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External Shocks, Policy Reforms, and Pro-poor Growth in Bolivia

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Abstract:

This paper analyzes how major external shocks and policy reforms affect Bolivia's ability to achieve pro-poor growth. Employing a recursive-dynamic CGE model, it considers three different scenarios: an optimistic baseline scenario that roughly extrapolates the situation prevailing before the onset of the recent economic crisis; a more realistic scenario that accounts for two important negative external shocks (declining capital inflows and El Niño); and a scenario that captures the combined effect of the shocks and two major reform projects (development of the gas sector and deregulation of the urban labor market). It turns out that the shocks have not only contributed to the economic crisis, but that they are also likely to impair Bolivia's medium-term development prospects, leading to marked increases in both urban and rural poverty. If the reform projects were implemented, their impact on growth would be large enough to slightly overcompensate the impact of the negative external shocks. The poverty increase caused by the shocks would be more than offset for urban households, but reinforced for rural households.

Keywords: Pro-poor Growth; CGE Analysis; Bolivia

JEL-Classification: D58; O54

I. Introduction

Much of the recent debate in the field of development policy has centered round the concept of pro-poor growth. This concept can be viewed as a response to the finding that growth, on average, is good for the poor (Dollar and Kraay 2002), but that its impact on poverty varies strongly across countries (Ravallion 2001). The variation found in cross-country analyses has given rise to in-depth country studies (e.g. Kappel et al. 2005; Jiménez and Landa 2004; Ravallion and Datt 1999), which up to now have largely aimed at tracing the past evolution of growth, poverty and inequality, using measurement concepts such as the Growth Incidence Curve (Ravallion 2003). Here, by contrast, the focus is on assessing the medium-term prospects for growth and poverty alleviation and the factors that might affect these prospects. The assessment will be performed for Bolivia, a country that constitutes a case in point as opinions about its future development path differ widely.

A natural point of departure for the analysis is the Poverty Reduction Strategy Paper (PRSP), which contains explicit projections for medium-term growth and poverty rates. In its PRSP, which was completed in May 2001, the Bolivian government formulated ambitious social goals to be achieved over the period 2001–2015 (República de Bolivia 2001). Among the improvements the PRSP envisaged were the following targets with respect to income poverty:

- a reduction of the nationwide poverty incidence from 63 to 41 percent;
- a reduction of the urban poverty incidence from 47 to 32 percent;
- a reduction of the rural poverty incidence from 82 to 52 percent.

Success in reaching these and other social targets will to a large extent depend on Bolivia's ability to achieve higher growth. The PRSP calls for average growth in excess of 5 percent over the period under consideration, compared with an average growth rate of about 4 percent in the 1990s. It acknowledges that faster growth will require additional structural reforms – in particular a more flexible labor market – which enable the country to boost private investment. So far, the expectations raised

in the PRSP have not materialized. During the protracted economic slowdown of the last 5 years, both per capita income and the incidence of poverty have stagnated at best. In a recent revision of the PRSP, the Bolivian economy is projected to grow at an average rate of 4.8 percent between 2006 and 2015 (UDAPE 2003), which is somewhat below the original projections. Moreover, poverty elasticities with respect to overall growth have been revised downwards from –0.77 to –0.60 and from –0.54 to –0.26 for urban and rural areas, respectively. Given these estimates, which are extremely low in international perspective, the headcount index is now only expected to fall to 54 percent nationwide and to 45 and 75 percent in urban and rural areas, respectively, until 2015.

Against the background of these fairly disparate projections, Bolivia's prospects of achieving pro-poor growth will be evaluated using GEM-PIA, a computable **G**eneral **E**quilibrium **M**odel for **P**overty **I**mpact **A**nalysis. The remainder of the paper is structured as follows. Section II outlines the main features of the Bolivian modeling framework. The subsequent simulation analysis proceeds in three steps. First, an optimistic baseline scenario is presented in Sub-section III.1, which roughly extrapolates the situation prevailing before the onset of the recent crisis and thereby projects a medium-run growth rate similar to the one envisaged in the revised PRSP. Sub-section III.2 then discusses two important negative external shocks, declining capital inflows and the El Niño phenomenon. These shocks have not only been major factors behind the recent crisis, but are also likely to shape Bolivia's medium-term development prospects. Accounting for them therefore leads to more realistic projections for growth and poverty reduction. In Sub-section III.3, it will be analyzed whether the further development of the gas sector and a deregulation of the urban labor market, which arguably are the main reform projects that might be realized in the near future, could offset the negative external shocks and thus help achieve the targets set out in the (revised) PRSP. The paper closes with some concluding remarks in Section IV.

II. The Modeling Framework

GEM-PIA is a dynamic real-financial CGE model which combines neoclassical and structuralist characteristics, but does not account for Keynesian multiplier effects so that the simulation results have to be interpreted as medium to long term.[1] The production structure and product market conditions, for example, correspond with standard neoclassical theory. As an important structuralist element, the segmentation of labor markets observable in Bolivia is taken into account. In addition, the savings and investment behavior of different economic agents is modeled explicitly via the specification of a financial market. In the following, the major components of the modeling framework for Bolivia will be described in a non-technical manner. A full mathematical documentation of GEM-PIA can be found in Wiebelt (2004).

Trade and Production

The real side of the model is in the tradition of Dervis et al. (1982). The model distinguishes 12 sectors (see Table 1), each of them producing a characteristic but not necessarily homogenous good. Rather, it is assumed for exporting sectors that, e.g. due to quality differences, domestically sold and exported goods are not identical. This is modeled by means of a Constant Elasticity of Transformation (CET) function. The exceptions are mining and oil&gas, where exports are assumed to be exogenously determined by world market conditions or by long-term contracts as in the case of gas exports to Brazil. Domestically produced and imported goods of the same category are also treated as different, which is modeled by means of a Constant Elasticity of Substitution (CES) function (Armington assumption). Finally, some sectors (utilities, construction, public services) produce pure non-tradables. This rather strong differentiation in production allows, for instance, to capture in a realistic way the impact external shocks may have on the earning opportunities of different households.

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[1] For simulation results based on a short-run CGE model for Bolivia, see Jemio (2001), Jemio and Wiebelt (2003), and Thiele and Wiebelt (2004).

A distinctive feature of the model is the explicit treatment of traditional agriculture and (urban) informal services as informal production sectors, where most of Bolivia's poor earn their living. Workers in these sectors are considered self-employed relying mainly on their own labor input and using only small amounts of capital. Together with the assumption of segmented labor markets, which will be discussed below, this implies that supply over one year is almost constant, as the number of workers as well as factor productivities are given. Therefore, adjustment in response to adverse demand shocks will work through a fall in prices of the goods the self-employed produce, which in turn reduces their income.

Table 1. Classification of the CGE Model

Activities/ Goods and Services	Production Factors	Economic Agents
Traditional agriculture	*Labor*	*Households*
Modern agriculture	– Skilled labor	– Smallholders
Oil&gas	– Agricultural unskilled labor	– Agricultural workers
Mining	– Non–agricultural unskilled labor	– Non–agricultural workers
Consumer goods	– Smallholder labor	– Employees
Intermediate goods	– Urban informal labor	– Urban informals
Capital goods		– Employers
Utilities	*Physical Capital*	
Construction	– Corporate (formal) capital	*Enterprises*
Informal services	– Employers' capital	– State enterprises
Formal services	– Urban informals' capital	– Private corporations
Public services	– Smallholders' capital	
	– Public (infrastructure) capital	Government
		Rest of the world

		Financial Institutions – Commercial banks – Central Bank

By contrast, formal sectors tend to produce with modern, more capital-intensive techniques and, like the public services sector, hire skilled and unskilled workers, which provides them with greater adjustment flexibility on the supply side. Throughout the formal economy, primary factors are combined via CES production functions, while the production technology of the two informal sectors is represented by a Cobb-Douglas function to account for the fact that labor can fairly easily substitute for the very basic capital goods used in these sectors. Both formal and informal sectors use intermediate inputs in fixed proportions to production.

Factor markets

To capture the reality of Bolivian employment and to keep track in a detailed manner of the poor's main income flows, the model assumes a high degree of labor market segmentation (see Table 1). Beside the self-employed labor of smallholders and urban informals, two types of unskilled labor (agricultural and non-agricultural) as well as skilled labor are distinguished. Labor markets are linked via rural-rural and rural-urban migration. While the former involves smallholders becoming hired workers in modern agriculture, the latter involves the absorption of smallholders by the urban informal sector. Along the lines of the Harris-Todaro model, the decision to migrate depends on wage differentials. In the urban labor market, the barriers for informal workers to enter the formal workforce are taken into account by assuming limited mobility between these labor market segments. The model does allow for underemployment in the sense that people are stuck in low-paid informal sector jobs, but not for open unemployment of unskilled labor, which appears to be an accurate

characterization of the Bolivian labor market except for recession years where rates of open unemployment tend to rise to non-negligible levels. Wage adjustments ensure that all labor markets clear.

The model also assumes segmented capital markets, with a distinction made between unincorporated and corporate capital. Three household groups (smallholders, urban informals, and employers) own unincorporated capital. While smallholders and urban informals invest almost exclusively in traditional agriculture and informal services, respectively, employers receive capital income from all formal sectors with the exception of utilities. Corporate capital, by contrast, is owned by private and public enterprises, which invest in all formal sectors and retain the respective factor income. Finally, the model separates public infrastructure capital, which is assumed to affect the level of sectoral production. As in the IMMPA model (Agenor et al. 2003), this is specified by means of a CES function where public capital and aggregated private production factors enter as arguments. Thus, by determining its investment focus, the government can influence the income generation possibilities in different sectors and regions.

Income and Expenditures

The model identifies six representative private households groups, which are basically characterized by their distinct factor endowments (Table 1). This is justified because factor income is the single-most important income source in Bolivia given the low degree of redistribution. In addition, workers and the self-employed are disaggregated regionally as their earning possibilities and consumption patterns tend to vary between regions. Four of the six household groups (smallholders, urban informals, and agricultural and non-agricultural workers) can be considered as poor. Depending on factor endowments, households receive labor or capital income as well as (net) interest payments on financial assets. Moreover, they receive transfer income from the state and from relatives living abroad. They use their gross income to pay for taxes and consumption as well as for savings. The allocation of private

consumption expenditures on different goods is modeled employing a Linear Expenditure System (LES), where poorer households devote a larger budget share to price-independent subsistence consumption than do richer households.

The government finances its current and capital expenditures out of direct and indirect tax revenues, operating surpluses of public enterprises, capital inflows from abroad, and credit from commercial banks and from the Central Bank. Private and public enterprises receive capital income, subsidies and net interest payments on financial assets; they use this income to pay corporate taxes and to save in the form of retained earnings. Since financial institutions are assumed to act as mere intermediaries, their current transactions (interest payments) are also allocated to the two kinds of enterprises. Finally, the rest of the world imports and exports goods from and to Bolivia, undertakes direct and portfolio investments in the country, and provides development aid.

Financial markets

The model's financial sector follows the approach developed by Rosensweig and Taylor (1990). It is based on Tobin's portfolio-theoretic framework, where the interaction of stocks and flows plays a decisive role. Starting from the beginning-of-period stocks of assets and liabilities, financial markets match the savings and investment decisions of all economic agents over the period, comprising the accumulation of both physical and financial assets and liabilities. The financial markets handle simultaneously the flows arising from savings and financial accumulation, and those arising from the reshuffling of existing portfolios due to changes in asset returns. For the latter, it is assumed that individual agents have only limited possibilities to substitute among different assets, which is captured by CES functions. A further characteristic of the financial sector is that specific economic agents, e.g. smallholders, may be constrained in their access to credit, which is clearly the case for most of Bolivia's informal producers. This is modeled by

determining bank credit to the respective agent residually after all other agents' credit demand is satisfied (Jemio 2001).

The identification of stocks in the model makes it possible to account for the revaluation of assets and liabilities, which is of great importance in the highly dollarized Bolivian economy where the value of most domestic financial assets and liabilities is at least partially indexed to movements in the exchange rate. Together with the accumulation occurring over the period, these revaluations determine the end-of-period stocks of assets, liabilities and net wealth for each economic agent.

Dynamics

An important feature of the model is its recursive-dynamic nature, which means that the model is solved for a sequence of static equilibria connected through capital accumulation and labor growth. The dynamics of the model are based on assumptions concerning exogenous growth rates for different variables such as labor supply and government expenditures, as well as the endogenous savings and investment behavior of economic agents. A general advantage of the dynamic specification is the possibility to generate a medium to long run growth path. Moreover, structural change over time can be analyzed.

Implementation of the model

In using the model for policy simulations, 1997 was chosen as the base year, for two different reasons. First, crucial data, in particular an Input-Output Table, are available for that year. Second, 1997 appears to be a fairly "normal" year for the Bolivian economy in the sense that no major shocks occurred, rendering it an appropriate benchmark against which to evaluate counterfactual simulations.

In specifying the model numerically, the first step was to compile the (real and financial) transactions between the sectors, production factors and economic agents identified in Table 1 in a Social Accounting Matrix (SAM) for 1997 (see Thiele and Piazolo 2003). The SAM provides the statistical backbone for the calibration of the

model. From the information given in the SAM, many parameters, such as tax and subsidy rates, can readily be calculated. Other parameters, such as trade elasticities and income elasticities of private demand, have to be taken from external sources. Here, the choice of parameters is based on the stylized facts known from the existing empirical literature and on what is known about Bolivia's economic structure, not on specific estimations performed for Bolivia. Armington elasticities, for instance, are assumed to be considerably higher for agriculture than for intermediate and capital goods, where import substitution is only possible to a limited extent because Bolivia's own production of these goods is very small and of low sophistication compared to the relevant import substitutes. In a final step, the calibrated model was updated so as to generate a fairly smooth growth path over ten years.

Link between the model and household data

The CGE model is linked to household survey data in order to obtain detailed results on the poverty and distributional impact of the simulated policies. The starting point for linking survey data and the CGE model is household income, split up into (1) individual factor incomes, (2) household net interest income and transfers from abroad, and (3) household public transfers including pensions. These components of household income can be identified in the CGE model (see above) as well as in the household survey.[2]

Households receive factor income from different sources, i.e., the individuals of a household may earn different factor incomes. The household head may be self-employed (e.g. urban informal in the CGE model) and his/her spouse may be employed as a worker (e.g. non-agricultural worker in the CGE model). The link between CGE and the survey is simply sequential: each individual factor income in the household survey is scaled up or down according to the CGE results for the eight

[2] The household survey used is the 1999 MECOVI (INE 2001). This survey is to be preferred over the 1997 employment survey as it contains more detailed and more reliable information on household incomes.

production factors owned by households (Table 1). This is how changes in factor prices in the CGE model affect the distribution of income.

The remaining two components of household income and the changes therein are given by household group in the CGE model. These changes from the CGE model are applied to the survey information at the household level. The household types in the survey are classified according to the occupation of the household head, in line with the classification used in the SAM.

III. Model Simulations

1. An Optimistic Baseline Scenario

A scenario that describes how the Bolivian economy might evolve in the absence of shocks and policy changes serves as a benchmark against which all alternative developments will be evaluated. In this scenario, the economy exhibits smooth economic growth of about 4.7 percent on average over a ten-year period, where economic growth is driven by capital accumulation, (exogenous) growth of the labor force, and (exogenous) technical progress. This not only describes an optimistic forward-looking scenario, but is also a good description of the record of Bolivia in the 1990s. The growth process is associated with roughly constant domestic savings and investment ratios, which implies that the large savings gap is not closed over time. The continuing savings gap corresponds to a persistent current account deficit, and both are reflected in a fairly stable real exchange rate.

In line with past experience, the structural change projected in the baseline scenario is rather moderate. The shares of the broad aggregates Agriculture, Industry and Services in total value added barely change over time. More pronounced shifts of resources are taking place within these three sectors. Within agriculture, for example, the more productive export-oriented segment gains at the expense of the traditional, subsistence-like segment. The same pattern prevails in the services sector, where

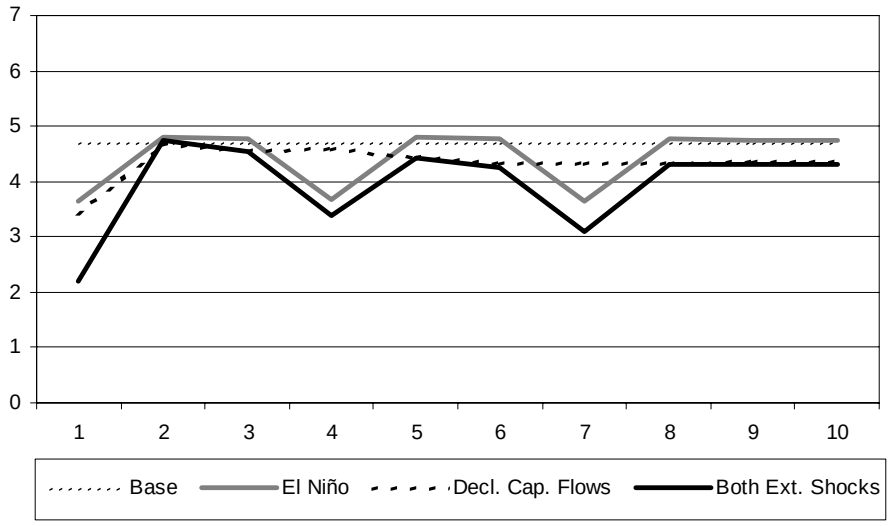
higher productivity growth and a higher income elasticity of demand raise the provision of formal relative to informal services.

From a distributional point of view, the baseline scenario suggests that without further policy reforms and without external shocks the rise in urban inequality observed over the 1990s will continue, and that the rural-urban gap in income levels will widen. In addition, inequality within rural areas will also increase (Table 2). In both urban and rural areas inequality is already at very high levels, which is why aggregate growth in Bolivia barely translates into poverty reduction. As the following figures indicate, this holds in particular for rural areas. In the course of the simulated 10-year period, the national headcount merely declines from 63.6 to 55.5 percent. This moderate reduction results from a decrease in the urban headcount from 49.7 to 39.6 percent, and a reduction of only 4.5 percentage points from 86.9 to 82.3 percent in rural areas. Even under this optimistic scenario, Bolivia would just manage to reach the revised national poverty reduction target. According to our model results, poverty reduction in rural areas falls short of the reduction predicted in the revised PRSP, while urban poverty declines faster.

2. Accounting for External Shocks

The assumption made in the baseline scenario that no external shocks occur during the simulation period is highly unrealistic in the Bolivian context. Most predictably, the agricultural sector will be recurrently hit by the El Niño phenomenon. And as the Brazilian crisis forcefully demonstrated, Bolivia’s small open economy can hardly avoid being affected by instabilities in neighboring countries. In particular, the experience of the Brazilian crisis suggests that the high level of foreign capital inflows realized in the mid-1990s should not be taken for granted. Doubts about the sustainability of these inflows are reinforced by the fact that most foreign direct investment was related to the capitalization process, which was more or less completed at the end of the 1990s. Hence, it has to be reckoned with permanently lower capital imports.

Figure 1. Growth Rates of Real GDP, Base vs. External Shocks (in percent)



Source: Authors' calculations.

Table 2. Poverty and Inequality Indicators, Base vs. External Shocks

		Base		Percentage Point Change (Final Year)		
		Initial Year	Final Year	El Niño	Declining Capital Inflows	Both External Shocks
National						
	P0	63.6	55.5	1.0	2.2	3.7
	P1	37.5	31.9	1.2	1.4	2.7
	P2	27.3	23.0	1.1	0.9	2.1
	Gini	62.7	63.2	0.2	–0.2	0.1
Urban						
	P0	49.7	39.6	0.8	2.9	4.8
	P1	21.9	16.3	0.9	2.0	3.0
	P2	12.6	9.1	0.5	1.3	2.0
	Gini	54.4	54.9	0.1	0.3	0.5
Rural						
	P0	86.9	82.3	1.3	0.8	1.8
	P1	63.7	58.2	1.6	0.3	2.1
	P2	52.0	46.5	1.8	0.1	2.0
	Gini	64.5	64.8	0.4	–0.6	–0.2

Note: P0, P1 and P2 refer to the first three measures of the Foster-Green-Thorbecke class of poverty indices. They denote the headcount index (P0), the poverty gap index (P1), and the poverty severity index (P2). Gini refers to the Gini-index, an inequality index that assumes values between 0 (total equality) and 1 (total inequality).

Source: Authors' calculations.

a. El Niño

Among the external shocks threatening Bolivia, El Niño carries the highest cost in terms of short-run agricultural output losses. An El Niño shock of average size, which is assumed to lead to a three percent reduction in agricultural production, may lower GDP growth by about one percentage point in the year of its occurrence (Figure 1). Since this is only partly compensated by higher growth in subsequent periods, and since El Niño tends to occur every three years, the losses add up to significantly lower average growth rates. In addition, the fall in agricultural exports during El Niño years leads to a deterioration of the current account balance and a real depreciation of the Boliviano. The real depreciation, in turn, gives rise to a reallocation of resources from inward-oriented sectors such as utilities, construction, and informal services to more outward-oriented sectors such as intermediate goods and mining.

The direct distributional consequence of El Niño is that smallholders and agricultural workers suffer income losses. The same is true for employers, who obtain a significant share of their capital income from investments undertaken in modern agriculture (Appendix 1). The negative impact on these three household groups is somewhat dampened by a slight increase in domestic agricultural prices as a result of supply shortages.[3] The price increases are not strong enough, however, to show up in lower real incomes for urban food consumers. In urban areas, the only major effect of El Niño on household incomes runs via the real devaluation, which makes the providers of non-traded informal services worse off. By contrast, the overall income position of non-agricultural workers and employees hardly changes, as their gains in tradable sectors tend to offset their losses in non-tradable sectors. The decline of urban informal income results in a quite considerable increase in the urban poverty incidence (Table 2). In some periods, the urban headcount increases by more than 1.5 percentage points compared to the baseline scenario. The rise in urban poverty is

[3] It is assumed that domestic agricultural prices are to a large extent determined by world market conditions so that there is only limited scope for independent domestic price movements.

comparable to that in rural areas where the headcount is on average about one percentage point higher than in the base run. Inequality rises somewhat within urban areas, and quite considerably in rural areas, which is mainly due to the fact that the losses of the employers in modern agriculture are less pronounced than those for rural workers and smallholders. Inequality also increases among the rural poor as indicated by the 1.8 percentage point increase in the poverty severity index, i.e., the poorer among the poor suffer most from the el Niño shock.

b. Declining Capital Inflows

Figure 1 illustrates the growth impact of a joint decline in foreign direct investment (FDI) and foreign portfolio investment. In order to keep track of the transmission channels of these two types of shocks to capital inflows, simulations were also performed separately although we do not report the results here. If FDI falls by almost a third, as has been the case in Bolivia in the year 2000, this causes only about half the immediate output losses of El Niño, but the impact turns out to be much more persistent.[4] Even after ten years, growth has not fully recovered. The fall in FDI lowers the domestic investment ratio, which narrows the savings gap because domestic savings hardly change. Correspondingly, the current account deficit improves, with rising exports and falling imports. A similar drop in portfolio investment, which was the main consequence of the Brazilian crisis, strongly reinforces the negative short-run impact of the fall in FDI via a deflationary effect. During the initial year, the combined capital flow shock drives the growth rate of real GDP down by about 1.5 percentage points (Figure 1). Since lower portfolio investment reduces growth only temporarily, the medium-run impact is dominated by the reduction of FDI. Average growth over the whole simulation period is about 0.3 percentage points lower than in the baseline scenario.

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[4] Since a dramatic fall in FDI can be expected to lead to temporary open unemployment on a significant scale, the true short-run losses probably exceed those reported here.

Lower FDI directly reduces the resources available to formal enterprises for physical and financial investments, whereas lower foreign portfolio investment constrains the credit supply of the domestic banking system to all domestic institutions and thus indirectly limits domestic investment. In the short run, the resulting contraction of investment demand leads to income losses in the investment goods industries, most notably in construction and in the capital goods sector. Since traditional agriculture does not produce investment goods, smallholders are the only household group that does not immediately suffer from lower investment demand. Modern agriculture, though being slightly affected by the contraction of investment demand (for seedlings, cattle etc.), benefits from its outward orientation, which limits domestic price adjustments. Overall, the domestic agricultural terms of trade improve, thereby improving the real income position of both smallholders and agricultural workers, while all other household groups suffer from the reduction of domestic absorption. In the medium to long run, lower physical investment of private corporations and state enterprises in manufacturing and in the formal services sector reduces the income earnings possibilities for non-agricultural workers, employees and employers in these sectors, while urban informals are hurt by lower consumption demand. By contrast, the agricultural sectors and the income position of rural households are almost unaffected in the medium to long term. Nominal income losses that result from the contraction of domestic demand for agricultural goods are slightly overcompensated by lower consumer goods prices, thereby leaving the real income position of rural households almost unchanged.

These developments lead to the following distributional results. While smallholders and agricultural workers even gain a little in the medium run, it is the losses of the employers that cause the rural poverty incidence to increases by up to 0.8 percentage points in the final year. Over the entire simulation period, the rural income distribution therefore improves quite considerably, which is illustrated not only by a reduction of 0.6 percentage points in the Gini, but also by a rural poverty severity index that almost remains unchanged despite lower growth. By contrast, all

urban households are negatively affected by the decrease in FDI, and the decrease in consumer prices cannot compensate for these adverse effects. The urban headcount increases by almost three percentage points compared to the baseline scenario due to the heavy income losses incurred by the urban informals and non-agricultural workers. The urban income distribution worsens somewhat, which is mainly due to the very pronounced decrease in urban informal income.

All in all, taking declining capital inflows and El Niño together, two important results stand out. First, the combined shocks drive growth in the first period down to 2.2 percent (Figure 1), which indicates that they can be regarded as major factors behind the outbreak of the recession. Second, a realistic baseline scenario for Bolivia's medium-run development prospects would have to acknowledge that under the current policy framework average growth rates are unlikely to lie above 4 percent, with substantial fluctuations between years. Compared to the optimistic scenario, this implies worse prospects for poverty reduction (Table 2). This is particularly true for urban households, who are hit markedly harder by the sharp and permanent decline in foreign capital inflows than rural households by the negative impact of El Niño on agricultural production.

3. Accounting for Major Reform Projects

a. Labor Market Reform

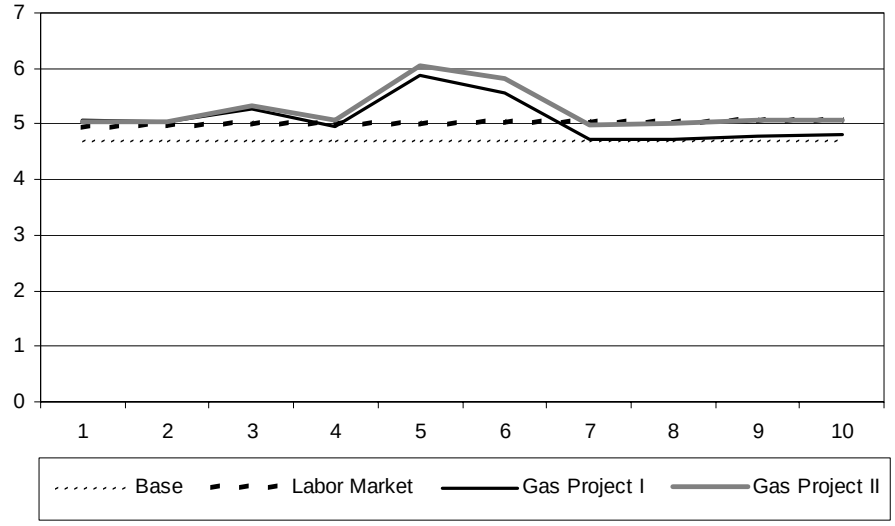
By Latin American standards, Bolivia has made remarkable progress in the area of structural reforms (see, e.g., Lora 2001). The main exception is labor market reform, where Bolivia lags behind most other Latin American countries. Among the labor market distortions that still prevail, the segmentation of the urban labor market into formal and informal parts stands out.

If the government makes it easier for urban informals to be employed as non-agricultural workers in the formal labor market, e.g. by lowering the costs of dismissal or by granting more options for temporary work, the obvious direct effect is

that average real wages go down for non-agricultural workers and up for urban informals (Appendix 1). Better earning opportunities in the urban informal sector, in turn, induce rural-urban migration on a significant scale, which moderately increases the incomes of those who stay in traditional agriculture. At the macro level, the efficiency gains achieved by reducing labor market segmentation – the wage differential between informal labor and non-agricultural workers is roughly halved – translate into average economic growth rates that are more than 0.3 percentage points higher than in the base run (Figure 2).

On balance, these developments cause negligible distributional shifts in urban areas because higher incomes for informals are offset by lower incomes for non-agricultural workers. Nonetheless, urban poverty decreases because of higher growth (Table 3), but it takes some periods for the positive growth effect to materialize. The rural income distribution changes somewhat in favor of poorer groups due to the gains experienced by smallholders. However, neither this distributional change nor the slight increase in rural growth has an impact on rural poverty.

Figure 2. Growth Rates of Real GDP, Base vs. Reform Projects (in percent)



Source: Authors' calculations.

Note: Gas Project I assumes that the project is associated with higher government consumption. Under the Gas Project II scenario government consumption is held constant.

Table 3. Poverty and Inequality Indicators, Base vs. Reform Projects

		Base		Percentage Point Change (Final Year)		
		Initial Year	Final Year	Labor Market	Gas Project I	Gas Project II
National						
	P0	63.6	55.5	–0.8	–0.9	–1.6
	P1	37.5	31.9	–0.5	0.4	–0.4
	P2	27.3	23.0	–0.4	0.7	0.1
	Gini	62.7	63.2	0.2	0.7	0.2
Urban						
	P0	49.7	39.6	–1.4	–2.2	–3.1
	P1	21.9	16.3	–0.9	–0.8	–1.6
	P2	12.6	9.1	–0.7	–0.4	–1.0
	Gini	54.4	54.9	0.1	0.2	–0.5
Rural						
	P0	86.9	82.3	0.0	1.0	0.8
	P1	63.7	58.2	0.0	2.2	1.5
	P2	52.0	46.5	0.0	2.4	1.8
	Gini	64.5	64.8	0.0	1.2	1.1

Source: Authors' calculations.

b. Development of the Gas Sector

Perhaps more than any macroeconomic and structural policy reform, the development of the natural gas sector promises to change the medium-run growth path of the Bolivian economy. Two large export-oriented hydrocarbon projects with Brazil and Argentina are already under way, another project involving the export of liquefied natural gas to North America has entered the planning stage but is currently on hold

(IMF 2004). Taken together, these projects could roughly double the share of oil and gas in total domestic production from 5 to 10 percent within a decade, and oil and gas could finally account for as much as 50 percent of total exports. Since the sector is an "enclave" in the sense that it uses negligible domestic inputs and generates little employment, its main link to the economy is through the fiscal accounts via increased revenues from taxes, and through its effects on the balance of payments – the current account improves and the exchange rate appreciates in real terms.

The natural gas boom translates into markedly higher economic growth. In 2008 and 2009, when the liquefied natural gas project is assumed to reach full capacity, the growth rate is likely to approach 6 percent (Figure 2).[5] The size of the growth effect will depend on how the government uses its additional revenues. If the receipts are channeled into consumption, the average gains over the simulation period will only be about two thirds as large as if consumption growth is left constant and the resources are instead used to prop up public investment.[6] Choosing the latter option would increase the overall domestic savings ratio by up to 3 percentage points compared to the base run, a remarkable improvement which macroeconomic and structural reforms are unlikely to achieve.

The real appreciation of the Boliviano, which in the peak years of the resource boom might reach 8 to 9 percent, leads to a contraction of export-oriented sectors such as modern agriculture, mining and consumer goods, and an expansion of non-tradables, in particular construction. This is the well-known Dutch Disease effect of resource booms, which, however, turns out to be rather moderate except for the two peak years. By keeping consumption growth constant, the government can slightly dampen the Dutch Disease effect. As a further economy-wide repercussion, lower consumer goods production reduces intermediate demand for agricultural raw

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[5] The growth results obtained here come quite close to the projections reported in IMF (2004).

[6] The average gains are likely to be underestimated somewhat because the upfront investment necessary to construct and develop large gas projects is not taken into account. While most of the inputs, in particular capital goods, will need to be imported, some domestic activities such as construction and business services might benefit during the early phases of the gas projects.

materials so that modern agricultural activities contract even more, while smallholders suffer from declining prices as they can hardly adjust supply. A restructuring of final demand away from private consumption reinforces the pressure on smallholders' prices and also hurts urban informals. Together with the fact that rural-urban migration rises considerably, this explains that urban informals are slightly worse off as a result of the gas projects even though they benefit from the real appreciation and the expansion of the construction sector. Overall, rural areas, i.e. smallholders as well as agricultural workers, suffer significant income losses, in particular in the two peak years (Appendix 1). In urban areas, both non-agricultural and skilled workers gain, with the gain of skilled workers, who are for the most part employed in the public sector, being much more pronounced if government consumption expands.

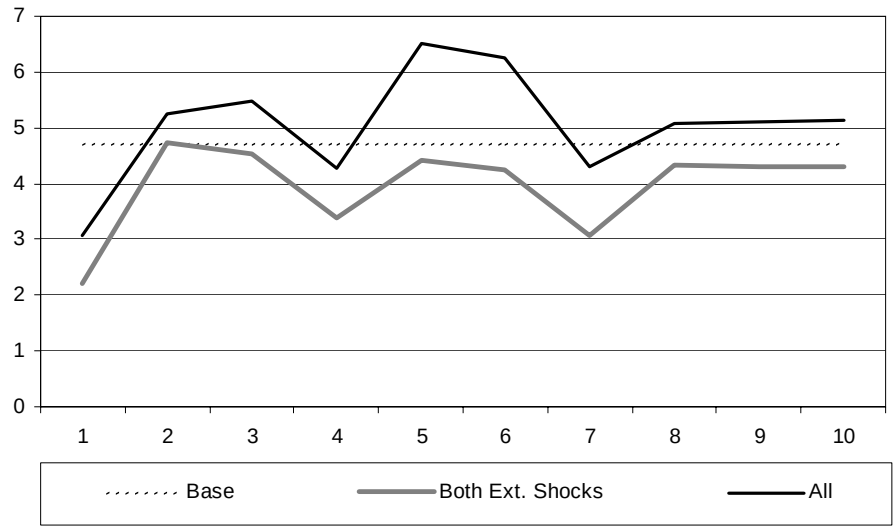
These changes in relative factor prices induce major distributional and poverty changes. From a national perspective, inequality increases substantially, which is due to both rising inequality between and within urban and rural areas. In the scenario with higher government consumption, the national Gini coefficient increases by about 0.7 percentage points (Table 3). The results regarding the evolution of poverty during the gas boom are disappointing. Despite considerably higher growth rates, the decrease in nation-wide poverty is only moderate compared to the baseline scenario. More remarkably, rural poverty even increases substantially, with a rural headcount that falls by up to one percentage point. The rural poverty gap ratio, which during the second half of the simulation period is about 2 points higher than in the baseline scenario, illustrates that many of those who were already poor incur income losses.

A somewhat more favorable outcome could be expected if the government refrained from raising consumption expenditures. In this case, the headcount would be significantly lower in urban areas, but rural households would hardly benefit and thus would remain markedly worse off than without the gas projects. In addition, the rise in inequality would be somewhat less severe due to the dampened Dutch Disease effect, with an increase in the Gini coefficient of about 0.2 percentage points.

c. Can the Reforms Offset the External Shocks?

A fairly large medium-term boost for the Bolivian economy might become possible if the gas projects were combined with the labor market reform. Such a policy package could raise average economic growth over the 10-year period by about 1 percentage point. Combining this package with the two external shocks delivers a scenario in which growth is higher than in the baseline scenario, except for the years where El Niño occurs (Figure 3). Since the growth rates of more than 6 percent during the two peak years of the gas boom have to be regarded as temporary, the medium-run growth rate implied by the combined scenario is more likely to approach 5 percent.[7]

Figure 3. Growth Rates of Real GDP, Shocks vs. Shocks plus Reform Projects



Source: Authors' calculations.

Note: "Both external shocks" includes the El Niño and the capital flow shock. "All" comprises the "Both external shocks" scenario, the labor market reform and Gas Project II.

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[7] It has to be taken into account that this scenario assumes that the government refrains from raising government expenditures in response to the gas boom. An alternative (and probably more realistic) scenario, where part of the gas revenues is assumed to be used for government consumption, would come up with somewhat lower growth rates.

Together, the gas projects and the labor market reform would also bring about a substantial reduction in national poverty. The gains would, however, exclusively accrue to urban households. They would benefit from a substantial drop in the poverty rate by more than 5 percentage points compared to the base run, while rural poverty would even rise somewhat. As a result, the poverty increase caused by the external shocks would be more than offset for urban households, and reinforced for rural households (Table 4). In addition, the dominant impact of the gas projects would lead to an overall increase in rural inequality. At the national level, the combined scenario would add up to almost the same poverty reduction as in the baseline scenario and slightly higher inequality.

Table 4. Poverty and Inequality Indicators, Shocks vs. Shocks plus Reform Projects

		Base		Percentage Point Change (Final Year)	
		Initial Year	Final Year	External Shocks	All
National					
	P0	63.6	55.5	3.7	0.2
	P1	37.5	31.9	2.7	0.9
	P2	27.3	23.0	2.1	1.1
	Gini	62.7	63.2	0.1	0.6
Urban					
	P0	49.7	39.6	4.8	–1.2
	P1	21.9	16.3	3.0	–0.4
	P2	12.6	9.1	2.0	–0.3
	Gini	54.4	54.9	0.5	0.0

Rural				
P0	86.9	82.3	1.8	2.4
P1	63.7	58.2	2.1	3.1
P2	52.0	46.5	2.0	3.3
Gini	64.5	64.8	–0.2	0.9

Source: Authors' calculations.

IV. Concluding Remarks

This paper has analyzed the effect of major external shocks and policy reforms on Bolivia's ability to realize pro-poor growth. It turns out that the two external shocks discussed in the paper go a long way to explain the outbreak of the economic crisis in the late 1990s, and that they have led to marked increases in both urban and rural poverty, with El Niño mainly hitting rural households and the decline in capital inflows mainly hitting urban households. Beyond contributing to the recession, the shocks are likely to impair medium run development prospects because El Niño occurs recurrently and the decline in capital inflows threatens to be permanent. Whereas the shocks equally hurt the urban and the rural economy, the opportunities for achieving pro-poor growth are much better in urban than in rural areas. Given the available policy choices, Bolivia could exceed the targets for urban poverty reduction set in the revised PRSP, despite the drop in foreign capital inflows. Rural poverty reduction, by contrast, risks falling short of the targets, which is in large part owed to the fact that the implementation of the gas projects bypasses rural areas and might even raise rural poverty via the economy-wide repercussions it entails.

The positive outlook for urban areas has to be qualified if one takes political economy considerations into account. A deregulation of the urban labor market carries the potential to make growth considerably more pro-poor by removing a

substantial part of the existing wedge between formal and informal wages, but it would meet with strong resistance from formal workers, who arguably are much better organized than the diverse group of people working in the informal sector. Against this political background, it becomes understandable that profound labor market reforms have not yet been initiated. Concerning the development of Bolivia's gas sector, the trade-off between growth and the participation of the poor – in particular the rural poor – in the growth process provides a strong rationale for public protest, as has already been witnessed by the recent social unrest. The trade-off is, however, hard to avoid as the gas sector is capital intensive, generates comparably little employment, and uses limited national inputs. To what extent growth and poverty objectives can be reconciled depends on how the government allocates the additional revenues it receives. While an increase in public savings might cushion the trade-off, more specific pro-poor measures targeted in particular to the rural poor are likely to be required in order to make the impact of the gas projects socially acceptable.

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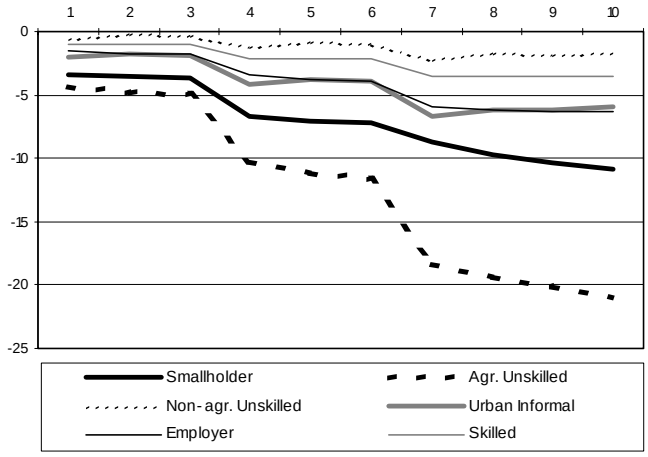
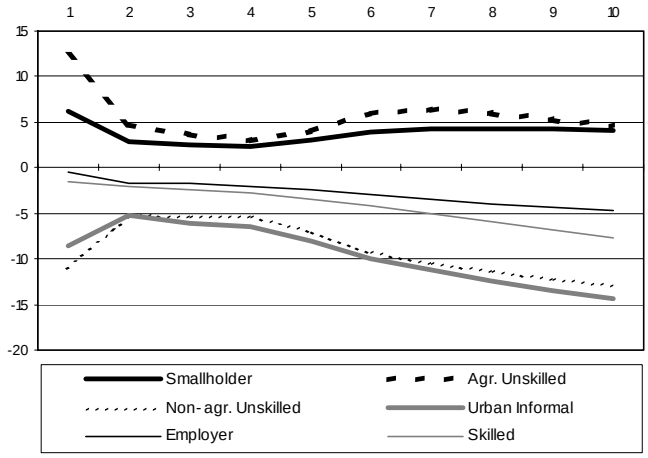
Appendix 1: Percentage Point Changes in Factor Prices vis-à-vis Base Scenario

El Niño



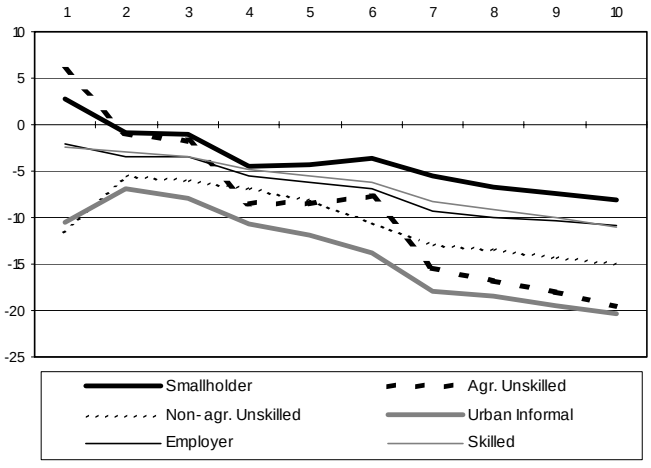
Source: Authors' calculations.

Declining Capital Inflows



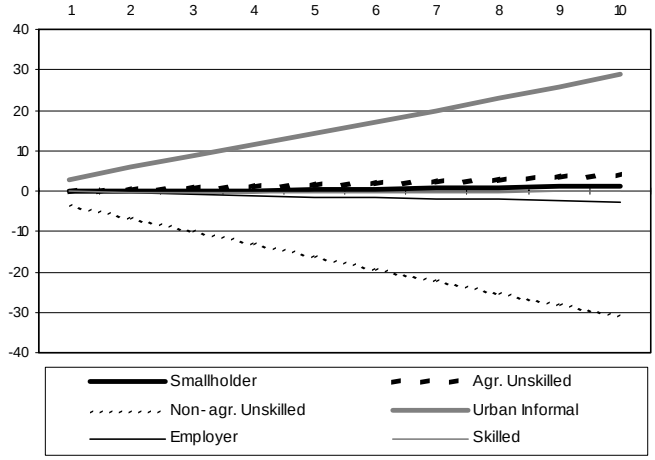
Source: Authors' calculations.

Both External shocks



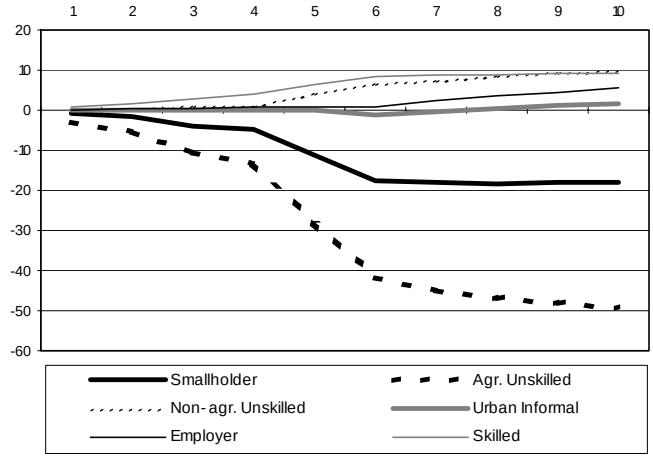
Source: Authors' calculations.

Labor Market



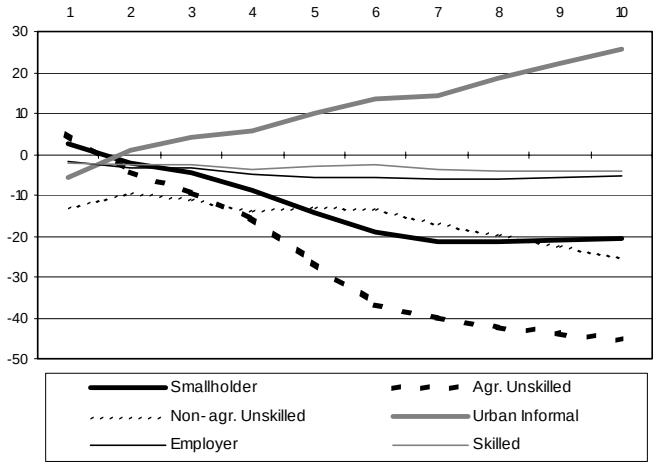
Source: Authors' calculations.

Gas Project I



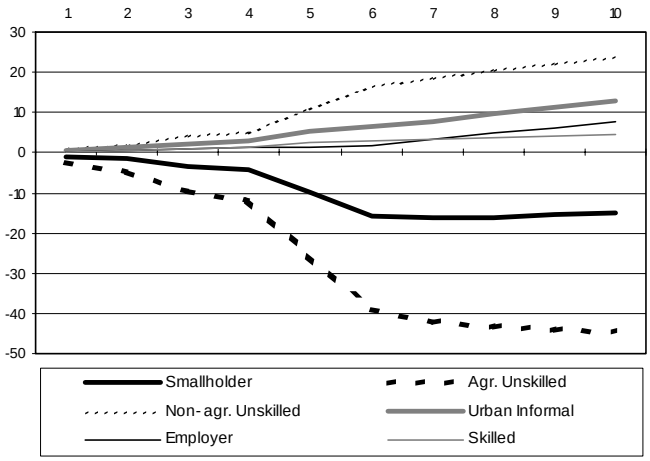
Source: Authors' calculations.

Gas Project II



Source: Authors' calculations.

All



Source: Authors' calculations.