build an integrated statistical system to ensure coherence among different statistical activities in the country and promote stronger interaction between data producers and users; and (v) improve the quality and coverage of administrative data and capacity to collect data at the sub-national levels.

National Survey on Human Development Potential and Aspirations

In 2000, the UNDP sponsored a nationally representative (a sample of 10,000 persons) household survey, also conducted by INE, which captures the values and aspirations of the Bolivian people with respect to themselves, their communities and the country's institutions. This survey includes individuals' poverty self-classifications, as well as many of the variables included in the MECOVI surveys such as the household structure, employment condition, income, assets and access to basic services. We use this to construct self-rated (subjective) poverty profiles. The main limitation of this UNDP survey is that it does not capture incomes of all household members, or household expenditures. This precludes straightforward comparisons of objective and subjective poverty determinants relying only on data from this survey. However, it is possible to compare the results with those obtained with the MECOVI survey, since they share a similar sampling framework and common survey instruments (e.g., questionnaires).

Developing a Consumption Poverty Map in Bolivia

Household surveys rarely allow for reliable estimation of income/consumption poverty in small geographic areas (e.g., municipalities). While census data often allows considerable geographic dissagregation (e.g., at the municipal level), it does not capture household income/expenditures. A recently developed methodology derives consumption poverty maps by combining data from both censuses and household surveys to fill in the missing income data in the census (Elbers, Lanjouw and Lanjouw, 2003). This methodology is applied to Bolivia to derive income/consumption poverty maps at the municipal level with adequate statistical confidence levels using hedonic regression models.

The main sources of data are National Census of Population and Housing of 2001 and the MECOVI household surveys of 1999, 2000, and 2001, which were combined to obtain a larger sample and then disaggregated by departamento and area.

The methodology linked household consumption expenditure with variables measured in both household surveys and the census to impute the missing income data (Elbers, Lanjouw and Lanjouw, 2003), and is developed in two stages. First, an econometric model of estimated household expenditure was generated as a function of variables from the surveys related to household structure, durable goods and housing equipment, basic services, and socio-demographic characteristics of the members. Second, the parameters of this model were applied to the census data to obtain conditional estimates of per capita consumption expenditure for each geographic unit.

These can be grouped into four categories: household/family characteristics (type of household, number of members, number of children), dwelling characteristics (construction

materials, access to water, sewage, electricity, durable goods), characteristics of the head of household (age, sex, education level, employment status, occupation), characteristics of the community or residence area (education level, natal care, materials and space used in the household, services and energy consumption).

For more robust estimations the survey sample is divided into more homogeneous geographic units, namely regions and departments. The estimation errors of the model are composed of two parts: one attributed to geographic or location effects, and the other related to individual or idiosyncratic errors. The first indicates the presence of non-observable characteristics that affect household consumption in a certain area or community; to address this, explanatory variables were generated for each community or area (cluster), which predicted the location error with fixed effects. The idiosyncratic error is then estimated from a theoretical distribution (normal, t-student) with sampling procedures with at least 100 iterations.

Once the distribution of the consumption expenditure for each geographic unit was estimated, it was possible to calculate the usual indicators of inequality and poverty together with empirical confidence intervals. The poverty lines used to measure poverty were estimated by taking into consideration the basket of basic products comprised of the types and quantities of food typically consumed within and outside the household, along with the minimum caloric intake recommended by the World Health Organization. The household reference group was composed by families whose food expenditure levels are able to cover the minimum nutritional requirements within an interval 1 percent, 5 percent, and 10 percent above and below the adequate level of nutrition. The poverty lines were obtained by averaging the values of expenditure in the interval.

In practice, few households cover the totality of the basic caloric and protein requirements, and generally, they are not fully represented. These factors, combined with expenditure measurement errors, explain the use of interval rather than ordinal estimation. Two poverty lines were used for poverty estimations: a higher poverty line, which considers the upper limit of the value of non-food products, and a lower poverty line, determining an inferior limit (Wodon 1997).

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ANNEX 1.2 The Geography of Poverty and Inequality[1]

This section provides more detail results of the recent work of UDAPE and INE, with the support of the Bank to develop a consumption-based poverty map for disaggregated geographic units. The analysis presents new data on poverty in Bolivia measured by consumption expenditure and alternative poverty lines combining information from the 2001 Census and MECOVI household surveys 1999–2001. Besides the extreme poverty line two other lines were used: a high poverty line which considers the upper limit of the value of non-food products, and a lower poverty line determining an inferior limit (see Annex 1.1 for details). The results pinpoint the more unequal areas and localities with the highest concentration of poverty and the implied relative rankings.

While poverty is widespread in Bolivia, there are important differences across locations. The departments of Potosi and Chuquisaca have the largest poverty incidence, followed by Beni, La Paz and Oruro, regardless of the poverty line used (Figure A.1.2.1). Over 70 percent of the population in these departments is poor. The departments of Santa Cruz, Pando, and Cochabamba are the least poor at any poverty line, but even in Santa Cruz 40 percent of the population is poor. These rankings are largely similar for extreme poverty.

Figure A.1.2.1: Incidence of Poverty by *Departamento*, 2001

Source: Based on data from the 2001 Census and Household Surveys 1999-2001.

Over 60 percent of the population in Potosi and Chuquisaca is indigent, compared to 25 percent in Santa Cruz. Due to population density the departments with the highest poverty rates concentrate the largest number of poor: Cochabamba and Santa Cruz concentrate over 42 percent of Bolivia's population while Potosi and Chuquisaca have less than 15 percent.

The urban conglomerates of Beni and La Paz present the highest poverty incidence (over 50 percent) while Cochabamba and Santa Cruz are among the least poor (almost a quarter of the population) (Figure A.1.2.2). The patterns of urban extreme poverty are very similar. Urban extreme poverty in Beni reaches 37 percent, three times higher than Santa Cruz and Cochabamba, the two most vibrant local economies of Bolivia. Indeed, the process of urban development in these two large cities has created broad-based income opportunities.

Rural areas all over the country are overwhelmingly poor regardless of the poverty lines used (Figure A.1.2.3). Over 40 percent of the rural population has levels of consumption insufficient to meet the basic food needs. Even rural areas of Cochabamba and Santa Cruz have levels of poverty as high as those of rural Potosi and Chuquisaca. Extreme rural poverty is

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1. Based on the report *Pobreza y Desigualdad en Municipios de Bolivia: Estimación del Gasto de Consumo Combinando el Censo 2001 y las Encuestas de Hogares* (2003) led by UDAPE and INE and on the World Bank side by Quentin Wodon (AFTPM), Werner Hernani (consultant), and Peter Lanjouw (DECRG).

particularly concentrated in Potosi and Chuquisaca (close to 90 percent). Rural Pando and Beni present the lowest levels of extreme poverty (half of their population).

Figure A.1.2.2: Urban Areas: Incidence of Poverty by *Departamento*, 2001
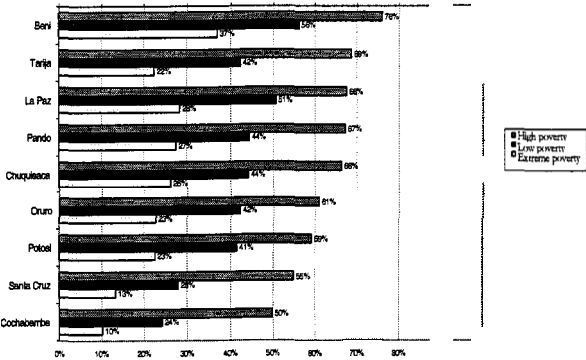
Figure A.1.2.3: Rural Areas: Incidence of Poverty by *Departamento*, 2001

Source: Based on data from the 2001 Census and Household Surveys 1999-2001.
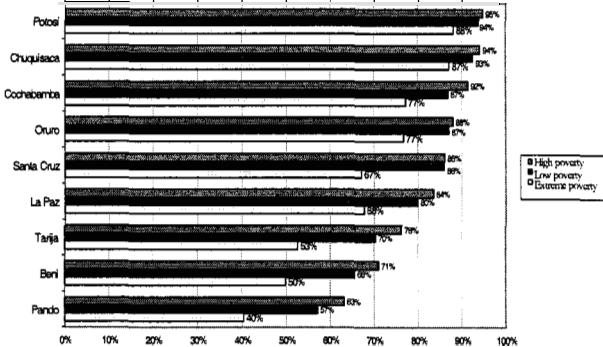
Source: Based on data from the 2001 Census and Household Surveys 1999-2001

The municipal disaggregation shows that, regardless of the poverty line, many localities show both low per capita consumption and severe poverty, while in others moderate pockets of poverty coexist with high inequality in per capita consumption. Figure A.1.2.4 shows the fraction of municipalities for the range of poverty incidence and poverty gaps observed in Bolivia using alternative poverty lines, the vertical dotted lines signifying the corresponding national values. A large share of municipalities exhibit poverty incidence above the national levels (most of the curves in the left-hand graphs (a-b) fall to the right of the dotted lines). In fact, a significant fraction of municipalities have poverty incidences above 80 percent (see the peaks of the curves). The curves depicting the distribution of poverty gaps (right-hand graphs) also suggest that most municipalities have poverty intensity levels above the national average, although the distribution of municipalities is more symmetric at lower poverty lines.

Poverty is particularly concentrated in municipalities located in the valleys and the central highlands. Municipalities endowed with resources and larger urban populations have developed at a relatively higher rate, tend to concentrate larger levels of economic activity and have higher levels of consumption. This is typically the case of capitals of *departamentos* and relatively larger cities. The municipalities of Cochabamba and Santa Cruz present indeed the lowest incidence and intensity of total and extreme poverty (about 20 percent of their population is poor). However, some municipalities outside department capitals (e.g., Montero, Colcapirhua, Puerto Quijarro) have also been successful in reducing poverty levels. On the contrary, in at least 20 municipalities with dispersed populations (Morochala, San Pedro Buena Vista, Ravelo), virtually all residents live with insufficient consumption levels to cover basic food needs.

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Figure A.1.2.4: Distribution of Poverty Incidence and Poverty Gaps in Municipalities, 2001

(a) High poverty line
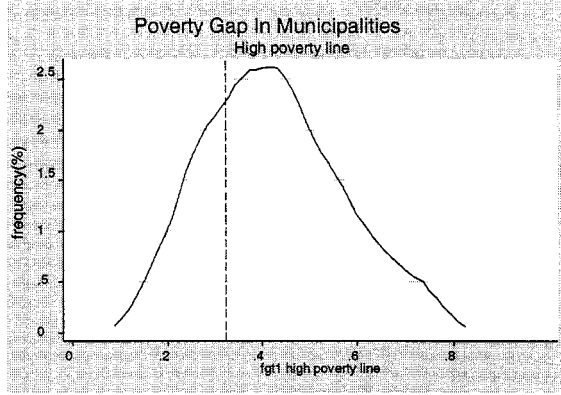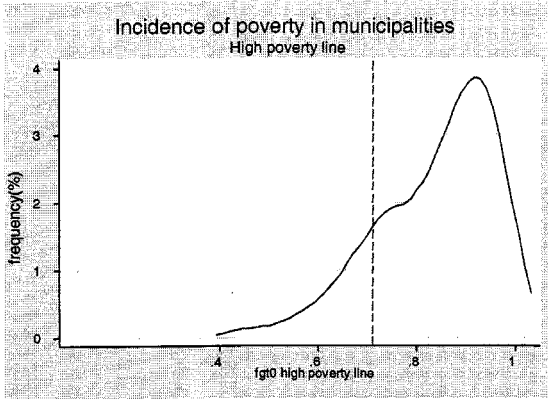
(b) Low poverty line
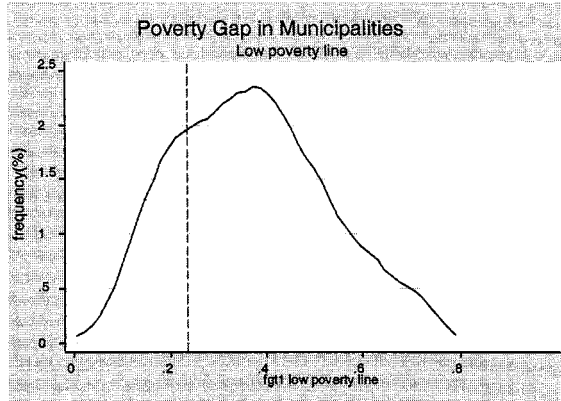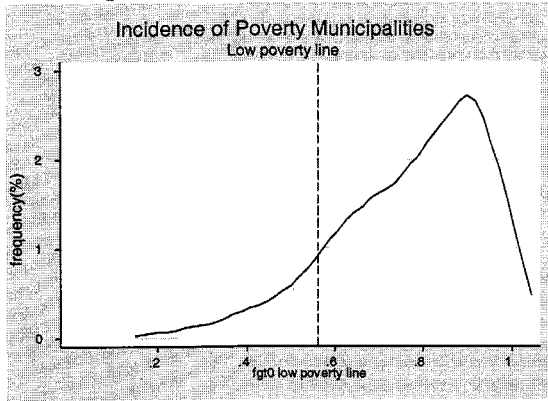
(c) Extreme poverty line
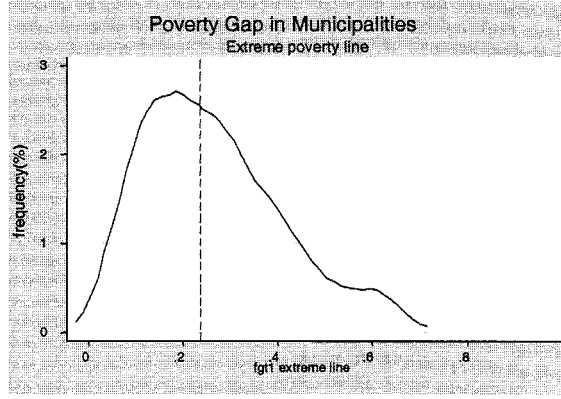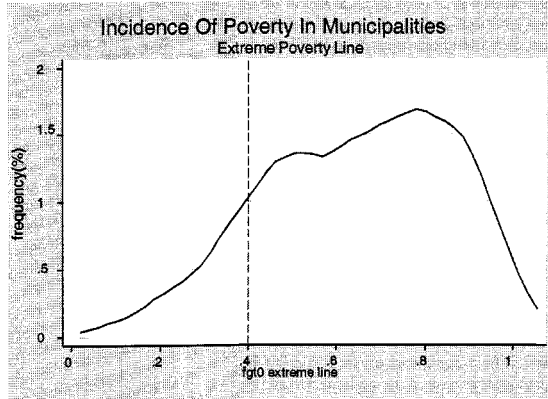
Source: Based on data from the 2001 Census and Household Surveys 1999-2001.

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The results also illustrate the important local interaction between poverty and inequality. Bolivia also exhibits high levels of inequality in consumption both between and within departments. Figure A.1.2.5 shows the Theil inequality index which similar to the Gini coefficient ranges from 0 (equal) to 1 (most unequal). Potosi, Cochabamba, and Chuquisaca have the highest inequality in consumption expenditures. In contrast, Tarija, Pando, and Beni show a more equitable distribution of consumption expenditure, partially reflecting greater economic opportunities by virtue of being located along the borders with Brazil and Argentina, having a lower proportion of indigenous population, among other factors. About half of the inequality level in the most unequal regions is explained by the large rural-urban income gaps, while in the more egalitarian inequality mainly reflects disparities within both urban and rural areas.

Figure A.1.2.5: Inequality in Distribution of Consumption Expenditure: Theil Index
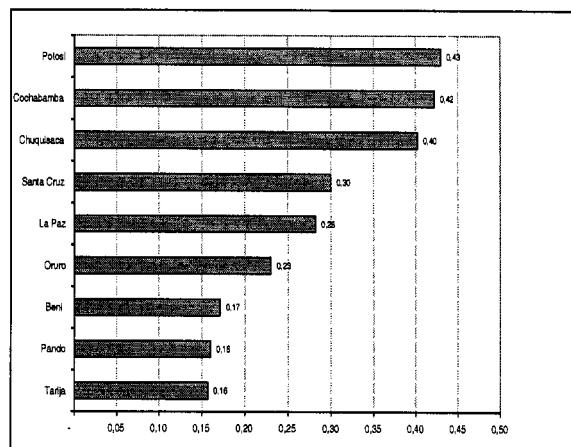
Source: Based on data from the 2001 Census and Household Surveys 1999-2001.

The municipal data does not suggest a clear cut correlation between average consumption and inequality levels. Figure A.1.2.6 shows the inequality indexes and per capita consumption of municipalities with the corresponding national levels (vertical and horizontal lines). While most municipalities with low consumption levels also have low inequality, among those with higher average consumption we find both low and high inequality levels. That is, for most municipalities (the mass of points in the bottom of the graph), there is little evidence that higher average consumption entails higher inequality. However, in municipalities that start with high inequality at a given level of average consumption (the more dispersed points at the top), a rise in average consumption first lead to a more unequal distribution before greater equality is achieved. These patterns should be taken as tentative since they reflect cross sectional correlations.

Figure A.1.2.6: Inequality and Consumption Expenditure
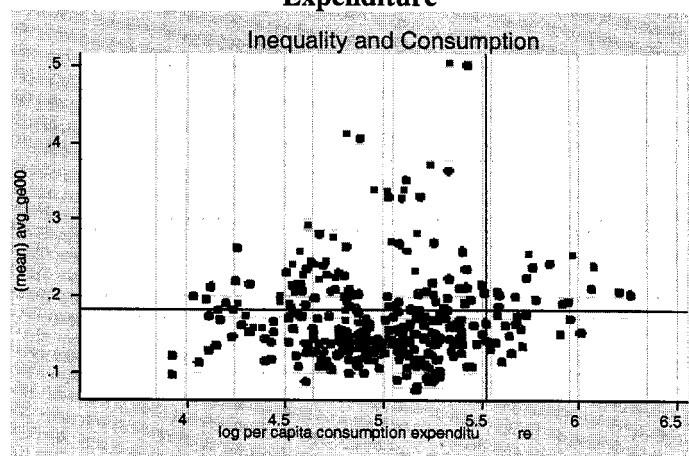
Source: Based on data from the 2001 Census and Household Surveys 1999-2001.

The municipal data does illustrate how the high levels of inequality in Bolivia are a key factor behind the country's high poverty levels. Figure A.1.2.7 shows the relationship between inequality (total and extreme) and the levels of poverty incidence and intensity for alternative poverty lines. Again the horizontal and vertical lines depict national levels for each variable that divide each of the graphs into four quadrants.

Figure A.1.2.7: Inequality and Poverty Measures

(a) Low poverty line
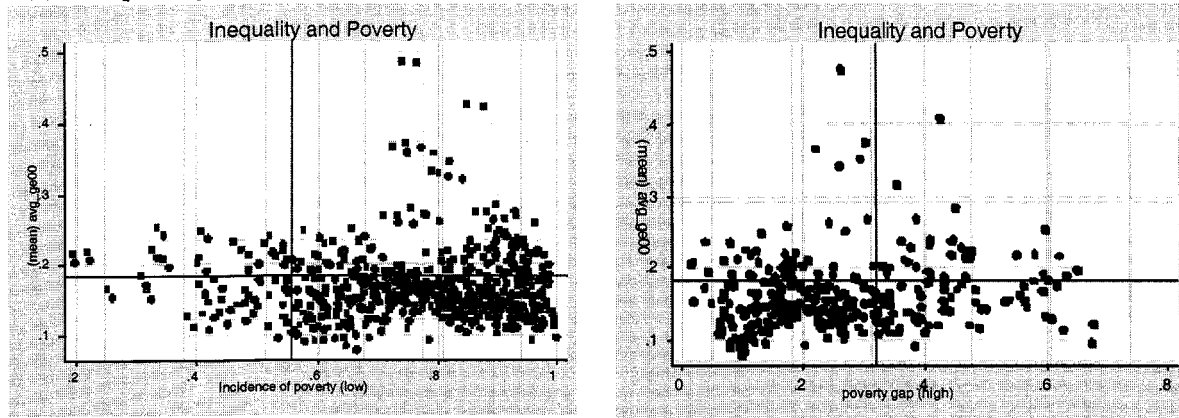
(b) Extreme poverty line
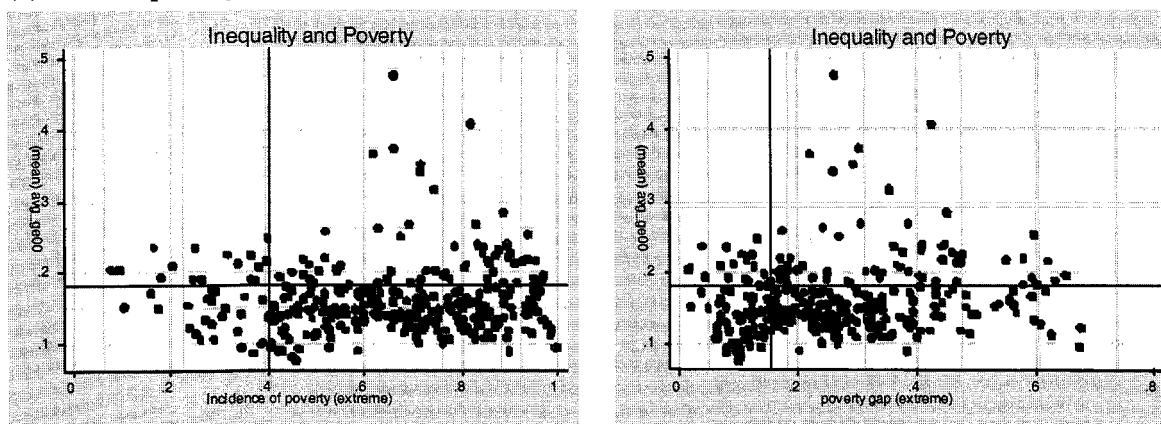
Source: Based on data from the 2001 Census and Household Surveys 1999-2001.

High inequality and low incomes are pervasive in many localities. Three groups of municipalities are worth distinguishing. The largest group comprises municipalities with very high poverty and low inequality (bottom-right quadrants in each graph), which are mostly low populated, remote indigenous communities living in subsistence. The second largest includes those with both high poverty and inequality (upper-right quadrants in each graph) and comprises larger urban localities with better resource endowments and small cities dedicated to mineral exploitation or border trade with Brazil and Argentina. Finally, municipalities with low poverty and low inequality (bottom-left quadrants in each graph) are typically found in more economically dynamic urban areas. Bolivia's geographic poverty profile call for a wide range of interventions depending on local poverty and inequality levels, location and resource endowments.

Finally, the analysis finds that the relationship between consumption and Unsatisfied Basic Needs (UBN) measurements becomes weak among municipalities with lower levels of poverty. Figure A.1.2.8 shows the relationship between UBN poverty and the levels of poverty incidence and intensity at high poverty lines with the corresponding national levels (horizontal and vertical lines). Severe levels of poverty, evidenced by high proportions of population with UBN and low consumption levels, characterize a large number of municipalities in Bolivia (note

the sizeable concentration in the upper-right quadrants of the graphs). However, the relationship is less clear among the municipalities with moderate poverty levels, precisely those where the needs of going beyond geographic targeting are greater. This suggests that the current system of inter-municipal transfers based on UNB poverty (formula of the National Dialogue Law) targeting tends to be less responsive to municipalities with entrenched pockets of income poverty.

Figure A.1.2.8: Incidence of Poverty by UBN and (High) Poverty Line
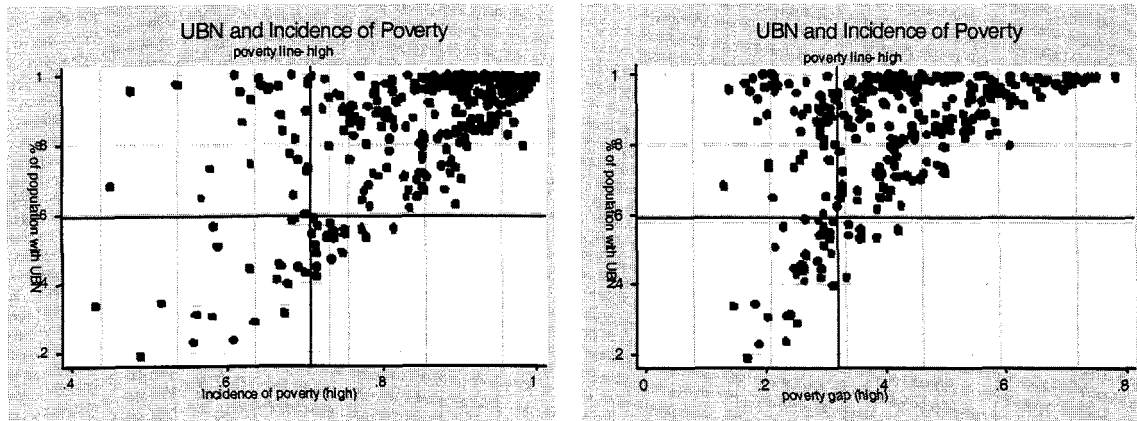
Source: Based on data from the 2001 Census and Household Surveys 1999-2001.

ANNEX 1.3 Income Poverty and Subjective Perceptions

The background study by Arias and Sosa (2004) analyzes the determinants of subjective and income poverty estimate using binary regression models (see Box A.1.3.1).[2] The study employs a nationally representative household survey (*Encuesta Nacional de Aspiraciones y Prioridades de Desarrollo Humano*, ENAPD) conducted by the UNDP for its 2000 Human Development Report in Bolivia. The survey captures the values and aspirations of Bolivians, including their self-rated poverty perceptions, in addition to most socioeconomic variables in the MECOVI surveys (see Annex 1.1).

Box A.1.3.1: Explaining Income and Subjective Poverty

Arias and Sosa (2004) estimate binary regression models of the determinants of subjective and income poverty. For subjective poverty, the dependent variable is based on individuals' responses to the question "Do you consider yourself poor?" in the 1999 ENAPD survey (on individuals 18 years or older). A major limitation of the ENAPD survey is that it captures only a limited fraction of household incomes. The 1999 MECOVI survey is used to estimate poverty regressions based on per capita household incomes (urban) and expenditures (rural) and official poverty lines for a sample similar to the ENAPD sample.

The study examines the role of a multitude of socioeconomic characteristics on poverty classifications: Demographics (gender, age, household size, marital status), Human Capital (own, mother and father's education, work experience, public school attendance), Employment Status (unemployed, underemployed, or employed, temporary job), Type of Employment (employer, independent worker or employee), Occupation (white collar, blue collar), Place of Residence (urban/rural, *departamento*, migration status), Ethnicity (Spanish, Aymara, Quechua, mother tongue), Wealth (income, consumption expenditures, assets), and Social Capital (participation in social, economic, political or other organizations).

As in standard in probit/logit analysis the models relate poverty binary indicators (1 if poor, 0 otherwise) to socioeconomic characteristics and can be thought as arising from the following process. Individuals rank themselves as poor by comparing her self-assessed welfare level w_i with a personal critical value w_i* that she deems adequate to avoid poverty:

$$y_i = 1 \text{ if } [w_i^* - w_i = x_i \beta + u_i > 0], \text{ and } 0 \text{ otherwise}$$

where x_i are observed characteristics, u_i captures unobserved determinants of welfare and measurement errors, the β are the weights placed on the x_i. The term $w_i^* - w_i$ is an unobserved measure of net welfare capturing the propensity to consider oneself poor. In the case of income poverty w_i is a measure of income or consumption and w_i* is a poverty line based on a minimum cost basic food basket. Probit yields estimates of the conditional probability of poverty for individuals with different x_i.

In this formulation unobserved (unmeasured) factors (u_i) do not interact with observed determinants of welfare (poverty). That is, individual characteristics (x_i) affect welfare (poverty) in the same way for all individuals (β is common to everyone, i.e., independent of x_i and u_i). However, idiosyncratic welfare and poverty perceptions are unlikely to be formed so restrictively. For example, the impact of education on welfare and self-rated poverty may differ according to the rank that unobserved characteristics grant an individual in the latent welfare distribution, that is, depending on her propensity to self-rate as poor.

In order to examine whether individuals who differ in their unobserved welfare determinants weigh socioeconomic characteristics differently in their poverty self-ratings, Arias and Sosa (2004) estimate binary quantile regression models (Manksi, 1985; Kordas, 2002). The results offer richer information to policy makers for discerning the priorities of different segments of the population, specifically of individuals more likely to self-rate poor given their socioeconomic characteristics.

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2. See Ravallion and Lokshin (2002, 2001) for a recent similar analysis for Russia.

Self-rated poverty profiles are compared with conventional profiles based on income/expenditures. The results point to a few important differences in the effect of socioeconomic characteristics (such as education, employment, ethnicity) on the probability that individuals perceive themselves as poor and are classified as poor on the basis of their family income. The findings also reveal the relative importance of poverty determinants (i.e., the priorities implicit in poverty self-ratings) according to individuals' ranks of subjective welfare (i.e., their propensity to consider themselves poor).

SELF-RATED AND INCOME POVERTY PROFILES

A first step is to compare simple profiles of income/expenditure poverty and self-rated assessments. Figure A.1.3.1 depicts both the fraction of individuals that are classified as poor according to their family per capita income/expenditure, as well as the fraction of individuals that self-rate as poor according to several socioeconomic characteristics. This is restricted to the sample of household heads over 18 years old. The vertical lines indicate the total fraction of income and self-rated poor for the full sample. The following are the main results:

There is a striking similarity between the patterns of income and self-rated poverty incidence. Whenever the income poverty rate of a group (characteristic) exceeds (is below) the overall rate of income poverty, that same group is more (less) likely to self-rate poor than household heads.

With few exceptions, self-rated poverty rates are lower than (or similar to) income poverty rates. Poverty incidence is 7 percentage points higher according to traditional income measures (55 percent) than with individuals' own direct assessments (48 percent). That is, individuals are less likely to consider themselves poor than expected given their level of family per capita income.

Education significantly reduces both income and self-rated poverty. Income poverty incidence falls from 77 percent among household heads with no education to around 10 percent for those with completed college, while the parallel self-rated poverty rates decline from 74 to 12 percent. The largest declines in poverty incidence, by either measure, occur with the completion of an education degree (basic, secondary or college).

The profiles of income and self-rated poverty are also very similar when considering employment, demographic and several living conditions indicators. The unemployed, the underemployed, blue collar workers, the self-employed, the indigenous population (proxied by mother tongue) and those with low access to assets and basic services have higher income and self-rated poverty rates.

However, for a few important characteristics, income poverty headcounts depart significantly from subjective poverty rates, suggesting that the former may fail to adequately reflect non-pecuniary aspects of well-being. The self-employed and the Aymara population have subjective poverty rates roughly 15 percentage points lower than their income poverty rates. Quechuas and Aymaras have equal income poverty rates but the latter have lower self-rated poverty. The self-rated incidence of heads outside the labor force is 10 points above their income poverty rate.

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Figure A.1.3.1: Self Rated and Income Poverty Profiles for Bolivia

(Head of Household, 18 Years old and Over)

Education

Employment

Demographics

Living Conditions
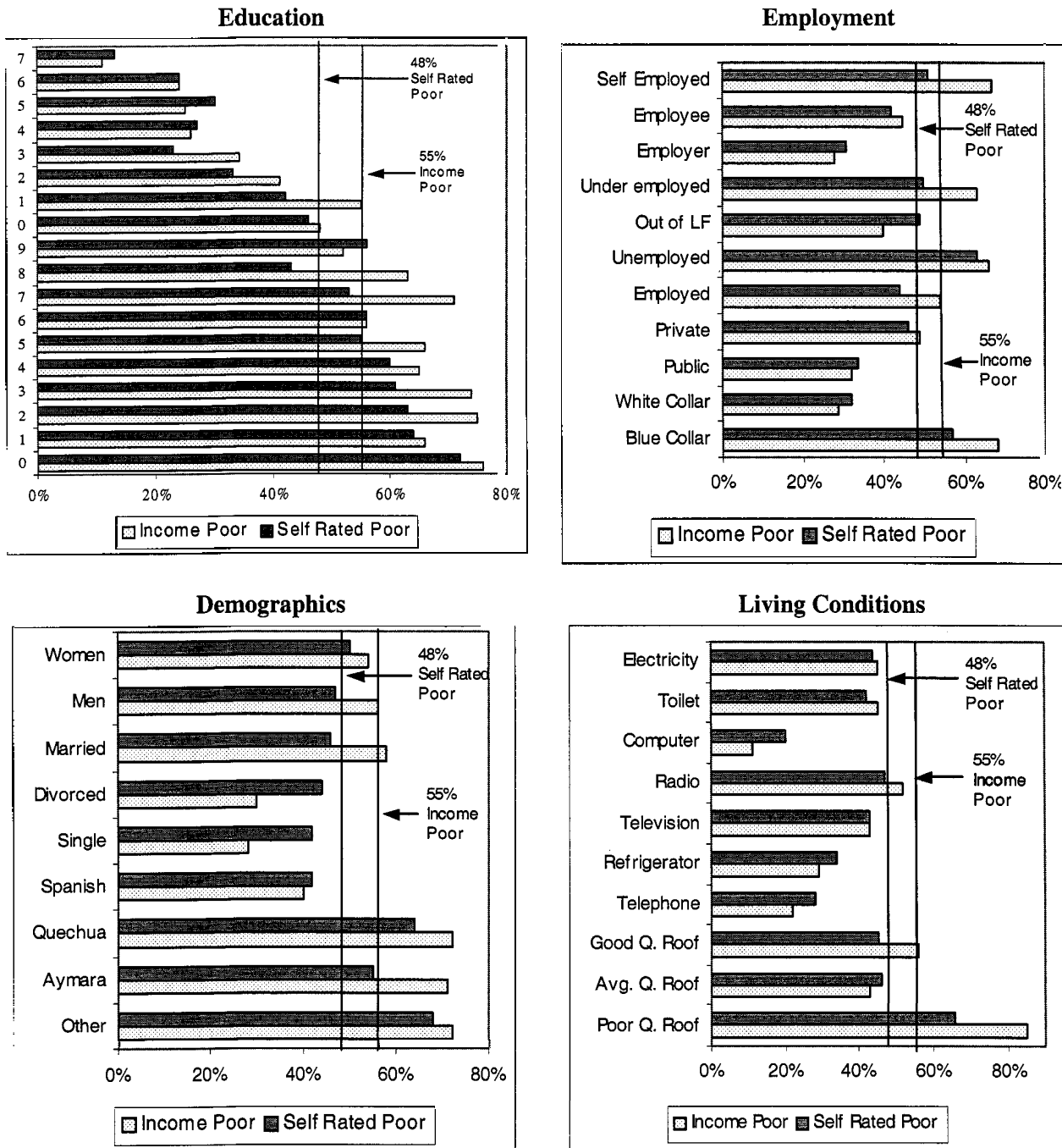
Note: Income poverty measures are based on household income per capita for urban areas and rural per capita expenditures.
Source: Authors' estimates based on 1999 UNDP survey and MECOVI 1999.

Probit regressions are used to isolate the independent effects of these and other variables on both income poverty and subjective poverty perceptions. Table A.1.3.1 presents results, also including as explanatory variables the levels of individual's income and family expenditures, indicators of assets, living conditions, temporary jobs, attendance to public schools, parental education, proxies of social capital, and whether the effects of key variables (e.g., education and employment conditions) vary by ethnicity (columns 3 and 5). Table A.1.3.2 compares results for income and subjective poverty only for variables common to the ENAPD and MECOVI surveys. For comparison purposes, each set of coefficients is normalized (columns 3-4) so that they measure the relative importance of each variable with respect to all explanatory variables (the sign still indicates whether they lower (negative) or increase (positive) poverty). For example, the education coefficients reveal whether education is more important in reducing income poverty than self-rated poverty relative to other explanatory variables.

The results are consistent with a multidimensional notion of poverty in which incomes/consumption represent one particular dimension. They contradict the assertion that self-rated poverty mostly reflects idiosyncratic opinions that bear little systematic relationship to socioeconomic characteristics. Overall, income poverty measures provide a reasonable, albeit imperfect, characterization of welfare (poverty) rankings in Bolivia. Specific results that confirm the findings from simple poverty profiles are worth noting:

The probabilities of being income-poor and of self-rating poor are higher among heads with lower education, of younger age, unemployed or underemployed, in blue-collar occupations, with an indigenous (Quechua or Aymara) heritage, low access to assets and basic services and/or living in rural areas. In many cases the relative importance of these characteristics in explaining income and self-rated poverty is strikingly identical (such as in the case of education) despite the fact that potentially different processes could be behind these poverty classifications.

The small effects of income and expenditures indicate that their impact on subjective welfare mainly operates through factors like education or employment. Significant income compensation is needed to increase the probability that an individual self-rates poor if her socioeconomic characteristics remain unmodified.

Income poverty rankings fail to accurately reveal the relative subjective welfare status of the self-employed, workers outside the labor force, migrants, the indigenous population and region of residence effects. Salaried workers are more likely to self-rate as poor than the self-employed while household heads outside the labor force tend to consider themselves poorer than the employed with similar characteristics, but these rankings differ for income poverty. Migrants are equally likely to self-rate poor but less likely to be income poor than non-migrants.

The discrepancies for ethnicity are distinctively relevant. Bolivian Quechuas tend to self-rate poorer than suggested by income poverty profiles (adjusting for observed characteristics) while the converse is true for Aymaras. The relative importance of education for self-rated poverty is similar along ethnic lines, but the weight of unemployment is double for the indigenous' self-rated poverty.

Table A.1.3.1: Determinants of Self-rated Poverty in Bolivia
(Probit estimates, individuals over 18 years of age)

	Empirical Models				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.043	0.093	0.048	0.050	-0.064
Male	0.022	0.031	0.021	0.031	0.032
Age	-0.004*	-0.003*	-0.004*	-0.004*	-0.001
Household Size	0.015**	0.018*	0.015**	0.015**	0.018*
Married	-0.078**	-0.065**	-0.077**	-0.076**	-0.045
Education	-0.059*	-0.053*	-0.059*	-0.058*	-0.044*
Education x non-indigenous			-0.000		0.001
Mother education	-0.020*	-0.018*	-0.021*	-0.021*	-0.014*
Father education	-0.019*	-0.017*	-0.019*	-0.019*	-0.013*
Public education	0.019	0.000	0.018	0.019	-0.011
Unemployed	0.558*	0.516*	0.902*	0.549*	0.826*
Unemployed x non-indigenous			-0.444**		-.0478**
Out of the Labor Force	0.309*	0.264*	0.308*	0.298*	0.217*
Underemployed	0.138*	0.136*	0.138*	0.144*	0.128*
Employer	-0.274**	-0.179**	-0.275**	-0.275**	-0.167
Employee	0.118*	0.115*	0.121***	0.115*	0.117***
Employee x non-indigenous			-0.006		-0.041
Temporary Employment	0.126*	0.117*	0.117***	0.126*	0.092
Temporary x non-indigenous			0.011		0.012
Blue Collar	0.218*	0.20*	0.22*	0.214*	0.147*
Rural	0.141*	0.095**	0.141*	0.159*	0.004
Non-migrant	0.046	0.041	0.047	0.048	0.044
Quechua	0.218*	0.213*	0.210*	0.217*	0.154**
Aymara	0.134**	0.122**	0.119	0.141**	0.045
Other Indigenous	0.345**	0.344**	0.337**	0.352**	0.280
Income (Bs$1000)		-0.004*			-0.003*
Consumption (Bs$1000)		-0.007*			-0.003**
Community Org.				-0.010	-0.047
Community Org. x non-indigenous					0.012
Political Org.				-0.059	-0.054
Political Org. x non-indigenous					0.001
Economic org.				-0.041	-0.045
Other Org.				-0.042	0.024
Other Org. x non-indigenous					-0.070
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Observations	9018	9018	9018	9018	9018

* Significant at 1%; ** significant at 5%; *** significant at 10%.
Source: Authors' estimates based on ENAPD and MECOVI 1999 household survey data.

Table A.1.3.2: Determinants of Income and Self-Rated Poverty in Bolivia
(Probit Estimates, Head of Household)

	Original Probit coefficients		Normalized coefficients	
	ENAPD	MECOVI	ENAPD	MECOVI
	Self-rated	Income	Self-rated	Income
	(1)	(2)	(3)	(4)
Male	-0.022	0.021	-0.020	0.014
Age	-0.004**	-0.013**	-0.004	-0.009
Household Size	0.007	0.217*	0.006	0.144
Married	-0.050	-0.053	-0.046	-0.035
Education	-0.061*	-0.085*	-0.055	-0.056
Unemployed	0.530*	0.628**	0.481	0.416
Out of the Labor Force	0.142***	-0.136	0.129	-0.090
Underemployed	0.075	0.104	0.068	0.069
Employer	-0.303**	-0.526*	-0.275	-0.348
Employee	0.194*	-0.107	0.176	-0.071
Blue Collar	0.263*	0.494*	0.239	0.327
Rural	0.170*	0.210*	0.154	0.139
Non-migrant	0.043	0.117**	0.039	0.077
Quechua	0.227*	0.087	0.205	0.058
Aymara	0.180**	0.399*	0.163	0.264
Other Indigenous	-0.244	0.180	0.221	0.119
Intercept	0.109	-0.158	0.099	-0.105
Regional Dummies	Yes	Yes	Yes	Yes
Observations	3491	3035		

*Significant at 1%; ** Significant at 5%; ***Significant at 10%
Coefficients in columns 3 and 4 are normalized for comparative purposes, their statistical significance
is similar to the original estimates.
Source: Authors' estimates on ENAPD and MECOVI 1999 household survey data.

The non-monetary benefits associated to settlement decisions are misrepresented by geographic income poverty rankings. In Figure A.1.3.2 the departments are ranked from the income poorest to the least income-poor. Although Chuquisaca is the second income-poorest region its residents self-rate the least poor in the country. The residents of Santa Cruz are equally likely to be income or self-rated poor than those of La Paz controlling for differences in individual characteristics. Residents of rural areas are more likely to be poor than urban inhabitants measured by either income or self-rated poverty. However, rural residents no longer self-rate poorer than urban inhabitants if they have equal socio-economic and living conditions but remain more likely to be income-poor.

The discrepancies in income and subjective poverty rankings may be traced to non-monetary traits that affect the well-being of these groups. These include exclusion and/or cultural factors (e.g., sense of empowerment or identity) as well as location-specific characteristics (e.g., inequality, social capital, crime) all of which may have meaningful effects on Bolivians' poverty perceptions.

This section sheds light on whether different segments of the population place different priorities on observed characteristics as a means out of poverty. Determinants of income and welfare not captured in household surveys (such as unobserved skills, education quality, labor market connections, personal attitudes) lead to differences in individuals' intrinsic propensity to self-rate poor. This in turn may affect the weight attached to observed characteristics in self-ratings of poverty.

In fact the findings point to important differences in the way measured socioeconomic characteristics are weighted by individuals in their self-ratings of poverty. The results are shown in Figure A.1.3.3 which shows the relative weights (vertical axis) of the various poverty determinants for individuals with high (e.g., quantiles 0.3 to 0.5) to low (e.g., quantiles 0.7 to 0.8) conditional probabilities of self-rating poor (horizontal axis). The horizontal line represents the average relative weight. For many characteristics the weights increase or decline with the conditional probabilities of self-rated poverty. Thus, the relative importance of poverty determinants varies significantly among individuals depending on how likely they are to self-rate as poor.

Figure A.1.3.2: Impact of Region of Residence on Income and Self-Rated Poverty (Probit Estimates)

Note: La Paz is the omitted region. Coefficients measure the relative importance of regional effects with respect to all explanatory variables.
Source: Authors' estimates based on household survey data.

Specifically, factors that help people move out of poverty (such as own and parental education or getting a job) are more effective (the weights decline in absolute value with higher probabilities of self-rating as poor) precisely among Bolivians who are more likely to self-rate as poor given their observed characteristics. Chiefly, education is less effective in reducing self-rated poverty of individuals for whom non-observed factors play a bigger role in their poverty perceptions. Meanwhile the effect of unemployment is stronger at higher conditional probabilities of self-rated poverty, that is, it matters relatively more for Bolivians more prone to self-classify as poor.

Among other results, the relative effect of rural residence increases systematically, becoming less noticeable among individuals who are more likely to consider themselves poor given their other observed characteristics. Meanwhile, having a Quechua heritage increases self-rated poverty (relative to non-indigenous) the same way regardless of non-observed determinants of welfare.

These differences in the formation of poverty perceptions are important considerations for public policy. Despite not being directly tangible, many of the unobserved factors driving them are amenable to policy interventions. For example, early skills development, education quality and labor market connections are key for income and welfare more generally. Other

cultural and idiosyncratic factors are difficult to quantify let alone influence by policy. Yet ascertaining their role is important to attune public policy priorities with the revealed priorities of its target population.

Figure A.1.3.3: Effect of Socioeconomic Characteristics on Self-Rated Poverty Binary Quantile Estimates (relative weights)
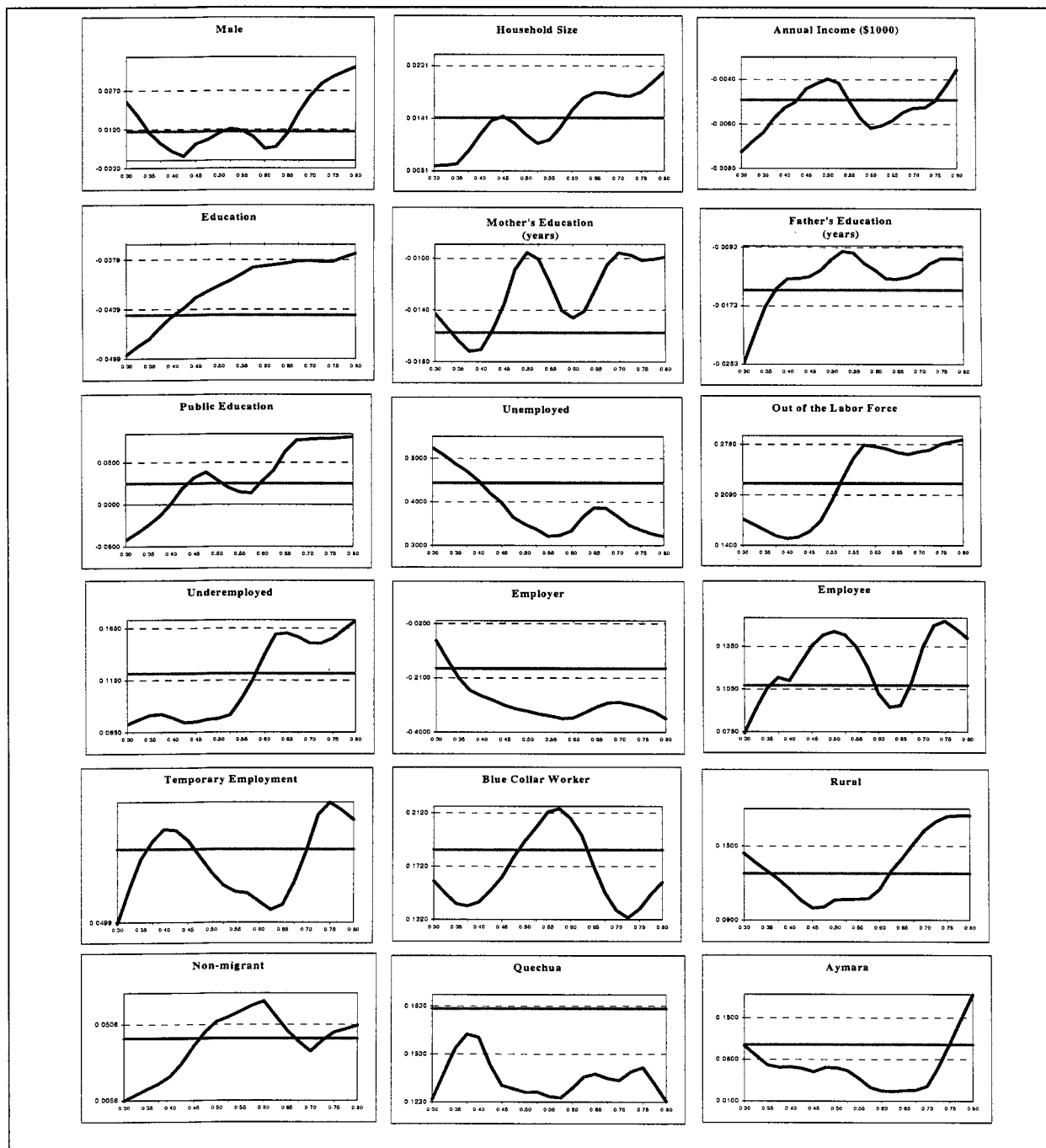
Note: Coefficients have been normalized (norm 1) so that they measure the relative importance of each variable w.r.t. all the explanatory variables.
Source: Authors' estimates based on microdata from household surveys.

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Annex 2.1 Technical Annex on Determinants of Growth

Table A.2.1.1: Determinants of Differences in Per Capita GDP Growth in the 1990s Bolivia with respect to Top LAC Performers

	Actual Difference	Projected Difference	Transitional Convergence	Cyclical Reversion	Structural Policies	Stabilization Policies	External Conditions	Country-Specific Effect
Chile	-3.46	-2.82	1.82	-0.18	-2.83	0.01	-0.11	-1.53
Argentina	-2.18	-1.45	1.92	-1.10	-0.81	1.19	-0.25	-2.4
Costa Rica	-1.95	-1.12	1.28	-0.06	-0.7	0.1	-0.24	-1.51
Panama	-1.26	-1.21	1.05	-0.16	-1.85	-0.17	-0.22	0.14
Colombia	0.82	-0.83	1.17	0.04	-1.03	-0.16	-0.15	-0.7
Peru	-0.79	-0.28	0.39	-0.46	-0.49	1.15	0.03	-0.9

Source: Based on Loayza, Fajnzylber and Calderon, 2002.

Table A.2.1.2: Determinants of Growth between 10 year Periods, Bolivia, 1970s-1990s

	1990s versus 1980s	1980s versus 1970s
Transitional Convergence	0.11	0.02
Cyclical Reversion	-0.02	-0.56
Structural Policies	1.34	0.38
Stabilization Policies	1.70	-1.53
External Conditions	-0.59	-1.09
Actual Change	3.49	-3.62
Projected Change	2.54	-2.77

Source: Based on Loayza, Fajnzylber and Calderon, 2002.

ANNEX 2.2 Explaining Changes in Income Distribution

Microeconometric simulations of counterfactual distributions are helpful to characterize past distributional changes and to simulate the distributional impact of changes in economic factors and public policies. The idea is to simulate the distribution of labor income at time t as a function of individual observable characteristics affecting wages and employment, the parameters that determine the effect of these characteristics on market hourly wages and employment outcomes (participation and hours of work), and unobservable characteristics. A counterfactual distribution in time t1 is generated taking some of its determinants (parameters or distribution of characteristics) as if they were those of time t2 and this counterfactual distribution is then compared to the actual distribution observed in t1. The difference between the two distributions can be attributed to the change in the selected determinants between t1 and t2. This allows to isolate the contribution of changes in: (i) observed household characteristics (endowments), (ii) the returns to those endowments, and (iii) unobserved heterogeneity in the returns.

Gasparini et al. (2004) estimate regressions for a reduced form of a labor supply model with two equations, one for the number of hours of work and one for wages. The explanatory variables include the typical measures of workers' human capital (education and experience, proxied by age and its square), demographic characteristics such as gender and ethnicity, job characteristics (sector of activity and labor-informality indicators), and geographical location. The earnings equations are estimated separately for household heads and non-heads, both in rural and urban areas. The simulations are carried out for the periods 1993-97 and 1997-2002 and focus on the effects of changes in the educational structure, the returns to education, the gender and regional earnings gaps, and unobserved earnings determinants.

The decomposition analysis is enriched with estimates of quantile earnings equations, (see below) which are used to generate counterfactual distributions when the whole family of returns to education (varying across quantiles) change or for changes in each of the return quantile coefficients. This procedure may provide a richer characterization of past and predicted changes in the income distribution generated by economic and social changes or policy interventions. Particularly, when simulating changes in the educational structure, we can simulate the new individual wage from upgrading education according to the wage-education profile of the particular percentile to which the individual belongs. See Gasparini et al. (2004) for details.

Table A.2.2.1: Decomposition of Changes in Income Distribution in Bolivia, 1993-2002

Independent Contributions to Changes in the Gini coefficient					
Model 1		Model 2		Model 3	
A. 1993-1997 (main cities) Hourly earnings	Equivalized income	Hourly earnings	Equivalized income	Hourly earnings	Equivalized income
Observed 1993-1997 -0.3	0.8	-0.3	0.8	-0.3	0.8
Returns					
Education - wages -1.0	-1.0	-1.8	-1.6	-1.5	-1.3
Education - hours	0.5		0.4		0.5
Gender -0.2	0.0	-0.6	0.0	-0.5	0.1
Unobservables 3.9	2.7	3.6	2.7	3.7	2.9
Regions 0.2	-0.6	0.0	-0.2	-0.1	-0.3
Educational structure 0.4	0.4	-0.7	-0.3	-0.1	0.3

Model 1		Model 2		Model 3	
B. 1997-2002 (urban areas) Hourly earnings	Equivalized income	Hourly earnings	Equivalized income	Hourly earnings	Equivalized income
Observed 1997-2002 2.0	1.5	2.0	1.5	2.0	1.5
Returns					
Education - wages 0.2	0.3	0.9	0.9	0.7	0.7
Education - hours	0.3		0.2		0.4
Gender 0.2	0.0	0.3	0.1	0.3	0.1
Unobservables 3.0	2.2	2.9	2.3	3.0	2.3
Regions -0.2	-0.6	-0.2	-1.0	-0.2	-1.0
Educational structure 1.0	1.5	0.5	0.9	0.3	0.9

Model 1		Model 2		Model 3	
C. 1997-2002 (rural areas) Hourly earnings	Equivalized income	Hourly earnings	Equivalized income	Hourly earnings	Equivalized income
Observed 1997-2002 -5.8	-3.7	-5.8	-3.7	-5.8	-3.7
Returns					
Education - wages 0.0	-0.1	0.0	-0.2	-0.1	-0.1
Education - hours	0.4		0.3		0.4
Gender 0.0	0.1	-0.2	0.2	-0.1	0.2
Unobservables 1.9	1.1	1.3	0.7	1.4	0.8
Regions -1.1	-2.1	-1.6	-2.3	-1.6	-2.3
Educational structure 0.3	0.0	-1.4	-0.3	-0.9	-0.4

A Primer on Quantile Regressions

The technique of quantile regression (Koenker and Basset (1978)) is used extensively in the background studies for this report since it provides a richer characterization of the effect of the explanatory variables (X) on the conditional distribution of the dependent variable (e.g., the distribution of earnings, of firm size). When there is sizeable unobserved heterogeneity in the data, mean linear regression models provide only a limited characterization of this distribution and of the role of explanatory factors. This is probably the case in a heterogeneous country like Bolivia specially given the limitations of existing surveys. For example, we can estimate regression lines for various percentiles of the adjusted (conditional) wage distribution (the distribution of earnings that results if all workers had the same observable characteristics). For

instance, median regression (the 50th quantile) splits the sample in half (half of the residuals above and below the regression line) and gives the same results as Ordinary Least Squares (OLS, mean regression) when the wage distribution is symmetric. This allows unobserved wage determinants to interact with measures of observed skills. This interaction is captured by regression coefficients that vary across percentiles of the adjusted wage distribution. This way we can recover different impacts of the explanatory variables throughout the entire distribution without imposing any prior assumptions, such as normality or constant variance of regression errors. Results are also robust to outliers in the wage data.

Suppose that X is a dummy variable for gender (women=1), the quantile regression coefficient measures the gender wage gap between woman and an otherwise similar man (e.g., same education and experience) at the same conditional quantile of the wage distribution. For example, the coefficient in the 90th percentile would yield the wage disadvantage faced by women in the top10 percent best paid jobs of any given level of observed skills while the 10th percentile coefficient yields the gap for women in the bottom 10 percent of jobs of the earnings scale. Now suppose that X consists of years of formal education. OLS provides a single estimate of the returns to education, the average for the whole population. Individual returns to education, however, may depend on some unobservable factors, like education quality, unmeasured skills, or labor market connections, and hence may differ across workers (Figure A.2.2.1A). In fact, recent studies for several countries suggest that returns are higher for workers at the top of the distribution. Moreover, it is possible for the returns to education to increase for workers in the upper quantiles of the wage distribution and decline for those in the bottom quantiles, leaving the average return unchanged (Figure A.2.2.1B). Quantile regressions allow assessing these important potential differences.

Figure A.2.2.1A: Differences in Returns to Education
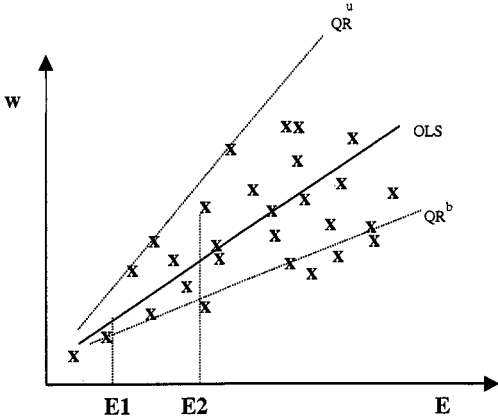
Figure A.2.2.1.B: Different Changes in Returns Over Time
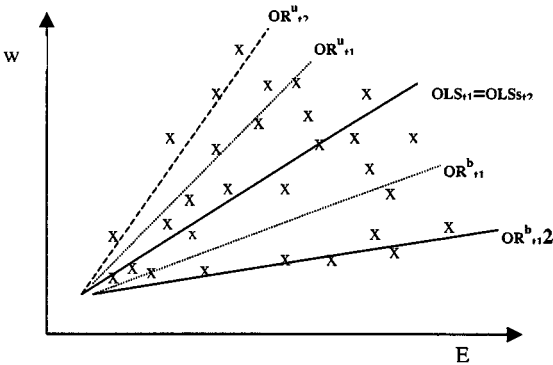
Annex 3.1 Manufacturing Firm Surveys

<u>FACS</u>

The Firm Analysis and Competitiveness Survey (FACS) 2000, conducted by INE and the World Bank, analyzes the micro constraints to the growth of manufacturing firms in Bolivia. It relies principally on objective, quantitative measures of a broad range of firm characteristics and problems affecting firms, such as capacity utilization (domestic markets, exports), sector, location, investment, sources of finance (credit collateral, debt exchange risk), labor productivity, operational costs (supply chains, inventory levels, cost of labor, infrastructure), and relations with government (taxation, licenses and permits, trade regulations, judiciary). A companion study identifies the compliance costs and legal requirements for informal firms and micro enterprises (less than five employees) to start and run a business.

The survey covers a random sample of 659 formal manufacturing firms in the *departamentos* of La Paz, Cochabamba and Santa Cruz that represent about 40 percent of the number of manufacturing firms in the country (85 percent weighted by employment). Almost half of the f sample are small (4 to 14 employees) and only 14 percent have over 100 employees. Informal firms and micro enterprises are not included, since they rarely keep accounts and are difficult to locate for sampling.

<u>The Annual Survey of Manufacturing Activity</u>

Since the late 1980s, INE conducts an annual survey to measure basic characteristics of manufacturing activities (*Encuesta de Establecimientos en la Actividad Manufacturera, EEAM*). The survey consists of establishment data related to the gross value of production, value added, intermediate consumption, sales, primary good inputs and electricity, level of employment, salaries, taxes, and fixed assets. It has national coverage with the exception of the *departamento* of Pando. The data is collected as part of the firms' accounting exercise (from April 1 to March 31 of the next year). Manufacturing firms are classified according to seven types of activities: food, beverages and tobacco, textiles and clothing, wood and wooden products, petroleum derived products, non-metallic mineral products and other industries. Firms in this sector are also categorized by size into three groups (excluding family and micro enterprises): firms with less than 14, between 15 and 49, and over 50 employees. The survey is conducted in all firms with five or more employees. All firms are classified into Forced Inclusion (IF), that is, firms with more than 15 employees; and Sample Inclusion (SI), firms with more than five and less than 14 employees. The survey covers between 1,500 and 1,600 firms annually from both the IF and SI groups, of which approximately two thirds are small enterprises.

It is possible to construct a panel data set since firms are surveyed every year. The panel is constructed using five surveys for the period (the only ones comparable due to changes in survey design) with firms for which data was gathered for two or more years. For firms with incomplete data (such as capital, value added, and employment), estimates were made based on other available data for the same firm. Since controls were not firmly implemented, it is difficult to differentiate firms that have exited the market from those that dropped out of the sample, a problem most evident among SI firms. The panel is comprised of between 650 and 850 firms, half of which are small enterprises. The number of medium enterprises is slightly greater than that of larger firms each year. Around 50 percent of firms remained stable in the sample over the period. Larger firms exhibit a lower rate of attrition than SMEs, and are thus slightly over

represented in the sample. Overall, the data is believed to offer a good representation of the economic activity and employment dynamics of the formal manufacturing sector in Bolivia.

ANNEX 3.2 Estimating Rates of Creation, Turnover and Reallocation of Employment

The methodology decomposes net changes in employment into the absolute creation and destruction that occurs between two points in time, resulting in the reallocation of workers across different industrial activities. The creation of employment of firm i is positive if the level of employment grows between t-1 and t, while the rate of destruction is positive if employment falls. The rate of net growth of employment between t-1 and t for firm i is then:

$$Net_{it} = 2\frac{E_{it} - E_{it-1}}{E_{it} + E_{it-1}}$$

where E is the level of employment of the firm in time t.

The gross creation of employment (sum of all the new jobs generated across firms between t-1 and t) is measured as:

$$C_t = \sum \phi_{it}^e \ \max(Net_{it}, 0)$$

The gross destruction of employment (sum of all the job losses between t-1 and t) is:

$$D_t = \sum \phi_{it}^e \ \min(Net_{it}, 0)$$

The difference between Ct and Dt yields the net creation rate in the sector over the period. The weight each firm receives is the average of its employment levels during a given period. The rate of employment reallocation, which measures the total reallocation of employment among workers, is the sum of the rates of creation and destruction.

Landa and Jimenez (2004c) estimated a standard production function (Cobb-Douglas) relating firm's output (VAT) with the quantities of unskilled (Lu) and skilled (Ls) labor, and capital (K) factors, a set of characteristics related to the firm (Z), time effects (T) common to all firms, and an error component (ε):

$$\ln VAT = \alpha + \beta_1 \ln K + \beta_2 \ln Ls + \beta_3 \ln Lu + T + \varepsilon$$

where the coefficients β are the output elasticities of each production factor. To measure firm's efficiency they estimate a production frontier (the maximum output obtained given the observed levels of input utilization) modeling the error term with a symmetric component (u) that captures non-observable aspects as well as measurements errors, and a non-symmetric component (v) that captures technical inefficiency, i.e., the distance between a firm's actual production and its production frontier. Technical inefficiency occurs when the output of the firm is below its production frontier, and is measured comparing each firm's actual output level with that predicted by the model. Another common inefficiency measure is the ratio of the standard deviation of v and u, that is: $\lambda = \sigma_v / \sigma_u$, which compares the variation in the inefficiency under the control of the firm with external sources of output variation. The sources of inefficiency include obsolete technology, low quality of inputs, and poor management and organizational skills.

Capital K is measured as the value of the stock of fixed capital in the current period, including the value of machinery and other firm's fixed assets. Skilled labor is the number of firm's managers and white-collar workers. Unskilled labor is the number of workers in blue-collar occupations and low wage temporary workers, excluding non-remunerated family members. The model controls for the firm's age, the use of intermediate inputs (electricity and water) as a proxy of capacity utilization, subsector, time and regional effects. The models are estimated through maximum likelihood with random effects, and invariable time.

ANNEX 3.3 Productivity and Technical Efficiency in Bolivian Manufacturing

Employment creation is ultimately linked to firms' economic performance. Firms choose the quantities of inputs they use (including labor) to minimize the cost of producing a given level of output. Thus, the rate of utilization and mix of inputs depends on their contribution to the generation of output (measured by output elasticities) and their costs. In a competitive market (i.e., with no distortions on price determination) a firm would utilize more those inputs with the highest output elasticity and/or lower cost. These relationships are summarized by firms' production and cost functions. In a background study for this report Landa and Jimenez (2004c) obtained estimates of the output elasticities with respect to capital, skilled and unskilled labor in Bolivia's manufacturing sector using the 1995-99 EEAM panel data (Box A.3.3.1).

Box A.3.3.1: Measuring Firm Productivity and Technical Efficiency

Landa and Jimenez (2004c) estimated a standard production function (Cobb-Douglas) relating firm's output (VAT) with the quantities of unskilled (Lu) and skilled (Ls) labor, and capital (K) factors, a set of characteristics related to the firm (Z), time effects (T) common to all firms, and an error component (ε):

$$\ln VAT = \alpha + \beta_1 \ln K + \beta_2 \ln Ls + \beta_3 \ln Lu + T + \varepsilon$$

where the coefficients β are the output elasticities of each production factor. To measure firm's efficiency they estimate a production frontier (the maximum output obtained given the observed levels of input utilization) modeling the error term with a symmetric component (u) that captures non-observable aspects as well as measurements errors, and a non-symmetric component (v) that captures technical inefficiency, i.e., the distance between a firm's actual production and its production frontier. Technical inefficiency occurs when the output of the firm is below its production frontier, and is measured comparing each firm's actual output level with that predicted by the model. Another common inefficiency measure is the ratio of the standard deviation of v and u, that is: $\lambda = \sigma_v / \sigma_u$, which compares the variation in the inefficiency under the control of the firm with external sources of output variation. The sources of inefficiency include obsolete technology, low quality of inputs, and poor management and organizational skills.

Capital K is measured as the value of the stock of fixed capital in the current period, including the value of machinery and other firm's fixed assets. Skilled labor is the number of firm's managers and white-collar workers. Unskilled labor is the number of workers in blue-collar occupations and low wage temporary workers, excluding non-remunerated family members. The model controls for the firm's age, the use of intermediate inputs (electricity and water) as a proxy of capacity utilization, subsector, time and regional effects. The models are estimated through maximum likelihood with random effects, and invariable time.

The results can be used to: i) assess the role of economic fundamentals, such as large differences in factor marginal productivity, in the utilization rates and degree of substitution of unskilled labor with respect to skilled labor and capital. That is, the extent to which manufacturing production processes (technologies) in Bolivia are biased against or in favor of the generation of unskilled jobs; ii) which subsectors are more likely to generate more labor-intensive growth; and, iii) estimate the levels of efficiency (or total productivity) with which manufacturing firms operate.

The overall results are reported in Table A.3.3.1. The empirical models control for the age of the firm, a proxy for its capacity utilization (use of energy and water), subsector and year effects. For Figure A.3.3.1 the models are also estimated by subsector. The coefficients for

capital, and unskilled and skilled labor are the factor output elasticities that measure the increase in output that could be derived from a 1 percent increase in each of these inputs. For example, the 0.359 overall capital elasticity (in the preferred specification, col. 3) indicates that on average a 10 percent increase in the quantity of capital would raise manufacturing output by 3.4 percent. The results can be summarized as follows:

- The output elasticity of capital is higher than for labor, so that, on average, its expansion leads to higher increases in manufacturing output compared to labor. This reflects the relative scarcity and high cost of capital in Bolivia.

- Manufacturing growth in labor intensive sectors would tend to favor the creation of unskilled jobs. This follows from the result that the output elasticities are essentially similar for unskilled (0.24) and skilled labor (0.28). Since wages are higher for skilled workers this means that manufacturing expansion would tend to use unskilled workers more intensively.

- Growth would tend to be more unskilled labor intensive in the beverages and textiles sectors (elasticities of 0.65 and 0.45) and more capital intensive in mining and wood production (capital elasticities of 0.63 and 0.46). The skilled labor elasticity is higher than the unskilled only in food (0.39) and mining (0.26) but only in the latter is the marginal productivity difference likely to result in relatively more skilled growth.

- The sectoral differences in factor elasticities is consistent with the expected high degree of substitution between capital and unskilled labor, moderate substitution between labor types, and little complementarity of skilled labor to capital.[1] The correlation coefficient of the factor elasticities across sectors are -0.65 for capital and unskilled labor, -0.45 for unskilled and skilled labor, and -0.28 for capital and skilled labor.

- In fact, younger firms tend to reach higher levels of output for the same level of input utilization than older firms. Eventually older firms appear to be more productive but seemingly after a long time (45 years according to the quadratic estimates).

- There is significant room for expanding manufacturing output by a more intensive use of the installed capacity of firms. A 10 percent increase in the capacity utilization rate, proxied by the use of the intermediate inputs energy and water, would expand output by 1.9 percent.

- Firms located in the lowlands, in the petroleum, wooden products and/or other industries sectors, reach a higher level of output for the same level of input utilization. This maybe reflecting differences in market conditions and aspects of the business environment that favor the operations of these firms.

- There were no significant overall productivity gains in manufacturing during the period. The 1999 crisis hit the sector hard with a 10 percent drop in the level of output of firms in the sample, keeping the level of input and capacity utilization constant.

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1. The proper assessment of the degree of complementarity between inputs should rely on cross-elasticities of input use, which were not estimated here.

Table A.3.3.1: Estimates of the Production Function in Manufacturing (Maximum Likelihood and Random Effects Estimates)

Dependent Variable lnValue Added	(1)	(2)	(3)
Log Capital	0.420**	0.357**	0.359**
Log Skilled Labor	0.289**	0.244**	0.243**
Log Unskilled Labor	0.321**	0.267**	0.281**
Age		-0.012**	-0.009*
Age Squared		0.000*	0.000*
Log Water and Energy		0.189**	0.190**
Beverage and Tobacco			0.203
Textiles			-0.069
Wood Products			0.335**
Petroleum			0.562**
Mineral			-0.142
Other			0.322**
Valleys			-0.017
Lowlands			0.143*
1996			-0.008
1997			0.023
1998			-0.006
1999			-0.102**
Constant	6.040**	5.440**	5.122**
σ_e	0.514**	0.470**	0.468**
σ_u	0.742**	0.705**	0.660**
Observations	3106	2745	2743
Number of Firms	969	787	787

Note: Omitted categories are food, highlands, and 1995.
* Significant at 5%; ** significant at 1%.
Source: Authors' estimates based on EEAM.

Figure A.3.3.1: Factor Elasticities in the Bolivian Manufacturing Sector
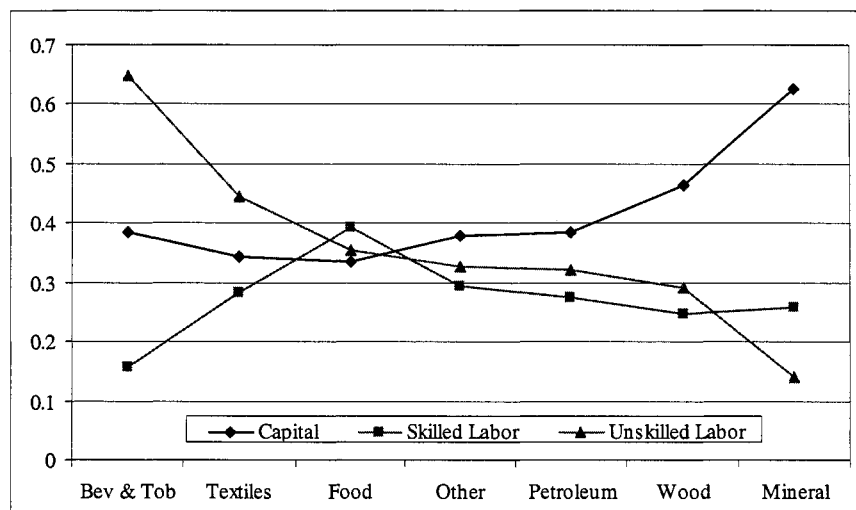
It is important to emphasize that the above results are not an assessment of the overall capacity for job creation (in absolute number) of manufacturing compared to other sectors of the economy or between different subsectors in manufacturing. The results refer to the relationship between *marginal* changes in output and input utilization *within* manufacturing or each subsector. How many jobs are created in the economy depends on the capital/labor ratio in manufacturing (each subsector) and on the spillover effects on the rest of the economy that is on the indirect generation of jobs. For example, the expansion of mining and wood production would tend to generate fewer direct jobs per unit of additional output (or new capital investments) in these subsectors.

The results of Landa and Jimenez (2004c) also point to low levels of efficiency of manufacturing firms in Bolivia, with considerable variation across firms. A large fraction of firms operate below the level of output expected given their level of input and capacity utilization, age, location and sector of operation (ie., below the optimal production frontier as defined by best performers). Inefficiency seems pervasive and bears little relationship with firm size, age and subsector. Beverages and tobacco and petroleum production present the lower levels and within-sector variation in efficiency.

Altogether the results suggest that Bolivian manufacturing firms have not been adapting modern technologies and that, in fact, many older ones may have become obsolete. The relative indifference in the use of skilled or unskilled labor (aside from their relative cost) is symptomatic of production processes that do not make intensive use of information technologies and very little innovation. The apparent inability of firms to capitalize productivity gains as they mature may reflect their little incentives to innovate faced with a high cost environment, limited sales and credit markets, and institutional constraints to the entry-exit process. The failure to adopt new technology or management changes hampers their ability of reaching the optimal production frontier.

ANNEX 3.4 The Demand for Labor

This section expands the previous results with a consideration of the (direct) cost of labor (real wages) in assessing the response of manufacturing employment to changes in economic conditions. This analysis is based on the estimates of demand equations for unskilled labor in the Bolivian manufacturing sector (Box A.3.4.1). The latter summarize the main parameters characterizing the dynamics of employment, including the response to changes in real wages (given by the own wage-employment elasticity) and the path of employment in response to shocks (captured by the lag employment term) and output expansions (given by the output-employment coefficients).

These relationships are important to assess the impact of a variety of policies on employment. The wage elasticity is of course key to assess the likely employment impact of measures that increase or reduce the cost of labor such as changes in minimum wages and non-labor costs (payroll taxes, pension benefits). Meanwhile, faster employment adjustments (to, say, an increase in the final demand for products, inputs scarcity or an external shock) imply fewer frictions for Bolivian workers and firms while they transition to the new equilibrium. The speed of adjustment of employment to shocks is affected by several factors including adjustment costs (constrained capital markets, firing/hiring regulations, supply bottlenecks), macroeconomic volatility (real exchange depreciation, external shocks) and the degree of competition in the industry (the less competition the slower the adjustment).

Box A.3.4.1: Estimating Manufacturing Labor Demand

The study by Landa and Jimenez (2004c) estimates a standard labor demand equation for unskilled labor (derived from the equilibrium equalization of the marginal productivity of labor with the real wage):

$$l_{i,t} = \lambda l_{i,t-1} + \gamma_1 w_{i,t} - \gamma_2 w_{i,t-1} + \gamma_3 VA_{i,t} + \gamma_4 VA_{i,t-1} + \mu_t + \mu_i + \xi_{it}$$

where ($l_{i,t}$) is the number of unskilled workers at time t (excluding managers and white collars) is specified as a function of employment in the previous period, the current and past levels of real wages and output, time varying and firms fixed effects, and an error term. The lagged values capture the fact that firms do not react immediately to wage and output shocks due to adjustment costs, while the time effects proxy unexpected fluctuations in demand common to all firms, and firm specific fixed effects capture factors affecting labor demand that are specific to each firm (e.g., its managerial capacity).

Following the recent literature three estimation methods are used, including the preferred Arellano and Bond (1991)'s Generalized Method of Moments (GMM) instrumental variables (IV), based on the orthogonality between the lag dependent variable and the error term to estimate the differenced equation:

$$\Delta l_{i,t} = \lambda \Delta l_{i,t-1} + \gamma_1 \Delta w_{i,t} - \gamma_2 \Delta w_{i,t-1} + \gamma_3 \Delta VA_{i,t} + \gamma_4 \Delta VA_{i,t-1} + \Delta \mu_t + \Delta \xi_{it}$$

Where Δ is the difference operator and the new error term is not correlated with the lag dependent variable. All variables are assumed exogenous except for lag employment which is instrumented using its second difference lags. The output variable could not be instrumented with the data available in the short panel.

Table A.3.4.1 presents the main results, including the long run own wage elasticity of unskilled employment, which takes into account the dynamic adjustment in employment as a result of a change in wages, and the speed of adjustment in employment measured as the number

of years traversed before employment reaches half the level of its new equilibrium value. Column 3 shows the results which according to statistical tests represent the labor demand function more adequately (Landa and Jimenez, 2004c). The main results can be summarized as follows:

- Firms and workers face a relatively high long run trade-off between higher wages and increasing unskilled employment. The long run demand wage elasticity for unskilled labor is –0.64 so that for every 10 percent increase in real wages labor demand declines in 6.4 percent (keeping output constant). This is twice as high as the average international cross-country estimate of –0.3 (Hamermesh, 2003) and on the high end of estimates for other Latin American countries, for example, Brazil (-0.4), Chile (-0.37), Colombia (-0.49), Mexico (-0.2), Peru (-0.2), and Uruguay (-0.69). The short run elasticity (sum of 2nd-3rd rows in Table 3.3) is half as big and lies within the middle range of recent estimates for some of these countries. Moreover, although the estimated elasticity does not account for the indirect cost of labor (e.g., mandated benefits) evidence for other countries show that the elasticity of these labor cost components can be as high as the own wage employment elasticities (Saavedra and Torero, 2000; Mondino and Montoya, 2000).

Table A.3.4.1: Estimates of Manufacturing Unskilled Labor Demand in Bolivia

Log Employment	(1) OLS	(2) Within Groups	(3) (Preferred) GMM differences
Log L_{t-1}	0.806	0.040	0.584
	(-27.128)	(-0.527)	(-2.565)
Log W_t	-0.223	-0.191	-0.307
	(3.566)	(3.359)	(2.378)
Log W_{t-1}	0.112	-0.011	0.043
	(-2.414)	(0.307)	(-0.793)
Log VA_t	0.234	0.238	0.196
	(-7.024)	(-7.613)	(-3.926)
Log VA_{t-1}	-0.107	0.074	-0.022
	(3.497)	(-2.578)	(0.415)
Year dummies	Yes	Yes	Yes
Long run wage elasticity	-0.572	-0.210	-0.635
Employment Adjustment (half-life)	3.21	0.22	1.29
Observations	1232	1232	924

Note: The long run own wage elasticity of employment is obtained as the sum of the short term elasticity coefficients (2nd and 3rd rows), divided by one minus the coefficient on lag employment (λ, 1st row). The coefficient of "half life" adjustment in the level of employment is computed as $\ln(.5)/\ln(\lambda)$. T-statistics in parentheses are robust to the presence of heteroscedasticity. Specification tests (2nd order auto-correlation, J-Hansen) support the results of Column 3 as the correct specification

Source: Authors' estimates based on manufacturing survey data

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- Employment tends to adjust slowly in response to cost or output shocks. The estimated (half-life) speed of adjustment of labor demand is 1.3 years which again is above international estimates (half a year) but aligned with those for Latin America (1 year in Brazil, 1.2 years in Chile, 0.4 years in Colombia, 0.8 years in Mexico, 1.3 years in Peru, 1.5 years in Uruguay). This suggests that deviations from firms' desired employment levels are relatively persistent so that it takes a relatively long time before fluctuations in the demand for labor adjust to changes in economic conditions.

- The long-term response of employment to changes in output seems low although it is not inconsistent with constant economies of scale. The long run employment-output elasticity is 0.47, implying that a 10 percent increase in long term manufacturing output results in an increase of 4.7 percent in unskilled employment. However, the estimated long term elasticity coefficient is not statistically different from 1 so that constant returns to scale could be describing the characteristics of manufacturing production. This would be more consistent with the previous findings of significant inefficiencies of firms in the sector.

- Firms rely on past employment decisions to adjust their labor demand. The dynamics of labor demand is dominated by the inertial employment component so that past changes in wages and output do not have an independent effect on current employment levels. This behavior is consistent with the presence of idle capacity in which case employers can utilize the existing labor force more (less) intensely (each hour) in response to an increase in output demand (wages). Moreover, the *de facto* flexibility in the labor market (given the high level of informality) and weak labor unions make past wage changes less relevant to the determination of present labor demand beyond their effect on past employment levels.

Altogether the results suggest that Bolivia's manufacturing employment is quite flexible with respect to changes in wages but adjusts slowly in response to shocks. One key implication is that policies that increase the cost of labor (e.g., increase in the minimum wage or a rise in non-labor costs) beyond its marginal productivity could have a high cost in terms of reduced overall employment. Policy actions that aim to reduce excessive non-labor costs (payroll taxes), described in the last section of this chapter, could have a positive impact on long run employment levels.

With respect to the slow speed of employment adjustment several of the explanatory factors noted above are relevant for Bolivia. Underdeveloped financial markets, volatile terms of trade and external capital, stringent labor regulations, and barriers to entry in the formal manufacturing sector, all likely conspire to lower the grease in the wheels of Bolivian's manufacturing labor demand. In particular, the deterioration of terms of trade, stop of capital flows and liability dollarization since the late 1990s has likely severely constrained the ability of manufacturing firms to undertake productive endeavors and expand employment in fuller speed. This contributes to the low levels of capacity utilization which in turn leads firms to first adjust hours of work before taking on new hires. Barriers to entry coupled with the disincentives of high non-labor costs increase the costs of employment adjustments for formal manufacturing firms although, as noted before, also lead many firms to join the informal sector. The latter means that the *de facto* regulations are in effect less binding than the *de jure* regulations so that

the speed of adjustment of total manufacturing employment (including informal microenterprises) and the labor market overall is likely higher. However, as we saw in chapter 3, in many cases this means that unemployment is masked as underemployment in the lower tier of the informal sector.

The EEAM panel data does not allow examining some of these hypotheses directly since it contains limited data on firm characteristics and lacks variables on the investment climate. In the final section of this chapter we use the FACS survey to examine more systematically the effect of micro constraints faced by manufacturing firms on two aspects of job creation: capacity utilization rates and the distribution of firm size.

ANNEX 3.5 Explaining The Constraints to Capacity Utilization and Firm Size

The companion study by Muñoz, Palma and Arias (2004) characterizes factors affecting the distributions of firm size and CU of distinct groups of firms with special attention to firms located at the bottom quantiles of the conditional distributions of size and CU, firms with sizes or CU that are lower than predicted by their firm-specific characteristics, and measured business environment. The standard regression's focus on "average" firms may obscure the particular conditions that affect these firms. Key determinants and key micro constraints to CU and firm size growth may differ for firms at different points of the conditional distributions of CU and size. The study estimates simultaneously regressions for the 10 percent, 25 percent, 50 percent, 75 percent and 90 percent quantiles of the distributions of size and CU using the cross-sectional data from the 2000 FACS survey. It explores 50 different explanatory variables that the theory suggests could be important determinants of firm size and/or CU. The variables considered include firm characteristics (age, sector, FDI, capital intensity); operational costs (costs of materials, labor, capital); limited demand and level of competition (undeveloped markets, access to exports, type of competition); limited investment and sources of finance (research and development, sources of credit, defaults, collateral requirements); shortage of production factors (access to skilled labor, rigidity of labor, technology); the business and legal environment (relations with suppliers/clients/workers, existence of contracts); basic services and infrastructure (electricity, water), as well as governmental requirements regarding licenses and permits.

The dependent variable in the regressions for CU ("capac_hr") corresponds to the firm's number of actual working hours per week (the scaling factor transformation by the constant (1/168) hrs does not affect the regression results). The dependent variable in the firm size regressions ("firmsize") is the (log) number of employees reported by the firms. We first estimate a GLS robust regression for the basic models of CU and firm size. In this basic model, the "minimalist model", we include as explanatory variables only those that different theories concur should be relevant. The group of minimalist explanatory variables for CU includes: age of the firm (lnage), sector dummies, cost of materials (lncostinputcap), average wage (lnwage2n), interest rate (lnltinterest), and capital intensity (lnKin1). Then we include the other explanatory variables listed above. The GLS robust regression analysis uses blocks of variables introduced sequentially. Only variables that remain robust and significant are kept to arrive to a parsimonious extended model, which includes the age of the firm (lnage), the size of its domestic market (lnmktsizepop, lnmktsizeinc), a dummy for exporters (exporter), capital intensity (lnKin1), expenditures in R&D (lnRyDspent1), and its interaction with capital intensity (RyDbyKin), the exporter dummy (RyDbyexporter) and a proxy for dishonest competition (RyDbydishonest). In addition, we examine variables related to financial and regulatory aspects, business relationships, contracts, infrastructure and human capital.

One important caveat, which is more relevant for the analysis of firm size than for CU, refers to the possibility that some of the independent variables could be thought as endogenous. Unfortunately, with cross sectional data and lack of good instrumental variables it is not possible to formally establish the causality in some of the relations established, and care should be take in drawing policy implications. Thus, the analysis should be viewed as a first step to examine these questions through further research using datasets (e.g., panel data) suitable for addressing these methodological concerns.

Tables A.3.5.1–A.3.5.3 present the results for the variables that show more robust results. The variables considered explain 22–33 percent and 37–49 percent of the variation in CU and firm size among Bolivian manufacturing firms, respectively. We first summarize the main findings for the determinants of CU.

Among the "fundamental" variables, capacity utilization rates are higher, on average, among firms that are younger, capital intensive, pay lower wages, use higher quality inputs, and in the petroleum and food and tobacco sectors. The proxies for demand constrains (market size proxied by the population or per capita income of the firm's internal sales market and whether it exports) are positive and significantly correlated with CU but surprisingly turned insignificant even in the minimalist model. This may reflect that the pervasiveness of demand constraints lead to insufficient variability in these variables in the sample. The proxy for the cost of capital (interest rate) reduces CU but becomes insignificant once other financial characteristics are added, particularly previous default.

Among the "non-fundamental" variables (extended model), financial and credit constraints impose the most pressing restrictions on CU. Belonging to a business association (gremio) has a positive and significant effect on CU. Governmental requirements affecting the firm's production process (govreq) has a negative and sizable impact on CU but it is measured imprecisely (10 percent of firms responded being affected). Firms reporting legal firing restrictions (hardtofire) tend to have higher CU.

The results for firm size show the relevance of fundamental factors in explaining the distribution of firm size. Bigger firms are older, face larger markets including access to external markets, are less capital intensive, and again are in the petroleum, and food and tobacco sectors. Meanwhile, among capital intensive firms or firms with an exports orientation those that invest in R&D tend to be smaller. These signal the following effects:

Among other investment climate variables, only the difficulty to hire skilled workers and the availability of contracts with suppliers has significant negative effects on firm size in Bolivia. Although unmeasured determinants of firm size may correlate with the capacity to shop for scarce skills, the lack of skilled labor prevents firms from reaching larger scales of operation by adopting more efficient technologies and management practices. The existence of contracts between the firm and its providers helps firms to grow, as contracts reduce transaction and other hidden costs of expanding businesses. The availability of contracts also facilitates the externalization of activities leading firms to reduce size, but this effect is seemingly unimportant in Bolivia. Thus, the difficulties for writing contracts and the shortage of skilled labor place constraints on firms' growth in Bolivia.

Note that results of Muñoz, Palma and Arias (2004) shows that the effect of financial variables on firm size is not robust to the introduction of other control variables. This cannot be taken as evidenced that credit access is not a serious constraint to the growth of firms in Bolivia given the reversed causality between size and credit constraints (e.g., small firms are riskier clients and thus face higher interest costs). However, the fact that financing does prove to be a crucial constraint for CU, especially collateral, corroborates that firm size and CU measure different aspects of firm growth. Liquidity constraints are less likely to be more binding to firm size than CU in the short run relative to other demand and institutional factors.

Firms that report legal restrictions to laying off employees have higher capacity utilization The effect of firing restrictions may suggest that labor rigidity leads firms to use their

payroll more intensively, getting more work from existing workers before hiring new workers. Alternatively, firms facing higher restrictions to fire skilled workers may have a more skilled workforce. Meanwhile, among capital-intensive firms or firms with an exports orientation those that invest in research and development tend to be smaller.

Table A.3.5.1 Determinants of Manufacturing Capacity Utilization and Firm Size in Bolivia

Capacity Utilization

Variable	Minimalist Model for capac_hr	Extended Model for capac_hr
Lnage	-7.563 (-2.30)*	-7.911 (-2.14)*
lncostinputcap	4.851 (2.88)**	5.183 (2.73)**
lnwage2n	-7.039 (-3.36)**	-5.701 (-2.40)*
lnltinterest	-11.187 (-1.86)^x	-4.376 (-0.68)
lnKin1	4.392 (1.69)^x	4.614 (1.67)^x
Dsector1	17.175 (2.33)*	16.89 (2.00)*
Dsector2	6.61 (0.87)	7.267 (0.85)
Dsector3	7.281 (1.62)	6.987 (1.26)
Dsector4	24.177 (3.55)**	27.01 (3.31)**
Coll		-7.109 (-2.01)*
Default		-12.798 (-2.63)**
otherlend		-13.768 (-1.87)^x
gremio		13.766 (2.17)*
govreq		-11.653 (-1.45)
hardtofire		9.921 (1.8)^x
Constant	67.609 (2.67)**	54.977 (1.94)^x
Observations	192	150
R-squared	0.22	0.33

Firm Size

Variable	Minimalist Model	Extended Model
lnage	0.2406 (2.74)**	0.2435 (2.64)**
lnmktsizepop	0.3016 (4.92)**	0.2148 (3.28)**
lnKin1	-0.2506 (-2.94)**	-0.2023 (-2.22)*
lnRyDspent1	0.0207 (0.75)	0.0110 (0.37)
exporter	1.4213 (4.85)**	1.9706 (5.17)**
RyDbyKin	-0.0112 (-1.29)	-0.0203 (-2.29)*
RyDbyexporter	-0.5839 (-1.65)^x	-1.2888 (-2.95)**
hardtofire		-0.1714 (-1.10)
lnerrands1		0.1575 (1.12)
gremio		0.3002 (1.64)
dispworker		0.7649 (3.21)**
d_contract		0.6895 (3.62)**
d_educger		0.3407 (1.61)
fillskill		-0.0022 (-1.72)^x
dsector1	0.7121 (2.67)**	0.7265 (2.66)**
dsector2	0.0271 (0.12)	0.1238 (0.57)
dsector3	0.0637 (0.28)	0.2268 (1.03)
dsector4	0.6751 (2.77)**	0.7161 (3.02)**
Constant	0.2790 (0.72)	-0.1299 (-0.30)
Observations	192	162
R-squared	0.3715	0.4889

Note: The dependent variable is capac_hr = number of working hours per week. Robust t statistics in parentheses.

Note: The dependent variable is firm size = ln (employment).

dsector1= food and tobacco, dsector2= textiles, garments, and leather; dsector3= wood, furniture, paper, and publishing; dsector4= petroleum, chemical and glass/ceramics; and omitted sector= metals, machinery, car parts, and other transport.

Significant at 5%; ** significant at 1%; ^{x} significant at 10%.
Source: Authors' estimates based on Bolivia's FACS survey.

Table A.3.5.2: Quantile Regression Determinants of Capacity Utilization

Variable	Q (10%) capac_hr	Q (25%) capac_hr	Q (50%) capac_hr	Q (75%) capac_hr	Q (90%) capac_hr
lnage	-0.145	-0.835	-1.004	-12.518	-13.721
	(-0.1)	(-0.59)	(-0.28)	(-2.23)*	(-1.93)[a]
lncostinputcap	-0.068	0.556	2.931	8.997	2.393
	(-0.09)	(0.75)	(1.47)	(2.96)**	(0.65)
lnwage2n	-1.611	-1.728	-2.482	-7.626	-6.159
	(-1.57)	(-1.75)[a]	(-1.05)	(-1.94)[a]	(-1.06)
lnltinterest	2.121	-1.707	1.19	-3.049	-6.537
	(0.48)	(-0.53)	(0.15)	(-0.25)	(-0.36)
lnKin1	1.409	0.705	4.248	6.647	4.024
	(1.24)	(0.55)	(1.35)	(1.39)	(0.75)
dsector1	6.376	7.663	2.395	22.054	48.753
	(2.02)*	(2.23)*	(0.24)	(1.25)	(2.38)*
dsector2	5.463	5.662	2.082	2.029	33.613
	(1.49)	(1.66)	(0.28)	(0.13)	(1.64)
dsector3	3.851	4.519	3.47	0.239	8.88
	(1.43)	(1.67)	(0.77)	(0.03)	(0.77)
dsector4	2.685	3.825	7.887	33.185	73.082
	(0.8)	(1.22)	(0.95)	(1.73)[a]	(3.58)**
coll	-3.596	-3.1	-4.969	-5.407	-13.406
	(-2.39)*	(-2.05)*	(-1.65)	(-0.79)	(-1.54)
default	-2.921	-1.444	-3.911	-12.01	-20.058
	(-0.83)	(-0.54)	(-0.86)	(-1.56)	(-1.83)[a]
otherlend	2.38	-0.305	-6.069	-17.732	-13.934
	(0.88)	(-0.09)	(-0.81)	(-1.36)	(-1.03)
gremio	-2.272	-4.339	-2.582	12.751	31.944
	(-0.81)	(-1.49)	(-0.42)	(1.23)	(2.45)*
govreq	-12.575	-10.172	-9.704	-17.676	-35.695
	(-2.86)**	(-2.26)*	(-0.95)	(-1.09)	(-2.27)*
hardtofire	0.868	0.112	6.179	11.841	3.458
	(0.35)	(0.05)	(1.2)	(1.51)	(0.31)
Constant	40.241	52.601	33.979	48.303	130.815
	(2.60)*	(4.52)**	(1.31)	(0.91)	(1.79)[a]

Observations = 150.

t-statistics in parentheses.

[a] Significant at 10%; * significant at 5%; ** significant at 1%.

Source: Authors' estimates based on Bolivia's FACS survey.

Table A.3.5.3: Quantile Regression Determinants of Firm Size

Variable	Q (10%) ln(employment)	Q (25%) ln(employment)	Q (50%) ln(employment)	Q (75%) ln(employment)	Q (90%) ln(employment)
Lnage	0.1480 (1.18)	0.2264 (1.90)^x	0.3222 (2.60)**	0.3576 (2.25)*	0.4532 (2.67)**
lnmktsizepop	0.0472 (0.52)	0.0825 (1.02)	0.2108 (2.24)*	0.3683 (3.28)**	0.4200 (3.14)**
lnKin1	0.0019 (0.01)	-0.1603 (-1.20)	-0.1839 (-1.45)	-0.3335 (-2.78)	-0.2732 (-1.78)^x
lnRyDspent1	0.0231 (0.64)	0.064 (0.17)	0.0354 (0.69)	-0.0180 (-0.32)	-0.0134 (-0.22)
exporter	2.3517 (3.50)**	2.0586 (3.33)**	2.3197 (3.59)**	1.4263 (2.12)*	1.7078 (2.33)*
RyDbyKin	-0.0168 (-0.58)	-0.0061 (-0.27)	-0.0197 (-0.83)	0.0049 (0.15)	0.0021 (0.05)
RyDbyexporter	-1.6201 (-2.20)*	-1.7009 (-2.50)*	-1.8655 (-2.59)**	-0.8295 (-1.13)	-1.1606 (-1.45)
hardtofire	-0.1895 (-0.71)	-0.0207 (-0.10)	-0.0870 (-0.42)	-0.4002 (-1.46)	-0.4122 (-1.21)
lnerrands1	0.3571 (1.53)	0.4312 (1.89)^x	0.2825 (1.25)	0.1159 (0.51)	-0.0212 (-0.08)
gremio	0.4052 (1.32)	0.3210 (1.18)	0.0830 (0.27)	0.1406 (0.45)	0.2415 (0.67)
dispworker	0.4884 (1.65)^x	0.6102 (1.78)^x	0.6807 (1.68)^x	0.8724 (2.48)*	0.5331 (1.38)
d_contract	0.4949 (1.92)^x	0.4756 (2.05)*	0.6162 (2.17)*	0.7027 (1.98)*	0.9322 (2.33)*
d_educger	-0.1184 (-0.23)	0.2490 (0.86)	0.2015 (0.63)	0.1787 (0.51)	0.1391 (0.37)
fillskill	-0.0036 (-1.67)^x	-0.0031 (-1.56)	-0.0031 (-1.48)	-0.0012 (-0.53)	-0.0019 (-0.72)
dsector1	0.2057 (0.61)	-0.0952 (-0.29)	0.5517 (1.21)	0.9107 (1.76)^x	1.4642 (2.91)**
dsector2	0.0786 (0.23)	-0.1815 (-0.61)	0.0800 (0.25)	0.2220 (0.65)	0.3346 (0.88)
dsector3	-0.3366 (-0.81)	-0.2776 (-0.87)	0.1091 (0.38)	0.6173 (1.47)	0.8642 (1.73)^x
dsector4	0.5778 (1.45)	0.2920 (0.95)	0.7614 (2.29)*	1.0923 (2.57)**	1.1519 (2.66)**
Cons	0.4371 (0.51)	0.324 (0.46)	-0.1494 (-0.23)	-0.4128 (-0.58)	-0.7393 (-0.83)
No. Obs.	162	162	162	162	162
R squared	0.2516	0.2809	0.3013	0.3715	0.3975

Observations = 162.

The dependent variable is firm size = ln(employment).

The t-statistics are in parentheses.

^{x} Significant at 10%; * significant at 5%; ** significant at 1%.

Source: Authors' estimates based on Bolivia's FACS survey.

ANNEX 4.1 Determinants of Earnings Differentials in Boliva

Figure A.4.1.1: Hourly Earnings Differentials In Bolivia 1993–2002
(Heads of Household)

Gender, Ethnicity, and Employment Type — **Regions**
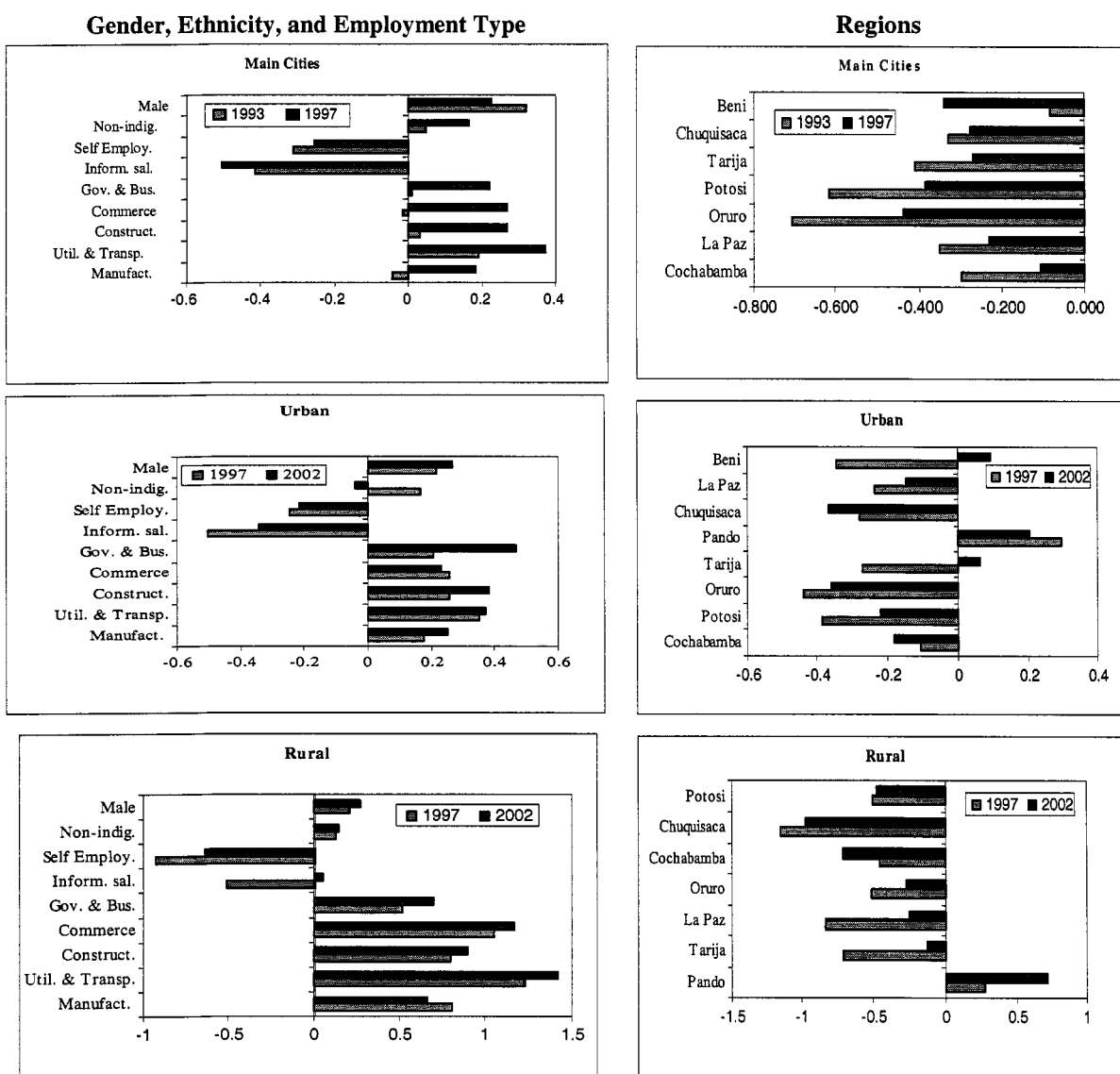
Note: Results from Mincer regressions (see background paper of Gasparini et al. for details). Pando and Beni were excluded from the main cities (1993) and rural (1997) regressions due to insufficient observations. Omitted categories are female, indigenous, formal workers, and primary sectors (agriculture and mining) and Santa Cruz.

Source: Authors' estimates based on household survey data.

Figure A.4.1.2: Marginal Returns to Education in Bolivia, 1990s
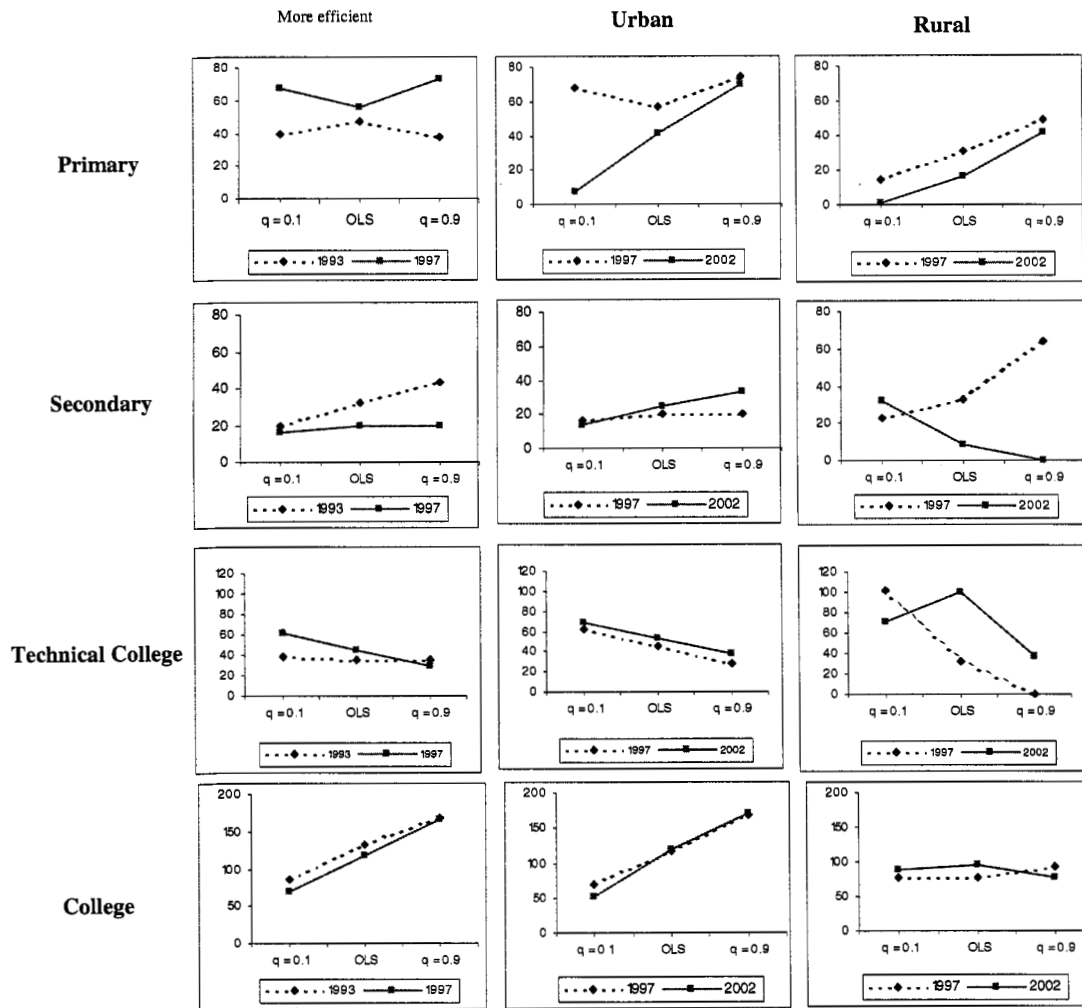
Source: Authors' estimates based on household survey data

ANNEX 4.2 Estimating Informal-Formal Earning Gaps

As stressed in the recent literature, unconditional earnings comparisons cannot be used as evidence of the superiority of formal sector jobs. First, it cannot be claimed that the lower informal earnings are due to the characteristics of informal jobs rather than to the productive attributes of the workers (both observed and unobserved). One should compare earnings of Bolivian workers with similar characteristics, both observed and unobserved. Second, gaps in average earnings can hardly characterize the situation of workers at all points of the earnings scale. Average earnings gaps may mask the differential situation faced by Bolivians whose unobserved characteristics place them at jobs with below or above average earnings for their skills sets. Third, and more importantly, monetary earnings gaps do not fully capture differences in the quality of jobs across sectors in so far characteristics such as flexible work schedules, the degree of protection and non-monetary benefits (e.g., health insurance, training) are also valued (differently) by individuals. These need to be factored in as part of the cost-benefit choice calculation of workers.

The background study by Tannuri-Pianto et al. (2004) attempt to address these issues by going beyond narrow average, cross-sectional earnings comparisons and a more careful multivariate analysis of earnings equations (Box A.4.2.1). They estimate differences in earnings across sectors for workers at different points of the sector-specific wage distributions conditioning on measured characteristics and the probability of sector participation, that is, comparing the earnings distributions that would result if workers had the same set of measured characteristics and similar sector self-selection propensities.

It is useful to first compare the earnings distributions for formal, informal salaried workers and the self-employed (Figure A.4.2.1). It is clear that median earnings mask substantial disparities between workers at different points of the earnings scale. The distribution for formal sector workers is further to the right of the informal salaried reflecting their wage advantage at any wage level, and in fact, the distributions become further apart at the right tail-- earnings gaps are larger between workers at jobs with higher pay. Meanwhile the formal salaried and self-employed distributions converge at the right tail (the highest paid self-employed earn wages similar to the highest paid formal employees). A worker at the 0.10 quantile of the distribution for the formal salaried (whose wage places him/her above 10 percent of formal workers) earns about 122 percent more than a worker at the 0.10 quantile of the distribution of the self-employed in 1993. The earnings gap is then reduced to 33 percent for the self-employed at the 0.90 quantile and goes to zero as we move to higher percentiles.

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Figure A.4.2.1: Density of Log Hourly Earnings By Sector, Metropolitan Areas
(Bs$, 2002)
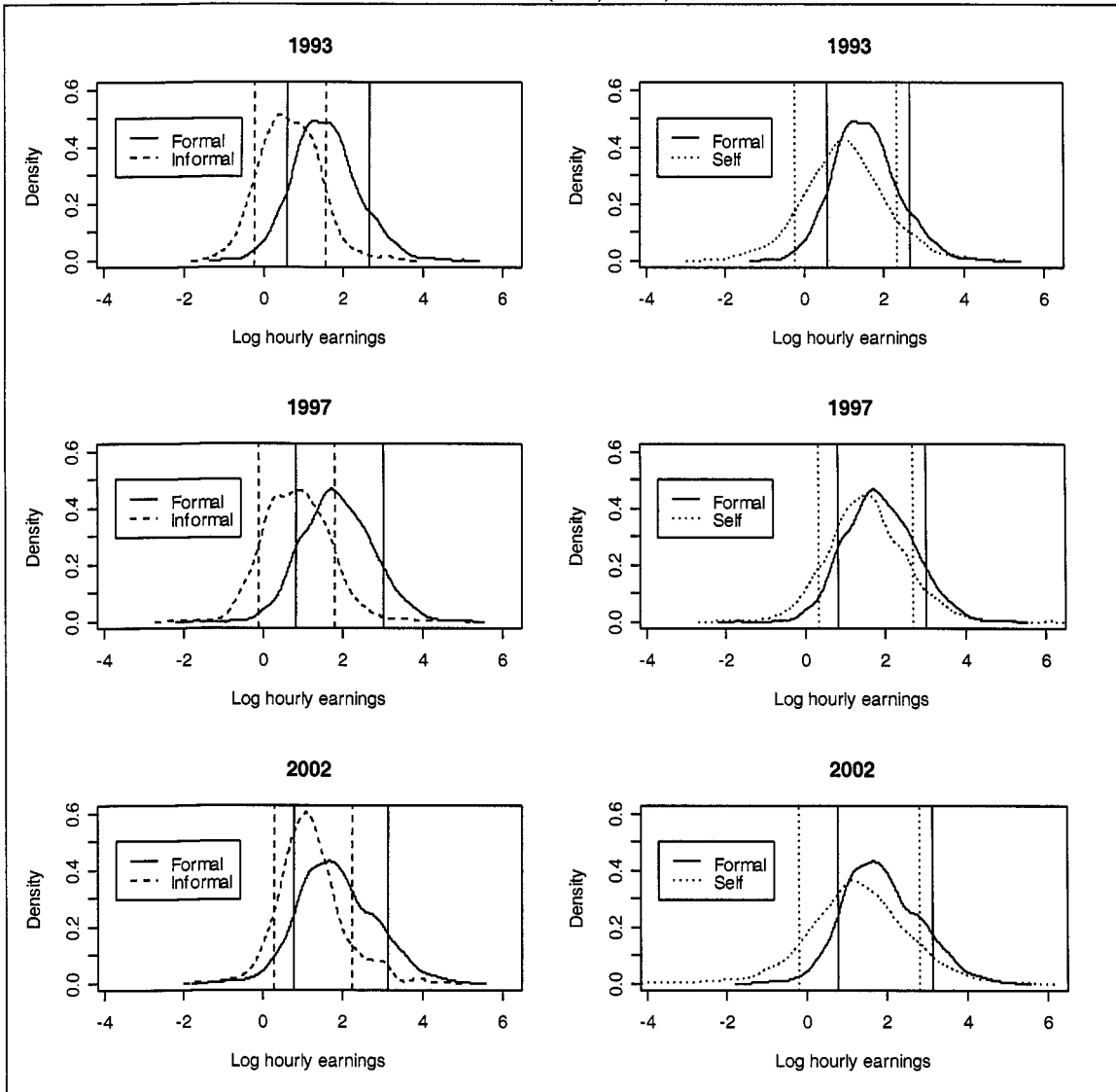
Source: Authors' estimates based on household survey data.

Box A.4.2.1: Estimating Selectivity Corrected Informal-Formal Earning Gaps

The background study by Tannuri-Pianto, Pianto and Arias (2004) estimates differences in earnings in the informal, formal and self-employed sectors taking into account the fact that workers' decision to participate in a sector is affected by differences in earnings levels, which in turn are correlated with their characteristics (observable and unobservable). Average earnings do not capture the relative positioning of workers in the conditional wage distribution, as the informal sector is very heterogeneous. The study uses quantile regressions to compare workers with the same rank in the sector specific earnings distributions.

Quantile Mincer earnings equations are estimated together with multinomial choice models to correct for workers' self-selection into each sector using a two-stage procedure (Fitzenberger, 2003). In the first stage, the probability of participation in the formal/informal/self-employed sectors is determined with a multinomial logit. This allows to consider simultaneity in the choice of sector. The second-stage quantile Mincer equations include correction factors related to the probabilities of participating in each sector. This corrects sector-specific earnings equations for selection bias that cause participants to join a sector even when they have a low probability of being in that sector. Earnings include in-kind payments. The results are then used to compute Oaxaca-type decompositions of the earnings gaps to measure the fraction explained by differences in worker characteristics and differences in their returns across sectors. The study employs the EIH 1993, ENE 1997, and MECOVI 2002 surveys for urban areas.

Linking Poverty and Conditional Quantiles

The quantile regression results allow to measure heterogeneity in the returns to workers' characteristics and determine if poorer households are more severely hurt by participating in the informal or self-employed sectors and which characteristics are most damaging. The conditional returns from the first stage Mincer regressions are linked to workers' positions in the unconditional per capita household income distribution. This allows identifying the returns to characteristics received by each individual, as well as the returns they would receive in another sector, and therefore the penalty (or benefit) that they receive for their characteristics by not working in the formal sector.

To do this, the authors first identify the conditional quantile of each worker. Quantile regressions are estimated at ten quantiles, and then the quantile to which each worker belongs is identified as the quantile with the smallest wage residual (in absolute value). Next, household specific returns for each level of education are computed by averaging the return coefficients across workers that belong to the same household. The household specific returns for each education level on the (unconditional) household's centile are then regressed in the per capita household income distribution. The samples in these second stage regressions are composed of households with positive returns. Two specifications are considered, the first one including only dummies for the five quintiles and the second, the unconditional centile and its square. To properly gauge at the statistical significance of the results, the second stage regressions are weighted to account for the standard errors of the estimates of quantile return coefficients from the first stage Mincerian equations.

These earnings gaps in part arise from differences in productivity-related characteristics of workers throughout the distributions. The regression results offer further light on the issue of the relative performance of informal salaried and self-employed workers in the Bolivian labor market. The specific findings are discussed in detail in Tannuri-Pianto et al. (2004). Figure A.4.2.2 summarize the main results of the counterfactual decomposition of informal-formal earnings gaps at three quantiles of the earnings distributions (low, moderate and high pay jobs) for the period 1993-2002. Each bar shows the components of the (log) earnings gaps attributed to differences in worker characteristics and differences in their returns. The left-hand side graphs show the computations using the characteristics of a typical informal worker and the returns received in the formal sector while the right-hand side graphs do the opposite.

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Figure A.4.2.2: Earnings Gap of Being Informal in Bolivia
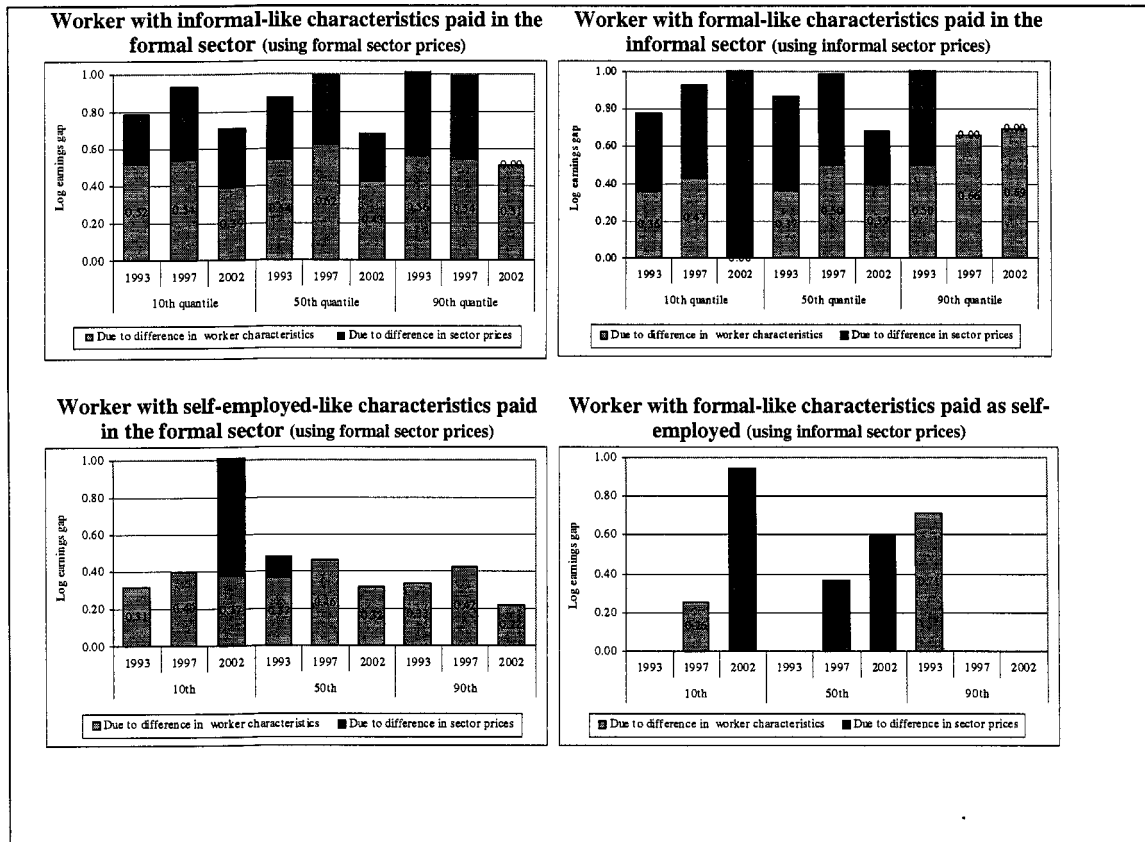
Note: Earnings regressions control for human capital (education and work experience), economic activity, gender, ethnicity, marital status, regional effects; and correct for self-selection into each sector. For the upper left figure, the gaps associated to characteristics and prices are measured as (Xf-Xi)*Bf and Xi*(Bf-Bi), respectively. For the upper right hand side, the respective formulas are (Xf-Xi)*Bi and Xf(Bf-Bi); and similarly for the bottom figures.

Source: Authors' estimates based on household survey data.

The results overall suggest that informal employment largely reflects the low opportunity costs and non-wage benefits of informality for many Bolivians. While urban workers in micro-firms and the self-employed had average hourly earnings 30 to 40 percent lower than formal workers, lower skills (e.g., 3 fewer years of schooling on average) explain almost the entire earnings disadvantage of the self-employed and about two thirds of the gap for the informal salaried. At the best paid jobs the returns to skills are not significantly different between the sectors and would seem to allow a choice for the worker. Segmentation might exist between the informal salaried and formal sectors for workers in low pay jobs for their skills set. Up until 1997 Bolivian workers seemed capable of moving freely between the formal and self-employed sectors without any wage penalties. However, by 2002 informal earnings penalties were back in force at the low pay jobs as the lowest productivity workers (with any skill set) might have been segmented out of the formal sector.

A noteworthy finding is that the sector participation patterns changed over time. In 1993 and 1997, informal workers with formal-like characteristics were positively selected into the informal sector. In this time period, formal jobs were plentiful and workers with formal-like characteristics might have accepted those informal jobs which offered good opportunities. By 2002, this positive selection had eroded away. The reduction in the size of the formal sector from 1997 to 2002 may have been responsible by causing lower productivity workers from the formal sector to lose their jobs and move to the informal salaried sector. Again, this suggests that the lowest productivity formal workers with informal-like characteristics left (or were forced to leave) the sector.

The significant positive earnings disadvantage for informal workers at the bottom of the earnings scale is likely a reflection of the lower productivity of micro firms and is hardly compensated by other non-wage benefits. Any unaccounted benefits received by formal workers would only increase these differentials, and the tax burden on these low income workers (which would reduce the gaps) is virtually non-existent. In kind payments of food, clothing, and transportation are included in the earnings estimates and should not bias informal earnings estimates. Training costs may be substantial, but formal workers enjoy wages from a minimum of 48 percent to a maximum of 210 percent more than their informal sector counterparts at the low pay jobs for their skill sets, which seems quite large compared to any reasonable estimates of the costs incurred by training.

Findings linking the earnings penalties of not being formal to the poverty status of workers further suggest that for low skill workers the opportunity cost of formality is low. In 2002, the educational penalties are small for basic and primary education and increase for secondary and above, leading us to conclude that the low educated (male) informal workers do not face large penalties from not participating in the formal sector. For those with secondary education the penalties are larger, but uncorrelated with poverty. For those with higher education there are very few observations in poor households, although the penalty for informal work is quite high. Meanwhile women in poor households face the worst penalties from informal work. Penalties for ethnicity are quite small though still correlated with poverty.

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ANNEX 4.3 Explaining the Labor Market Performance of Migrants in Bolivia

In the background work by Tannuri-Pianto et al. (2004), a migrant is an individual who has moved from one city/locality in Bolivia to another in the previous five years. This is allows comparability across surveys (EIH 1993, ENE 1997, MECOVI 2002). Analyzing such recent migrants has the drawback of not fully allowing their assimilation at destination, but it restricts the sample to a more homogeneous group. The results apply to migrants at an early stage of integration to the urban economy. The earnings analysis focuses on rural-to-urban migrants.

The approach for modeling migration is based on Roy's model (1951) applied to an international migration context by Borjas (1999). In it, migration is assumed to be costly, and only occurs if net benefit (income differential minus cost) is positive. Since the earnings of immigrants (who chose to leave) are only observed in the destination area, it is impossible to know what their earnings would have been had they not migrated. Consequently, we must use the earnings of non-migrants in the origin (chose to stay) as a proxy, which induces potential selection bias. This sample selection problem—inherent to the migration model (non-observable characteristics that influence the decision to migrate)—is resolved by a two-step method. In the first step, an individual's probability of migration is estimated, and included in the second step, earnings equations for migrants at the destination, to correct for the fact that we only observe earnings of individuals who have migrated.

This model is appropriate to describe choices and earnings of average migrants, but presumes that gaps in average earnings fully characterize the situation of migrant workers at all points of the earnings scale. Also, returns to migration may vary across workers that come from and insert themselves in different points of the conditional wage distribution due to, for example, their endowment of unobserved skills or to differential opportunities (crowding effects) in the labor market. Moreover, selection biases may vary along the earnings distribution, e.g., motivations and opportunity costs differ between migrants at the bottom and top of the distribution.

The motivations and opportunities of individuals at the top of the earnings distribution are likely different from those of the individuals at the bottom. Therefore, we estimate quantile earnings equations for migrants and non-migrants in urban regions correcting for selectivity bias using the methodology developed by Buchinsky (1998). The models are corrected for self-selectivity in 1997 and 2002, but not in 1993 because of lack of data at origin, and include the Human Development Index (HDI) and its various components at the level of municipal sections (sección) as a variable correlated with the migration decision but not with earnings at destination. The probability models were estimated using Ichimura's (1993) semi-parametric least squares, but were not very different from the results for the probit models

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BIBLIOGRAPHY

Andersen, L., A. Brooks and A. Mercado. 2004. "Macroeconomic Policies to Increase Social Mobility and Growth in Bolivia." Institute for Socio-Economic Research, Catholic University of Bolivia, La Paz, Bolivia.

Andersen, L., and R. Faris. 2002a. "Natural Gas and Income Distribution in Bolivia." Institute for Socio-Economic Research Working Paper No. 1/2001, Catholic University of Bolivia, La Paz, Bolivia.

_____. 2002b. "Reducing Volatility Due to Natural Gas Exports: Is the Answer a Stabilization Fund?" Institute for Socio-Economic Research Working Paper No. 11/2001, Catholic University of Bolivia, La Paz, Bolivia.

Arellano, M. and S. Bond. 1991. "Some Test of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies*, 58: 277-297.

Arias, O and W. Sosa. 2004. "Subjective and Objective Poverty in Bolivia." Background paper for the 2005 World Bank Bolivia Poverty Assessment.

Azariadis, C. 2004. "Povety Traps." Forthcoming in the *Handbook of Economic Growth*.

Borjas, G. 1999. "Self Selection and the Earnings of Immigrants." *Labor Economics,* ed. by O. Ashenfelter, 305-335, Princeton University.

Bossert, T. 2000. "Decentralization of Health Systems in Latin America: A Comparative Study of Chile, Colombia, and Bolivia." Harvard School of Public Health. Boston, Massachusetts.

Buchinsky, M. 1998. "The Dynamics of Changes in the Female Wage Distribution in the USA: A Quantile Regression Approach." Journal of Applied Econometrics 13: 1-30.

Camhi, A., E. Engel and A. Micco. 1997. "Employment and Productivity Dynamics in Chilean Manufacturing: Micro Evidence and Macro Consequences." In F. Morandé and R. Vergara (eds.), *Empirical Analysis of Growth in Chile*, Santiago: CEP and ILADES, 197-225.

Copenhagen Consensus. 2004. Available at http://copenhaganconsensus.com/

De Ferranti, D., G. Perry, F. Ferreira and M. Walton. 2003. *Inequality in Latin America & the Caribbean: Breaking with History?* The World Bank, Washington D.C.

De Soto, Hernando. 2000. *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* (New York: Basic Books and London: Bantam Press/Random House).

Djankov, S., R. La Porta, F. Lopez-de-Silanes, and A. Shleifer. 2003. "The Regulation of Labor." NBER Working Paper No. 9756. National Bureau of Economic Research, Cambridge, MA.

_____. 2000. "The Regulation of Entry." *Quarterly Journal of Economics*, 117, (1): 1-37.

Doria Medina, S. 1990. "Características y Perspectivas de la Industria Boliviana." *La industria: problemas y perspectivas*. ILDIS. La Paz, Bolivia.

Elbers, C., Lanjouw and P. Lanjouw. 2003. "Micro--Level Estimation of Poverty and Inequality." *Econometrica*, Econometric Society, vol. 71(1):355-364.

Faguet, J. 2004. "Does Decentralization Increase Government Responsiveness to Local Needs?: Evidence from Bolivia." *Journal of Public Economics* 88: 867–893.

Ferreira, F. and P. Leite. 2003. "Policy Options for Meeting the Millennium Development Goals in Brazil: Can micro-simulations help?" World Bank Policy Research Working Paper 2975. The World Bank, Washington, D.C.

Fitzenberger, B. 2003. "Gender Wage Differences Across Quantiles, Accounting for Sample Selection." University of Mannsheim. Processed.

Gasparini, L., M. Cicowiez, F. Gutiérrez and M. Marchionni. 2004. "Simulating Income Distribution Changes in Bolivia: A Microeconometric Approach." Background paper for the 2005 World Bank Bolivia Poverty Assessment.

Hamermesh, D.S. 1993. *Labor Demand*. New Jersey: Princeton University Press.

Heckman, J. 2000. "Microdata, Heterogeneity and the Evaluation of Public Policy." Department of Economics, University of Chicago, Chicago, IL.

Heckman, J. and C. Pagés. 2003. "Law and Employment: Lessons from Latin America and the Caribbean." NBER Working Paper No. 10129, National Bureau of Economic Research, Cambridge, MA.

Ichimura, H. 1993. "Semiparametric Least Squares (SLS) and Weighted SLS Estimation of Single-Index Models." *Journal of Econometrics* 58:71-120.

Inter-American Development Bank. 2003. *Good Jobs Wanted: Labor Markets in Latin America. 2004 Economic and Social Progress Report.* Baltimore: The Johns Hopkins University Press.

International Monetary Fund. 2004. *Bolivia: Second Review Under the Stand-By Arrangement and Request for Waiver of Applicability and Modification of Performance Criteria.* IMF Country Report 04/5. International Monetary Fund, Washington, D.C.

Jiménez, W. and F. Landa.. 2004a. "Poverty and Indigenous Peoples in Bolivia, 1989-2002." Background paper for report: Indigenous People, Poverty and Human Development 1994-2004. World Bank, Washington, D.C.

_____. 2004b. "¿Bolivia Tuvo Crecimiento 'Pro-Pobre' Entre Los Años 1993 y 2002?" UDAPE working paper for the World Bank Bolivia Poverty Assessment.

_____. 2004c. "Empleo y Productividad de la Pequeña y Mediana Empresa de la Manufactura en Bolivia 1995-1999." UDAPE background paper for the World Bank Bolivia Poverty Assessment.

Kakwani, N., S. Khandker and H. Son. 2003. "Poverty Equivalent Growth Rate: With Applications to Korea and Thailand." World Bank Working paper, Washington, D.C.

Kaufmann, D., M. Mastruzzi and D. Zavaleta. 2002. "Sustanined Macroeconomic Reforms, Tepid Growth: A Governance Puzzle in Bolivia?" The World Bank, Washington, D.C. Processed.

Klasen, S, M. Grosse, R. Thiele, J. Lay, J. Spatz and M. Wiebelt. 2004. "Operationalizing Pro-Poor Growth Country Case Study: Boliva." University of Göttingen and Kiel Institute for World Economics.

Koenker, R. and G. Bassett. 1978. "Regression Quantiles." Econometrica, Vol. 46 No.1:1-26.

Kordas, G. 2002. "Smoothed Binary Regression Quantiles." Mimeo, University of Illinois at Urbana Champaign, Department of Economics.

Landa, F. 2003. "Las Dotaciones de la Población Ocupada Son la Única Fuente que Explica la Desigualdad de Ingresos en Bolivia?: Una Aplicación de las Microsimulaciones." Draft, UDAPE.

Lay, J. 2001. "Segmentation and Informality in Urban Labor Markets: Evidence From Bolivia and Implications for Poverty Reduction." Kiel Institute for World Economics.

Loayza, N., P. Fajnzylber and C. Calderón. 2002. *Economic Growth in Latin America and the Caribbean: Stylized Facts, Explanations, and Forecasts.* World Bank, Regional Study LAC.

Machado, J., and J. Mata. 2003. "Counterfactual Decomposition of Changes in Wage Distributions Using Quantile Regression." Universidade Nova de Lisboa. Processed.

Maloney, W., "Informality Revisited." *World Development* 32, No. 7:1159-1178.

Manski, C. 1985. "Semiparametric Analysis of Discrete Response: Asymptotic Properties of the Maximum Score Estimator." *Journal of Econometrics,* 32:65-108.

Mondino G. and S. Montoya. 2000. "Effects of Labor Market Regulations on Employment Decisions by Firms: Empirical Evidence for Argentina." Research Network Working Paper R-391. Inter-American Development Bank, Washington, D.C.

Muñoz, R., A. Palma and O. Arias. 2004. "Determinants of Firm Size and Capacity Utilization in Bolivian Manufacturing Sector." Background paper for 2005 World Bank Bolivia Poverty Assessment.

Muñoz, R., and A. Palma. 2003. "Determinants of Firm Size and Capacity Utilization in Bolivian Manufacturing Sector." Background paper for the World Bank Bolivia Poverty Assessment. The World Bank, Washington, D.C. Mimeographed.

Nina, O., and A. Brooks de Alborta. 2001. "Vulnerabilidad Macroeconómica Ante Shocks Externos: El Caso Boliviano". Institute for Socio-Economic Research Working Paper No. 10/2001, Catholic University of Bolivia, La Paz, Bolivia.

Rajan, R. and L. Zingales. 1998. "Financial Dependence and Growth." *The American Economic Review* 88: 559-586.

Ravallion, M. 2004. "Pro-Poor Growth: A Primer". Policy Research Working Paper 3242, The World Bank, Washington D.C.

Ravallion, M. and S. Chen. 2002. "Measuring Pro-poor Growth", Policy Research Working Paper 2666, The World Bank, Washington, D.C.

Ravallion, M. and M. Lokshin. 2002. "Self-Rated Economic Welfare in Russia," *European Economic Review*. Processed.

_____. 2001. "Identifying Welfare Effects Using Subjective Questions," *Economica,* 68: 335-357.

Rodrick, D., and R. Hausman. 2003. "Economic Development as Self-Discovery", *Journal of Development Economics* (NETHERLANDS); 72, No. 2:603-33, December.

Roy, A.D. 1951. "Some thoughts on the Distribution of Earnings." *Oxford Economic Papers* 3:135-146.

Saavedra, J. and M. Torero. 2000. "Labor Market Reforms and their Impact Over Formal Labor Demand and Job Market Turnover: The Case of Peru." Research Network Working Paper R-394. Inter-American Development Bank, Washington, D.C.

Sachs, J. 2003. "Institutions Don't Rule: Direct Effects of Geography on Per Capita Income." NBER Working Paper No. 9490, National Bureau of Economic Research, Cambridge, MA.

Tannuri-Pianto, M., D. Pianto and O. Arias. 2004a. "Informal Employment in Bolivia: A Lost Proposition?" Background paper for the 2005 World Bank Bolivia Poverty Assessment.

_____. 2004b. "Rural-Urban Migration in Bolivia: An Escape Boat?" Background paper for the 2005 World Bank Bolivia Poverty Assessment.

Unidad de Análisis de Políticas Sociales y Económicas (UDAPE). 2003a. *Estrategia Boliviana de Reducción de la Pobreza: Informe de Avance y Perspectivas.* La Paz, Bolivia

_____. 2003b. *Pobreza y Deisgualdad en Municipios de Bolivia: Estimación del Gasto de Consumo Combinando el Censo 2001 y las Encuestas de Hogares,* La Paz, Bolivia.

United Nations Development Programme, (UNDP) 2000. *Human Development Report 2000: Human Rights and Human Development,* New York: Oxford University Press.

_____. 1999. *Human Development Report 1999: Globalization with a Human Face.* New York: Oxford University Press.

World Bank. 2004a. *Doing Business in 2005: Removing Obstacles to Growth,* Washington, D.C.

_____. 2004b. *Public Expenditure Report.* Washington, D.C.

_____. 2004c. *Social Sector Programmatic Credit Document,* Washington, D.C.

_____. 2001. *Bolivia Microeconomic Constraints and Opportunities for Higher Growth - Climate Investment Assessment,* Report No. 24746-BO, Washington, D.C.

_____. 2000. *Bolivia: Poverty Diagnostic.* Washington, D.C.

_____. 1999. *Consultando con los Pobres: Reporte de Sintesis Nacional.* Washington, D.C.

_____. 1996. *Bolivia; Poverty, Equity, and Income: Selected Policies for Expanding Earning Opportunities for the Poor.* Report No. 15272-BO. Vol. II: Background papers. Washington, D.C.

MAP SECTION

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BOLIVIA

- ○ SELECTED CITIES AND TOWNS
- ◉ DEPARTMENT CAPITALS
- ✪ NATIONAL CAPITAL
- RIVERS
- MAIN ROADS
- RAILROADS
- DEPARTMENT BOUNDARIES
- INTERNATIONAL BOUNDARIES

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70°W
65°W
60°W

BRAZIL

PANDO

Cobija

Abuná

To Porto Velho

10°S

Madre de Dios

Riberalta

Asunción

Puerto Heath

Madidi

Yata

Lago Huaitunas

Lago Rogaguado

Guaporé

BENI

Beni

Lago Rogagua

Yacuma

Santa Ana

Magdalena

Lago de San Luis

PERU

Reyes

Apere

Mamoré

Trinidad

San Borja

Ichoa

San Miguel

Blanco

San Martín

Paraguá

Apolo

15°S

LA PAZ

Puerto Acosta

Lago Titicaca

To Puno

Nevada Illampu (6,362 m)

Caranavi

Quiquibey

Ascención

Concepción

San Ignacio

Las Petas

LA PAZ

Guaqui

Viacha

Nevada Illimani (6,462 m)

COCHABAMBA

Chapare

Ichilo

Grande (Guapay) Yapacani

SANTA CRUZ

Desaguadero

Cochabamba

Montero

San José de Chiquitos

Nevada Sajama (6,542 m)

Oruro

Aiquile

Santa Cruz

Roboré

To Arica

Cordillera Occidental

ORURO

Lago Poopó

Cordillera Central

Banados del Izozog

Santa Ana

Puerto Suárez

To Iquique

Salar de Coipasa

Sucre

Pilcomayo

Gran Chaco

To Campo Grande

20°S

Salar de Uyuni

Tarabuco

Potosí

CHUQUISACA

Carniri

PARAGUAY

Uyuni

Pilaya

Villa Montes

To Mariscal Estigarribia

CHILE

Pacific Ocean

POTOSÍ

Grande de Lípez

Tarija

TARIJA

Yucuiba

Viljazón

To Calama

To Abra Pampa

To Tartagal

To San Ramón de la Nueva Orán

ARGENTINA

BOLIVIA

0 50 100 150 Kilometers
0 50 100 Miles

70°W
65°W
60°W

SEPTEMBER 2004