
Bolivian Capitalization and Privatization: Approximation to an Evaluation

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The wave of privatizations Latin America experienced during the 1990s was integral to stabilization programs and a general reordering of states' roles in the regional economy. Over the past few years, however, these privatizations have come under increasing fire. Their purported adverse effects range from higher utility prices to aggravating—or even causing—the current regional recession. In short, privatization shares in the criticism directed at the entire liberalization process.

Within this context, accurate knowledge of privatization's real consequences can be of considerable value. While research has been conducted on certain economic effects, less is known about privatization's broader social consequences. This chapter attempts to fill some of those gaps as they concern Bolivia.

We first describe Bolivia's privatization process, emphasizing the particularities of the capitalization mechanism used and the regulatory framework introduced as its essential complement.¹ We then detail the changes in industrial organization and ownership patterns in the electricity, oil and gas, telecommunications, transportation, and water industries. Our concern is mainly with large infrastructure privatizations because of their

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1. In terms of the amount of assets transferred, capitalization was clearly more important than privatization. As a result, this chapter's discussion often uses the two terms interchangeably.

economic size and the data and methods available to estimate the social and distributional effects of these transactions.

The discussion then turns to these processes' economic and social outcomes. The key economic issues are which agents benefit from assets transfer and the effects on such firm-level variables as investment, profitability, and transfers to the state. The main social issues are the effects on employees in the sectors involved and consumer welfare, including access, prices, and service quality of privatized utilities.

This chapter also highlights the Bolivian population's changing assessments of the entire capitalization and privatization process. Although data limitations make full treatment impossible, the information that is available leads to the following broad conclusions:

- By design, capitalization and privatization have generated significant asset transfers to foreign firms. However, the Bolivian population was not excluded from this benefit since it collectively received a 45 percent share in most of the transferred enterprises. Dividends from this ownership have been used to pay old-age benefits.
- These processes, combined with introduction of a regulatory framework, have met their core stated goal: to substantially increase investment—and competition, in some cases—in the sectors affected.
- These investments have been associated with significant increases in capacity and output—from improvements in utility access rates to a tenfold rise in proven gas and oil reserves within five years of reform.
- Productivity increased significantly across all sectors, in part, because of employment reductions; however, these reductions were small relative to the overall economy. Unless the indirect effects are large, privatization cannot account for the increasing unemployment observed in recent years.
- Tax receipts from regulated firms increased after reform. In the current recession, however, there is pressure—particularly from the oil and gas sector—for further increases.
- While most capitalized firms report positive profits, their returns on equity have declined in recent years, particularly during the ongoing recession.
- In urban areas, capitalization is associated with increased household access to utility services; these expansions—especially in electricity and water—have not bypassed the poor. On the contrary, in many cases, the lower-income deciles have benefited the most. For telephone services, improvements have been greater further up the income distribution ladder. Several of these findings persist when the effects resulting from privatization are isolated.

- There are large gaps in available pricing information. On balance, price increases have not been large, with the exception of those involving the Cochabamba water concession.
- Taken together, improved access outweighs increased prices, resulting in welfare gains for many households. Lower-income deciles gained significantly in access to electricity. For phone services, improved access was observed nearly across the board. For water, the La Paz and El Alto concession also produced welfare gains. In the case of the failed Cochabamba concession, we found that—had the concession continued—the welfare effects would have been negative unless substantially improved access had accompanied the proposed tariff increases.
- While the regulatory framework has strengthened the rule of law and promoted competition and transparency in certain sectors, it is still necessary to improve this regulatory and broader institutional framework.
- In Bolivia, as elsewhere, privatization, capitalization, and regulation are part and parcel of a broader economic restructuring. While privatization lagged stabilization significantly, it was still crucial in the state's shift of focus from productive to social-sector activities. Nevertheless, after seven or eight years of reform and four of recession, private investment slowed and a reemerging consensus now calls for greater state involvement.

These findings provide a brief—and admittedly incomplete—evaluation of privatization in Bolivia. Further, it should be emphasized that the combination of privatization and capitalization on the one hand and regulation on the other was substituted for state ownership, although for conciseness, we often refer to these processes collectively as privatization. Moreover, it is impossible to fully disentangle the effects of these processes from those of associated events, such as introduction of new technologies.

Despite the overall success of reforms, they are unpopular, judging by polls and politicians' pronouncements. The final section of this chapter offers hypotheses to explain this phenomenon. One popular suspicion highlighted is that, even if output and productivity have improved, the capitalized enterprises have only the best interests of the majority (foreign) owners in mind, and the regulatory system has been unable to adequately restrain this tendency. The recent worldwide focus on corporate malfeasance has helped bring these concerns to the forefront. This standard issue has gained salience in Bolivia since its population collectively owns a 45 percent share in capitalized firms. Another issue emphasized is that the government oversold reforms, promising more than it could reasonably deliver. Finally, the reforms' reputation has been hurt by two high-profile failures: the national airline and the Cochabamba water concession.

In a healthy economic environment, none of these issues might have mattered. However, within the context of Bolivia's economic slowdown since 1999, they have contributed significantly to privatization's negative reputation. Moreover, the fiscal rigidities introduced by other reforms, such as decentralization and pension reform, have prolonged the slowdown. For example, the fiscal deficit created by the transition away from the pay-as-you-go pension system reached 5 percent of GDP by 2002, and is not expected to decrease for at least a decade. This deficit, in turn, has generated pressure for economywide tax increases, thereby contributing to further questions about structural reform as a whole.

Capitalization/Privatization and Regulation: An Overview

In 1985, Bolivia initiated significant economic liberalizations in order to tame hyperinflation and emerge from a deep recession. Despite success with early market-friendly initiatives, the country did not engage in sustained privatization until about a decade later. When it finally embarked on this process, the government used traditional privatization in certain cases, but mainly relied on capitalization as a mechanism for the transfer of state-owned firms.

Under traditional privatization, the government transfers a majority of ownership in a state firm to the private sector, receives the sale proceeds, and has freedom over how to spend it. Under Bolivian capitalization, the state transferred shares (mainly in infrastructure firms) equivalent to 50 percent of the firm to the investor with the winning bid. It also yielded 45 to 50 percent to private pension-fund administrators who represent the general citizenry and use the funds to pay old-age benefits complementary to individual retirement accounts. The remainder (about 4 percent, on average) accrued to the company's employees.

By its payment, the investor gains the right to manage the firm, and commits to investing its capital contribution—the total amount it offered for its 50 percent share—in the firm's development. It must carry this out within a specified period (typically six to eight years), agree to fulfill obligations that encompass expansion and quality goals, and operate under regulation and a long-term (typically 40 year) contract.²

Thus, this option assigns investment a high priority, and the government gains no disposable income. Capitalization, introduced relatively late in Bolivia's liberalization process, was not viewed as a means to cover deficits but as a way to attract foreign investment and improve management in key areas of the economy. Together, privatization and capitalization raised

2. The investor made a bank deposit with this payment and was instructed to keep records on its use. Government audits of investment, firm management, and performance took a long time to be initiated and are only currently under way.

significant amounts of capital. Total commitments amounted to about \$2 billion (about 30 percent of GDP), \$1.7 billion of which was from capitalization.³

Capitalization was complemented by reforms to each sector's industrial organization and a regulatory framework, whose stated goal was to promote competition and efficiency.⁴ The key legislation was the 1994 SIRESE (Sistema de Regulación Sectorial) Law, which created a regulatory system for the infrastructure sector. It defined the institutional structure, including the role of five regulatory agencies (*Superintendencias*) for the electricity, telecommunications, hydrocarbons (oil and gas), potable water, and transportation industries. In addition, it set up an oversight agency responsible for systemwide coordination and second instance appeals and evaluation. SIRESE also introduced market competition as a guiding principle for the sector.

Four specific laws round out the legal framework: Electricity (1994), Telecommunications (1995), Hydrocarbons (1996), and Potable Water (2000). These introduced changes in each sector's industrial organization and govern aspects related to tariff regulation, entry, service quality, and sanctions. The sector-specific regulatory agencies created as part of SIRESE administer each law.

Changes in Industrial Organization and Regulatory Arrangements

The following sections briefly describe the more important changes implemented in the electricity, hydrocarbons (oil and gas), telecommunications, transportation, and water and sewage sectors.

Electricity

Before reform, the electricity industry was divided into the National Interconnected System (NIS) and other independent networks.⁵ The NIS covers the largest cities, while the other independent networks service other urban and selected rural areas.⁶ This chapter focuses on the NIS, where the state-owned National Electricity Company (ENDE) (Empresa Nacional de

3. While privatization started in 1992 with about 50 percent of its proceeds concentrated in 1999, capitalization occurred during the 1994–97 period.

4. For more details on Bolivian regulation and regulatory institutions, see Barja (2000) and SIRESE (2000).

5. The NIS accounts for nearly 90 percent of electricity consumption.

6. In Bolivia, the main cities are departmental capitals. The three largest have populations of nearly 1 million and form the so-called central axis: Cochabamba, La Paz and El Alto, and Santa Cruz. These central-axis cities reflect the fact that Bolivia has no single dominant urban center and has one of the lowest urban concentration ratios in the region.

Electricidad) had been active in generation and transmission activities, as well as distribution, mainly through the Cochabamba Light and Electric Company (ELFEC) (Empresa de Luz y Fuerza Eléctrica Cochabamba). The Bolivian Electricity Company (COBEE) (Compañía Boliviana de Energía Eléctrica), long a private company, participated in generation and distribution in La Paz and Oruro. Other distribution firms or cooperatives were the Rural Electric Cooperative (CRE) (Cooperativa Rural Eléctrica) in Santa Cruz, Potosí Electricity Services (SEPSA) (Servicios Eléctricos de Potosí), and Sucre Electric Company (CESSA) (Compañía Eléctrica Sucre). Competition between ENDE and COBEE was limited to the direct provision of electricity to a few mining and industrial concerns.

The 1994 Electricity Law vertically separated generation, transmission, and distribution, with certain firms privatized in each. In generation, capitalization created three firms—Corani, Guaracachi, and Valle Hermoso—valued at about \$140 million. Each received part of ENDE's generation activities, with the Law limiting market share to 35 percent of the NIS. Exclusive rights were initially granted to these three companies; however, by 1999, entry was liberalized and some smaller firms began operations.

In transmission, network operations passed from ENDE to the private electricity transport company (Transportadora de Electricidad) without exclusive rights. The Electricity Law did not allow transmission firms to participate in purchase or sale activities, but it did establish open access and tariff regulations. The privatization transfer was valued at about \$40 million.

Several types of distribution firms remained after reform, all of which operate under tariff regulation and are subject to quality controls. CRE, a former distribution cooperative, remains as an independent regional monopoly. CESSA and SEPSA, formerly municipal distribution firms, also retain their monopolies. ELFEC, a municipal company before reform, now operates as a private firm (the privatization transfer was valued at about \$50 million). COBEE's distribution divestiture produced two local private distributors: ELECTROPAZ (La Paz) and ELFEO (Oruro). For all of these distribution firms, tariff regulation consists of several average cost caps, with productivity factors set using a four-year lag. Tariffs are updated twice yearly to allow for pass-through of energy cost increases.

These reforms, together with introduction of a load dispatch coordination office, have created a wholesale electricity market that seeks to simulate competitive conditions. Partially as a result, the NIS has experienced excess capacity since 1999.

Oil and Gas

Before reform, virtually all of the hydrocarbons (oil and gas) industry was under control of the state-owned YPFB (Yacimientos Petrolíferos Fiscales Bolivianos), a vertically integrated monopoly. Limited private participation

in exploration, as well as in crude oil and natural gas production, occurred through joint ventures with YPF.

With capitalization and introduction of the 1996 Hydrocarbons Law, the priority became removing YPF from production and promoting a natural-gas export industry aimed at southern Brazil. The state intended this industry to support (through taxes and royalties) development of other economic sectors; with this goal in mind, reforms and foreign investment focused on exploration and infrastructure. Inauguration of the Bolivia-Brazil pipeline in 1999 turned this vision into a reality.

These reforms were also associated with a substantial increase in natural gas reserves. Proven and probable reserves increased from about 5.7 trillion cubic feet (ft³) in 1997 to 52.3 trillion ft³ in 2002, making Bolivia Latin America's leader in free reserves. With reserves now exceeding served Brazilian and domestic market demand, the Bolivian government is considering new projects, including liquefied natural gas (LNG) exports to the United States and Mexico;⁷ petrochemical and thermoelectric plants; and export pipelines to Argentina, Brazil, Chile, and Paraguay.⁸ With regard to the domestic market, a general policy of private control was adopted for all phases up to retail commercialization.

To implement these objectives, the Hydrocarbons Law required that exploration, production, and commercialization (upstream) be executed only by private firms in joint ventures with YPF—which remains the upstream regulator—while placing few restrictions on the export and import of petroleum products. Based on 2001 data, the most important upstream operators, in terms of reserves, are Petrobrás (34.8 percent), Maxus (29 percent), Total Exploration (19.8 percent), Andina (5.9 percent), and Chaco (4.6 percent). Capitalization resulted in the creation of two upstream-sector firms: Chaco (valued at \$306 million) and Andina (valued at \$265 million).

The Hydrocarbons Law stipulates that the government is entitled to a share of the production value—50 percent from fields before capitalization (at the wellhead) and 18 percent from those discovered after capitalization.⁹ In both cases, firms are also required to pay a 25 percent profit tax, a 25 percent surtax,¹⁰ and a 12.5 percent remittance tax.

In the downstream area, oil and gas pipelines owned by YPF were transferred to the capitalized Transredes, without exclusive rights and a total

7. Given that Bolivia is a landlocked country, one major debated issue is whether the export port should be in Chile or Peru.

8. A regional distributional issue has emerged because most new reserves are in the Tarija Department, which stands to receive significant royalty revenues.

9. The old 1990 Hydrocarbons Law required that all fields pay 50 percent in royalties, plus a profit tax.

10. The surtax base is equal to the profit tax base minus 33 percent of accumulated investment and 45 percent of the value of production at each field, up to a maximum of \$40 million per year.

value of \$264 million.¹¹ The administration of other pipelines (*poliductos*) was entrusted to the private Oil Tanking, with the remainder still under YPFB control. Most YPFB refinery units were transferred to the private Bolivian Refinery Company (EBR) (Empresa Boliviana de Refinación).

With regard to commercialization, most YPFB storage terminals were transferred to the Bolivian Hydrocarbons Logistics Company (CLHB) (Compañía Logística de Hidrocarburos Boliviana) of Oil Tanking, but other private firms are also active. All distribution plants of bottled liquefied gas are private; about 19 percent of bottling capacity continues under YPFB, but all are expected to become privatized. All compressed natural gas (CNG) service stations are private, and about 15 percent of service stations for liquids continue under the state firm. Nationwide, airport service stations were transferred to the private sector. Except for Transredes, all other downstream transfers were privatizations that reached a total of \$125 million.

Mixed ownership continues in network-based natural gas distribution: Santa Cruz Gas Services Company (SERGAS) (Empresa de Servicios de Gas Santa Cruz S.A.M.), Cochabamba Gas Company (EMCOGAS) (Empresa Cochabambina de Gas S.A.M.), Sucre Gas Distribution Company (EMDI-GAS) (Empresa Distribuidora de Gas Sucre S.A.M.), and Tarija Gas Company (EMTAGAS) (Empresa Tarijeña de Gas). YPFB operates in La Paz, Potosi, and Oruro. The expectation is that these companies will eventually become privatized.¹² Despite this activity, the network-based natural gas industry is still underdeveloped; by 2001, it included only 14,435 connections. Nevertheless, current policy is to increase connections to 250,000 over the next five years as part of an effort to direct energy consumption toward natural gas.

Except for vertical-integration restrictions imposed on pipeline transport firms, the industry structure is flexible and determined by export market needs, although mergers and acquisitions are subject to approval. This flexibility has permitted Petrobrás, in association with others, to integrate several phases directed at natural gas exports to Brazil and simultaneously participate, through EBR, in domestic-market refinement.

Rate-of-return regulation (with a four-year lag) is used for pipeline transportation, with a tariff structure that differentiates between domestic and export transportation. In natural gas network distribution, tariff regulation has not been implemented thus far. Initially, consumer prices for all petroleum derivatives were calculated starting with an international reference price and then adding the costs of processing, transportation, and commercialization, plus an oil derivatives tax. In response to price volatility, liquefied gas, diesel oil, and gasoline have been subsidized since 2000. Further, by decree (January 2003), the government froze all consumer prices, eliminated the

11. Other operators are Gas Transboliviano (GTB), Gas Oriente Boliviano (GOB), Transierra, and Petrobrás.

12. The first privatization attempt in April 2002 failed.

refining margin, and increased the oil derivatives tax—with the effect of lowering prices for upstream firms. However, due to fiscal pressures generated by subsidies, the government, by recent decree (February 2004), is promoting the gradual return to market-determined consumer prices.

Telecommunications

Before reform, the telecommunications industry was divided between the National Telecommunications Company (ENTEL) (Empresa Nacional de Telecomunicaciones), the state monopoly covering national and international long distance services; 15 cooperatives, with monopolies in fixed local telephone services; and Telecel, a private monopoly in the cellular market. Capitalization created the private ENTEL, valued at \$610 million, and the 1995 Telecommunications Law maintained these separations until entry was liberalized at the end of 2001. Until then, ENTEL and the cooperatives retained exclusive rights; however, the mobile market was opened gradually by allowing entry of ENTEL-Movil (1996)¹³ and Nuevatel-Viva (2000).¹⁴

Before entry liberalization, legislation mandated tariff regulation for firms that controlled more than 60 percent of a given market. This scheme had a similar structure in all areas, establishing an initial price cap for baskets of services, adjusted for inflation, and a productivity factor with a three-year lag. In addition, the Telecommunications Law stipulated annual expansion, quality, and technological goals.

November 2001 marked the end of exclusive rights in all markets.¹⁵ Entry occurred in the long distance market through AES Corporation (in association with COTEL), Teledata (a division of COTAS), Boliviatel (a division of COMTECO), Telecel, Nuevatel, and ITS. In addition, Nuevatel and COTAS-Movil entered the mobile market, while ENTEL expanded its local network to business clients. Most of these companies are also expanding in the data transmission and Internet markets. Until the end of 2002, registers showed 16 firms providing public phone services, 42 offering cable television, 48 value-added services, 288 television, 612 radio, 18 data transmission, and 557 private networks.

Moreover, market liberalization was accompanied by a four-year restriction on mergers, acquisitions, and stock swaps accounting for 40 percent or more of total local fixed lines in service by one firm or a group of related firms. Tariff regulation continues where a firm controls more than 60 percent of a given market (this regulation is expected to change with introduction

13. A division of capitalized ENTEL.

14. A joint venture between COMTECO (Cochabamba cooperative) and Western Wireless International.

15. A year earlier, the government approved the so-called Opening Decrees (Decretos de la Apertura).

of dominant-firm regulation rules), and new rules are being implemented to facilitate interconnection agreements. A proposed Universal Access and Service Fund, financed by foreign aid and operators' contributions, would have the broad aim of reaching rural areas and the urban poor.

Transportation

Bolivia's transportation industry is divided into air, rail, road, and water segments. To date, capitalization and regulation have affected only air and rail, and the long awaited Transportation Law has not yet been approved.

Before air-market reform, the state-owned Bolivian Air Lloyd (LAB) (Lloyd Aéreo Boliviano) and the Private Bolivian Air Transport Company (AEROSUR) (Compañía Boliviana de Transporte Aéreo Privado) competed in the main domestic-market route. LAB also participated in the international market, and the Airport and Auxiliary Navigation Services Administration (AASANA) (Administración de Aeropuertos y Servicios Auxiliares a la Navegación Aérea), the state monopoly, administered the national airport system. Capitalization of LAB created a new private firm (also known as LAB), with a capital contribution of \$47 million; and the three main air terminals—Santa Cruz, La Paz and El Alto, and Cochabamba—were transferred to the Bolivian Airport Services (SABSA) (Servicios Aeroportuarios Bolivianos), a private firm, as concessions. AASANA retains administrative control of 34 small airports, while AEROSUR has entered the international market.

Before reform, the National Railway Company (Empresa Nacional de Ferrocarriles) (ENFE), a state monopoly that administered passenger and freight services in Andean and eastern regions, dominated Bolivia's rail sector. Reform created two separate regional firms, Andina Rail Company (FCA) (Empresa Ferroviaria Andina) and East Rail Company (FCO) (Empresa Ferroviaria Oriental), which were then capitalized, generating two firms that received a total capital contribution of \$87 million.

Lack of a sector law has limited regulatory activities of the Transportation Superintendence. Nevertheless, it advanced actions based on existing norms and several government decrees. In air transportation, a tariff band was set for the regular domestic market, with the stated objective of discouraging anticompetitive practices. Some airport terminal tariffs are also regulated. Rail transport regulations involve economic, technical, and security aspects of service.

Water and Sewage

While the above-mentioned sectors underwent capitalization and the introduction of regulation, the water industry has witnessed limited changes and significant difficulties. Only one municipal firm, SAMAPA (La Paz and

El Alto), was transferred as a concession to Aguas del Illimani (in 1997).¹⁶ Under the new model, the concession seeks to improve internal efficiency, coverage, and quality. The Aguas del Illimani contract reflects these aims; for example, the objectives set for 1997–2001 included (1) 100 percent access to potable water or sewage (excluding public fountains) in the Achachicala and Pampahasi areas of La Paz; (2) 82 percent access to potable water in El Alto by 2001, of which 50 percent should be expansion connections and 41 percent access to sewage; and (3) compliance with long-term expansion goals. Quality norms cover aspects related to water source, quality, abundance, and pressure as well as continuity of service, infrastructure efficiency, customer service, and emergency preparedness. Tariff regulation was established under a rate-of-return mechanism with a five-year regulatory lag and no productivity factors. In addition, tariffs were set in dollar terms, payable in bolivianos.¹⁷

The expectation was that, within a short period, legislation would be in place to incorporate the remaining firms into a similar model. However, the long awaited Potable Water and Sewerage Law—finally approved in 2000—together with significant failure in a second transfer of a municipal firm (SEMAPA) to Aguas del Tunari in Cochabamba,¹⁸ significantly slowed sector change.

Nevertheless, until 2002, the Water Superintendence was able to incorporate the new regulatory regime and sign concessions with the other 25 existing municipal water firms and cooperatives. The new law makes municipal governments responsible for providing water and sewage services, which they can perform through private or municipal firms, cooperatives, civil organizations, or any existing rural community organization. The Bolivian population is divided according to whether areas are subject to concession (which depends on financial viability). Concessions are subject to rate-of-return regulation, with a five-year regulatory lag, while universal access in nonconcession areas should be achieved with government investment.

Other Regulatory Characteristics

SIRESE, the regulatory system, consists of five sector-specific offices—electricity, hydrocarbons, telecommunications, transportation, and water and sewage—and one General Superintendence. By design, the system is financially and administratively independent, and Superintendents are appointed by congress for five-year periods.¹⁹ The functions of each Superintendence

16. The main shareholder is Lyonnaise des Eaux, with 35 percent.

17. This feature has generated wide protest among El Alto residents.

18. The main shareholder is a private firm with British International Water (with 55 percent).

19. Seven years in the case of the General Superintendent.

vary by sector, although they generally include: granting rights, regulating tariffs, promoting competition, monitoring operator obligations, resolving controversies among firms, imposing sanctions, hearing first in-instance appeals, and receiving consumer claims. It should be noted that the regulatory system administers the law, while its design is left to the corresponding government ministries (although SIRESE can propose legislation).

The General Superintendence evaluates each sector Superintendence once a year, considering such factors as compliance with general functions, internal organization, and sector performance relative to regulatory objectives. Aside from its effect on specific regulatory activities, SIRESE has succeeded in improving availability of transparent information and strengthening the rule of law.

In terms of appeals, the system has a first instance, whereby any operator can appeal a decision made by its sector Superintendence. If the decision is upheld, the operator has a second chance to appeal before the General Superintendence. Even after these stages, the operator retains recourse to the judiciary system. Until 2003, there had been 456 first instance and 351 second instance appeals and 54 cases in the judiciary system.

With regard to consumer protection, the system sets up a first reclamation instance directly with the operator. If the dispute is not settled, the consumer has a second chance before the sector Superintendence. This set-up has revealed numerous consumer complaints in certain sectors, particularly telecommunications and electricity.

In 2001, cost of the overall regulatory system was estimated at 0.2 percent of GDP; it is fully financed by operators from a levy on gross income (usually less than 1 percent). While this investment has brought significant advances, various factors have hampered its effectiveness; these include lack of continuity of Superintendents caused by political pressures, lack of a sectoral law for water (until 2000) and transportation (to date), and slow approval of detailed regulations across sectors. Operators have often lobbied the executive and legislative branches successfully in order to bypass the regulatory system; meanwhile, consumers believe they are under-represented. Certain Superintendencies have been slow to produce transparent information or have lacked specialized human resources in their earlier stages. In recent years, the system has had to reduce costs in response to similar initiatives in the rest of government.

Pension Reform and Further Ownership Effects

Capitalization transferred 50 percent of state enterprises (and their control) to foreign firms. Moreover, 45 to 50 percent of shares in capitalized firms were given to the Collective Capitalization Fund (CCF), to be held for the benefit of the population at large. Table 4.1 lists the enterprises capitalized in the utilities and hydrocarbons sectors, the number of shares issued, and

Table 4.1 Distribution of share ownership for the capitalized firms (December 31, 1999)

Sector/firm	Ownership (percent)			
	Total number of shares	Capitalizing firm	CCF (represented by fund administrators)	Firm workers
Electricity				
Corani	3,144,486	50	47.23	2.77
Guaracachi	3,358,284	50	49.83	0.17
Valle Hermoso	2,927,322	50	49.87	0.13
Oil and gas				
Petrolera Andina	13,439,520	50	47.86	2.14
Petrolera Chaco	16,099,320	50	47.31	2.69
Transredes	10,048,120	50	33.43	16.57
Telecommunications				
ENTEL	12,808,993	50	47.47	2.57
Transportation				
Ferroviaria Andina	1,322,448	50	49.93	0.07
Ferroviaria Oriental	2,296,982	50	49.91	0.09
LAB	2,293,764	50	48.64	1.36
Mean		50	46.80	4.20

CCF = Collective Capitalization Fund

Source: *Pension Bulletin* (1999), Pension Superintendence.

their distribution among the capitalizing firm (50 percent), CCF (46.4 percent, on average), and employees of each enterprise (3.6 percent, on average). To reiterate, in the second case, shares are made out to the CCF and are represented by private pension-fund administrators; they are not owned by administrators, the state, or individual citizens.

The CCF receives dividends due from its shares in capitalized firms. During 1997–2000, these shares represented 0.39 to 0.55 percent of GDP per year, with the telecommunications sector contributing the most. In 2001, dividends grew to 0.65 percent of GDP, with the energy sector providing the most; however, in 2002, its contribution dropped to 0.45 percent of GDP.

The CCF has a significant social effect as a source of transfers to private citizens. These include an old-age benefit, known as the Bonosol; funeral expenses; and investment in the Individual Capitalization Fund (ICF) (pension plan that individual citizens own), and, subsequently, the Bolivida.

The Bonosol was a cash payment (equivalent to \$248 in 1997) directed at all citizens 65 years and older. This amount was a substantial transfer, given that Bolivia's GDP per capita is about 1,000 dollars.²⁰ A total of \$56.5 million was paid to some 320,000 people.

20. By December 31, 1999, the CCF had also been used to acquire shares of the ICF for approximately \$14.7 million and funeral expenses worth \$2.3 million.

The Bonosol was paid only once before the administration that implemented the capitalization process left office. A debate immediately ensued over whether the CCF had sufficient funds to continue payments at that pace. The next administration did not make payments for a period and then switched to the Bolivida, which it began disbursing in December 2000. The Bolivida was a cash payment of \$60 for every citizen over age 65. Retroactive payments for 1998 and 1999 (\$60 per year) were made; by March 2001, 150,000 individuals had benefited.

The year 2002 witnessed the return of the administration that had originally implemented capitalization and, hence, a desire to return to the Bonosol. Because of further reductions in the dividend flow, however, the CCF now lacked sufficient funds to make payments at this level.

Reforms' Effects on Firm Performance

Capitalization and privatization have involved major changes in the industrial organization of the sectors affected and the conditions within which the firms in each sector operate.

Investment

In any evaluation of the capitalization process, investment is a key parameter since increasing it was an explicit objective. Table 4.2 summarizes the sector-specific information presented earlier, and complements it with the investment activity observed in each case.

As table 4.2 illustrates, most firms have exceeded their investment commitments; thus, from this perspective, the process appears to have met its goal. Firms under concession agreements—Aguas del Illimani and SABSA—have also invested to comply with contractual goals not shown in table 4.2.

Employment and Labor Productivity

One frequent criticism of privatization is that it leads to unemployment. After 1997, Bolivia witnessed economywide unemployment, which reached about 8 percent by 2002. To what extent did privatization and capitalization account for this rise in unemployment? Because of data restrictions, we can arrive at only a partial answer in this chapter. It involves information on the evolution of labor productivity and sector analysis (Barja, McKenzie, and Urquiola 2004).

Electricity

During 1995–98, the number of employees in each electricity generation firm remained relatively constant, with some decline by 1999. Associated with

Table 4.2 Resources and investment generated by privatization and capitalization

Firm created by reform, by sector	Year created	Privatization value (millions of US dollars)	Capitalization value (millions of US dollars)	Investment (percent of commitment, as of 2002)^a	Company or institution in charge of investment
Electricity					
Corani, S.A.	1995	n.a.	58.79	74.7	Corani, S.A.
Elfec, S.A.	1995	50.30	n.a.	n.a.	TGN-Investment
Guaracachi, S.A.	1995	n.a.	47.13	150.0	Guaracachi, S.A.
TDE, S.A.	1997	n.a.	n.a.	n.a.	ENDE Residual
Valle Hermoso, S.A.	1995	39.90	33.92	111.9	Valle Hermoso, S.A.
Oil and gas					
Airport Service Stations					
Andina, S.A.	2000	11.10	n.a.	n.a.	TGN-Investment
Chaco, S.A.	1997	n.a.	264.77	108.9	Andina, S.A.
CLHB, S.A.	2000	12.05	306.66	89.2	Chaco, S.A.
EBRS, S.A.	2000	102.00	n.a.	n.a.	TGN-Investment
Transredes, S.A.	1997	n.a.	263.50	102.5	TGN-Investment
Telecommunications					
ENTEL, S.A.	1995	n.a.	610.00	21.4	ENTEL, S.A.
Transportation					
FCA, S.A.	1996	n.a.	13.25	167.6	FCA, S.A.
FCO, S.A.	1996	n.a.	25.85	241.6	FCO, S.A.
LAB, S.A.	1997	n.a.	47.47	100.0	LAB, S.A.
Total		215.35	1,671.34		

n.a. = not available

a. Based only on the amounts the regulatory system designated for capitalization.

Source: Fiscal Action Unit.

increased output, these trends have resulted in increased labor productivity, which, for the 1995–99 period, ranged between 14 and 100 percent.

Distribution enterprises can be split into two groups: (1) ELECTROPAZ, CRE, and ELFEC (which respectively operate in the three largest cities of La Paz and El Alto, Santa Cruz, and Cochabamba), and (2) CESSA, SEPSA, and ELFEO (which operate in smaller markets). Employment in distribution enterprises experienced a downward trend, while labor productivity grew somewhat consistently. In La Paz and El Alto, for example, ELECTROPAZ consistently reduced its employment level during 1996–99 and increased productivity by 59 percent over the same period. In Santa Cruz, CRE reduced personnel until 1997 and raised productivity 43 percent (it increased employment in 1998, but this failed to reverse productivity increases). In Cochabamba, ELFEC reduced employment until 1998, and increased productivity by 105 percent over the same period. Two firms, CRE and SEPSA, increased their employment levels between 1995 and 1999.

To summarize, both generation and distribution firms have experienced, on average, relatively moderate decreases in employment levels, particularly two or three years after they initiated operations (in the case of capitalized firms), while enjoying significant, consistent increases in labor productivity.

Telecommunications

ENTEL-Movil initiated its operations in 1996 and possibly completed hiring in 1997, which may have accounted for more workers during 1996–97. After employment peaked in 1997, a continuous, increasing decline began (15 percent in 1998, 19 percent in 1999, and 30 percent in 2000). Labor productivity, as measured by long distance minutes per employee, continued to grow until 1998; a decline followed in 1999, despite falling employment levels, reflecting weakening demand for long distance services, induced by the recession and perhaps growing Internet use.

In the case of cellular services, the data record is incomplete; nonetheless, one might venture that the Telecel experience reflects that of both operators. Telecel increased its employment continuously until 1996, but then reduced it in 1997, partially in reaction to ENTEL-Movil's entry and the onset of price competition. Increased labor productivity also displayed an upward trend during this period, reaching 152 percent by 1996. After 1997, Telecel resumed its employment increases, and its personnel count in 2000 was nearly double that of 1996. Despite this success, labor productivity continued to increase (57 percent in 1997 and 172 percent in 1998). These positive results reflect expansion resulting from price competition and quality-related improvements.

For local telephony, growth in labor productivity is consistent in all cases, reflecting increased number of connections. Nevertheless, some operators reduced personnel in certain years (e.g., COTEL in 1995, COTAS in 1993–96 and 1998–99, and COMTECO in 1998–99).

Oil and Gas

YPFB had employment decreases after the 1997 reforms; however, one should distinguish between upstream (exploration and production) and downstream (transportation and commercialization) activities. Before reforms, the number of upstream-sector employees fluctuated around 25 percent of the total. These were substituted by the capitalized Andina and Chaco, which, in 1998, operated with about 40 percent of the total upstream personnel YPFB had in 1996. The continuing decrease in YPFB employment extended beyond 1999 as downstream-sector activities were privatized.

Although the number of employees in oil and gas transportation (which Transredes represents) is known, no information is available on the rest of downstream activities (industrialization, storage, distribution, and commercialization).

Summary

Since employment in the electricity and telecommunications sectors peaked around 1997, one cannot rule out that capitalization might have caused personnel reductions. However, the employment level in these sectors is small, accounting for fewer than 6,000 jobs of the more than 1.3 million workers in the capital cities alone. Nonetheless, job losses in these sectors account for about 3 percent of aggregate job losses in capital cities during 1995–2000; thus, while small, the effect is not negligible.

Taken together, the evidence on employment levels suggests that capitalization was indeed associated with employment reductions, amid increasing output and labor productivity. Within the broader context of Bolivian employment, however, incomplete data indicate that direct employment losses have accounted for no more than a small proportion of the unemployment increases that started in 1998.

Profitability and Fund Flows

Financial results are another relevant firm-level outcome. In reviewing the descriptive statistics shown in table 4.3, one must recall that part of YPFB was capitalized in 1997, ENDE and ENTEL in 1995, and ENFE in 1996. With the exceptions of ENTEL and LAB, residuals of these firms remained, and privatizations (or portions of them) occurred later. If one considers current expenditures over revenues until the year of capitalization, the data show that, except for ENDE and ENFE in 1995, these firms covered their operating expenses and were capable of making short-term transfers to the state, although certain ones (e.g., ENDE and ENTEL) were positioned more comfortably. When one considers total—including capital—expenditures over revenues, state firms were in deficit (except for YPFB in 1995–97, ENDE

Table 4.3 Cash flow statistics of government firms, 1990–2001 (percent)

Firm	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
YPFB												
C. Exp./C. Rev.	0.90	0.89	0.90	0.95	0.90	0.88	0.90	0.95	1.05	0.97	0.95	0.97
T. Exp./T. Rev.	1.08	1.05	1.06	1.08	1.07	0.99	0.97	0.96	1.06	0.98	0.95	0.97
I/GDP	2.17	2.16	1.86	1.65	1.67	0.98	0.63	0.10	0.05	0.08	0.00	0.01
T/GDP	7.92	8.85	7.21	6.47	5.93	5.52	5.79	3.34	3.41	3.09	-0.18	-0.30
ENDE												
C. Exp./C. Rev.	0.65	0.63	0.63	0.58	0.62	1.31	0.87	0.55	1.12	1.02	2.05	2.15
T. Exp./T. Rev.	0.94	1.14	1.43	0.95	0.82	1.16	1.64	0.82	1.35	0.69	1.39	1.54
I/GDP	0.32	0.55	1.01	0.53	0.33	0.52	0.32	0.09	0.03	0.01	0.00	0.01
T/GDP	0.06	0.07	0.02	0.15	0.19	0.73	0.16	0.04	0.00	-0.02	0.00	-0.01
ENTELE ^a												
C. Exp./C. Rev.	0.72	0.70	0.72	0.84	0.88	0.87						
T. Exp./T. Rev.	1.23	1.04	0.89	1.15	0.98	0.93						
I/GDP	0.57	0.40	0.24	0.45	0.14	0.09						
T/GDP	0.41	0.49	0.44	0.63	0.80	0.71						
ENFE												
C. Exp./C. Rev.	0.97	0.84	0.77	0.95	0.88	1.03	0.97	2.68	2.33	6.91	1.88	4.26
T. Exp./T. Rev.	1.44	1.05	1.07	1.12	1.05	1.11	0.86	1.33	1.39	1.42	1.33	1.49
I/GDP	0.39	0.28	0.32	0.24	0.18	0.09	0.00	0.01	0.00	0.00	0.00	0.00
T/GDP	0.06	-0.10	0.12	-0.09	0.07	0.06	-0.20	-0.02	-0.01	0.00	0.00	0.00
All												
I/GDP	3.87	3.75	4.08	3.29	2.63	2.15	1.69	0.66	0.33	0.22	0.17	0.17
T/GDP	8.65	9.50	8.00	7.44	6.57	7.75	6.14	3.46	3.34	3.13	-0.22	-0.33

C. Exp. = current expenditures, including current transfers

C. Rev = current revenues, including current transfers and operational revenues

T. Exp. = total expenditures, including current and capital expenditures

T. Rev. = total revenues, including current and capital revenues

I = investment

T = taxes, royalties, and net transfers to government.

GDP = gross domestic product

a. Data for ENTEL not available for all years.

Source: Fiscal Action Unit.

in 1991 and 1993–94, and ENTEL in 1992 and 1994–95). Thus, most of the time, state firms had to finance their investments through debt,²¹ and many years witnessed investment shortfalls.

The magnitude of these firms' investment can be observed as a percentage of GDP and in relation to all state enterprise investment.²² In both of these areas, YPFB stands out in terms of size.

During the postcapitalization period, the outlook for residual firms changed substantially in terms of investment and net contributions. However, other indicators worsened dramatically, particularly for ENDE and ENFE residuals.

During 1997–2002, electricity generation companies Corani and COBEE (hydroelectric firms) performed better than did Guaracachi and Valle Hermoso (thermoelectric firms) for the criteria considered (table 4.4). In terms of distribution, in the year 2000, ELECTROPAZ had the lowest expenditure-to-revenue ratio and the highest return on equity, followed by ELFEC and ELFEO. The remaining firms were cooperatives (CRE) or had municipal participation.

For hydrocarbons (oil and gas), information is available only on Andina, Chaco, and Transredes. In upstream activities, both Andina and Chaco have increasingly improved their internal efficiency and return on equity. Transredes, the main firm in pipeline transport, has managed to generate annual surpluses, except in 2000, when an oil spill resulted in a capital loss.

Telecommunications data show that internal efficiency in ENTEL and COMTECO deteriorated in 1999; the measure of profitability fell from 8.9 in 1998 to 5.3 percent and from 5.2 in 1998 to 2.8 percent, respectively. For COTEL and COTAS, the efficiency indicator remained stable; however, COTEL generated losses each year while COTAS had weak profits. During 1998–2000, TELECEL improved its profitability; however, it experienced substantial losses during 2001–02.

In the airline sector, LAB managed to break even in 1999, but incurred significant losses during 2000–02. VASP, the company that capitalized LAB, departed in 2002 under allegations of asset stripping. At that point, Bolivian investors took over LAB, allegedly paying a gift price for it. AEROSUR, which participated in the domestic market only, produced better results during the years considered. Since 1997, SABSA, the airport terminal operator, has had deteriorating performance and, in 2000, experienced a dramatic loss; however, it bounced back by 2001–02.

The rail sector has experienced a more positive outlook. In 1997, FCA made a 13.6 percent return on equity; although, by 2000, it had fallen to

21. In general, state firms could not obtain commercial credit, and their debt consisted mainly of concessionary credit from bilateral or multilateral agencies, with government guarantees.

22. Infrastructure, hydrocarbons, minerals, and industrial sectors.

Table 4.4 Performance indicators of main firms in regulated sectors, 1997–2001

Sector and company	Operational costs and revenues					After tax profit or equity				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Electricity generation										
Corani	0.38	0.40	0.38	0.48	0.6	12.2	7.2	9.3	8.0	5.2
COBEE	0.65	0.69	0.59	0.63	0.5	11.1	7.2	11.6	9.8	14.3
Guaracachi	0.99	0.94	0.94	0.82	0.8	3.6	5.6	4.4	5.3	2.7
TDE-Transmission	n.a.	n.a.	0.66	0.65	0.65	n.a.	n.a.	5.2	6.2	6.6
Valle Hermoso	1.02	0.90	1.02	1.01	2.5	2.6	4.8	4.7	3.7	-0.9
Electricity distribution										
CESSA	0.93	0.90	0.77	0.97	0.97	4.6	8.4	0.6	7.5	5.7
CRE	0.90	0.89	0.89	0.93	0.94	6.0	6.8	3.0	2.8	2.3
ELECTROPAZ	0.81	0.78	0.77	0.84	0.86	11.1	10.9	14.2	14.4	6.9
ELFEC	0.82	0.83	0.83	0.92	0.95	10.1	9.1	10.3	14.2	7.2
ELFEO	0.81	0.77	0.82	0.91	0.87	12.4	16.9	12.4	8.2	4.6
SEPSA	0.98	0.92	0.92	0.90	0.94	6.8	6.5	6.3	4.4	4.2
Oil and gas										
Andina ^a	n.a.	0.92	0.91	0.75	0.00	n.a.	0.7	1.3	6.1	0.0
Chaco ^a	n.a.	0.76	0.54	0.38	0.37	n.a.	-2.1	6.1	9.6	8.5
Transredes ^b	0.58 ^c	0.57	0.61	1.60	0.87	7.3	6.0	8.3	-4.0	2.5

Telecommunications										
COMTECO	0.85	0.73	0.98	n.a.	n.a.	3.3	5.2	2.8	n.a.	n.a.
COTAS	0.89	0.89	0.88	n.a.	n.a.	1.7	0.5	0.6	n.a.	n.a.
COTEL	1.32	1.29	1.30	n.a.	n.a.	-30.5	-9.4	-11.0	n.a.	n.a.
ENTEL	0.80	0.83	0.94	n.a.	n.a.	6.2	8.9	5.3	n.a.	n.a.
TELECEL	0.95	0.84	n.a.	n.a.	n.a.	-24.3	33.4	n.a.	n.a.	n.a.
Transportation										
Airlines and airports										
AEROSUR	1.18	0.98	1.04	0.83	n.a.	-19.3	1.6	-9.4	0.0	n.a.
LAB	0.97	1.00	0.99	1.03	n.a.	2.5	-5.8	0.4	-14.0	n.a.
SABSA	0.93	0.97	1.10	1.16	n.a.	33.3	12.0	-15.7	-83.9	n.a.
Rail										
FCA	0.85	0.85	0.93	0.86	n.a.	13.6	7.3	8.7	8.2	n.a.
FCO	0.57	0.59	0.71	0.68	n.a.	27.0	28.5	15.5	15.2	n.a.
Water										
Aguas del Illimani	0.86	0.85	0.84	0.64	0.65	0.9	15.0	18.4	4.9	-4.9

n.a. = not available

a. For years ending in March.

b. Includes deferred-account revenues.

c. Seven months of operation.

Source: General Superintendencia.

8.2 percent and to 2 percent by 2002. For FCO, the 1997–98 profit rate fluctuated around 28 percent, falling to 15 percent by 1999–2000 and to 10.6 percent by 2002. Nonetheless, FCO is considered the most profitable firm among those capitalized. This may partially reflect its monopolization of the Santa Cruz–Puerto Suarez route, where it faces no trucking competition.

In terms of the water industry, Aguas del Illimani is the only privately administered firm. Indicators for the 1997–99 period show a consistent tendency toward improvement; however, its profitability fell significantly during 2000–01.

Utilities Access and Price Changes: Effects on Consumer Welfare

Privatization may affect consumers of utilities services in three main ways:

- If privatization results in expanded utilities networks, then unserved households might become consumers of the services.
- For consumers with access, privatization may bring about price changes.
- Privatization may affect the quality of the services provided.

We focus on the utilities sectors for which direct consumer expenditure data is available (i.e., electricity, telecommunications, and water). Data on transport is unavailable by type,²³ while hydrocarbons (oil and gas) privatization is likely to have affected consumers indirectly because of its export-intensive nature.²⁵

Increasing consumer access to infrastructure, especially water and electricity, has long been regarded as an essential component of poverty reduction strategies. Poverty measures of unmet basic needs are based directly on access to such services. Electricity helps to generate income for the poor; for example, 78 percent of all municipal workshops in Bolivia's rural areas identified rural electrification as the most important action in combating poverty (Government of Bolivia, or GOB 2001).

Changes in Access

The fifth (1992) and seventh (1994) rounds of the Integrated Household Survey (Encuesta Integrada de Hogares, or EIH) and the first round (1999)

23. This is unfortunate because transportation tends to account for a larger portion of poor household budgets.

24. Although the price volatility introduced by liberalization could have important welfare consequences.

of the Ongoing Household Survey (*Encuesta Continua de Hogares*, or ECH) can be used to examine changes in access to utilities services before and after the capitalization reforms of 1995 and 1996 (see appendices 4A and 4B).

The surveys determined household access to telephone and electricity services by directly asking whether the household had service. Calculations for communications, which included telephone and mail, were based on whether the household reported positive expenditure on this item during the past month. A household was considered to have access to water if it had a pipe connection to the dwelling unit's building (table 4.5).

During Latin America's rapid urbanization of 1994–99, Bolivian consumers' access to all services increased as low-income, rural residents migrated to urban areas, putting pressure on urban infrastructure. Without such significant investment, coverage rates would, in all likelihood, have declined.

Access changes by per capita, household-expenditure decile were also reported (table 4.6). Coverage for electricity was the highest before privatization (in 1994, more than 98 percent of the top half of the distribution had access). As a result, improvements concentrated mainly on the poor (during 1994–99, an additional 9.6 percent of the poorest decile gained access).

Access to water was initially high among the richer deciles, but lower than access to electricity among the poor. During 1994–99, each of the bottom seven deciles increased access of more than 10 percent; remarkably, an additional 24.6 percent of the poorest decile gained access to water. By contrast, access to telephone service was less common, and increased access occurred mainly for middle and upper portions of the overall distribution.

While access increased after privatization, it also increased before privatization (table 4.6). To estimate whether privatization changed the rate of increase, one can consider the difference between the annual growth rate in access before (1992–94) and after (1994–99) privatization.

This simple counterfactual will tend to bias downward any effect of privatization since access rates cannot grow beyond 100 percent; hence, one would expect growth rates to fall as coverage grows. Nevertheless, as table 4.6 shows, rates doubled for communications (for most deciles) and water (for middle deciles). The growth rate in electricity access has slowed, which is to be expected, given that access now stands at 97 percent or above for all but the second decile.

Another way to determine whether privatization increased access is to compare changes in access to water in La Paz and El Alto—the only city with a sustained concession—to changes in other major cities. This comparison is particularly relevant because the government chose to award the La Paz and El Alto concession on the basis of bids for the number of new connections to be offered at a predetermined tariff level, suggesting that increased access was a goal of this process.

As table 4.6 shows, for the top four quintiles, access to water during 1992–94 increased faster in the other cities than in La Paz and El Alto.

Table 4.5 Evolution of Bolivian capitals' access to basic services, for selected years (percent of households)

Income decile (household, per capita)	Telephone ^a			Communications			Electricity			Water				
	1994	1999	1992	1994	1999	1992	1994	1999	1992	1994	1999	1992	1994	1999
1	0.9	8.3	1.2	2.9	13.5	85.4	89.2	98.9	52.2	64.5	89.1	52.2	64.5	89.1
2	4.5	15.8	2.7	7.2	18.0	88.5	93.3	95.0	59.8	68.1	82.5	59.8	68.1	82.5
3	4.5	20.4	6.6	8.1	27.4	90.3	93.2	97.9	67.4	74.7	89.1	67.4	74.7	89.1
4	6.4	30.7	8.1	9.4	45.0	90.9	94.6	96.9	72.5	73.2	89.0	72.5	73.2	89.0
5	8.8	38.6	13.9	13.4	57.4	94.1	96.6	100.0	71.9	76.4	87.8	71.9	76.4	87.8
6	16.1	51.1	18.5	22.3	62.5	94.8	97.7	100.0	79.4	83.0	95.7	79.4	83.0	95.7
7	20.8	60.4	21.7	27.4	69.4	96.0	98.1	100.0	85.0	85.1	98.7	85.0	85.1	98.7
8	28.6	62.1	29.6	35.6	75.7	97.3	98.0	100.0	84.9	91.1	97.7	84.9	91.1	97.7
9	41.5	72.2	45.0	48.6	86.0	98.5	98.8	99.9	88.4	91.5	95.7	88.4	91.5	95.7
10	60.3	77.4	53.5	69.7	85.1	97.6	99.7	100.0	92.0	95.5	97.8	92.0	95.5	97.8
Total	20.0	42.5	21.1	25.5	52.7	93.6	96.0	98.8	76.3	80.6	92.1	76.3	80.6	92.1

a. Access on telephone access was not available for 1992.

Notes: Access to telephone, electricity, and water is based on direct survey questions on household ownership of phone, electricity services (including lighting), and water network services (whether water is connected to the building that houses the dwelling unit). The household is considered to have access to communications (telephone and mail) if it had positive expenditure on these items within the last month.

Sources: Authors' calculations from fifth (1992) and seventh (1994) rounds of EIH and first (1999) round of ECH.

Table 4.6 Access changes resulting from privatization
1994–99 annual change minus 1992–94 annual change (difference-in-difference)

Decile	Electricity		Water
	Communications	Electricity	
1	1.3	0.0	-1.2
2	-0.1	-2.1	-1.3
3	3.1	-0.5	-0.8
4	6.5	-1.4	2.8
5	9.0	-0.5	0.1
6	6.1	-1.0	0.7
7	5.5	-0.7	2.6
8	5.0	0.0	-1.7
9	5.7	0.1	-0.7
10	-5.0	-1.0	-1.3
Total	3.2	-0.6	0.1

Access to water, by expenditure quintile and region

Quintile	La Paz and El Alto						Other main cities			Difference-in-difference ^a								
	1992		1994		1999		1992		1994		1999		1992–94		1994–99		Triple difference ^b	
	1992	1994	1992	1994	1992	1994	1992	1994	1992	1994	1992	1994	1992–94	1994–99	1992–94	1994–99	1992–94	1994–99
1	53.3	66.1	66.1	66.1	88.8	88.8	57.4	66.4	66.4	66.4	82.5	82.5	3.8	6.6	3.8	6.6	-0.6	-0.6
2	70.7	73.3	73.3	73.3	93.3	93.3	69.8	74.2	74.2	74.2	86.9	86.9	-1.8	7.4	-1.8	7.4	2.4	2.4
3	76.0	77.4	77.4	77.4	95.6	95.6	75.7	80.6	80.6	80.6	89.4	89.4	-3.5	9.5	-3.5	9.5	3.6	3.6
4	87.1	89.8	89.8	89.8	100.0	100.0	84.1	87.5	87.5	87.5	97.3	97.3	-0.7	0.4	-0.7	0.4	0.4	0.4
5	96.2	94.6	94.6	94.6	100.0	100.0	87.8	93.1	93.1	93.1	95.4	95.4	-6.9	3.1	-6.9	3.1	4.1	4.1
Overall	78.1	81.7	81.7	81.7	94.4	94.4	75.6	80.3	80.3	80.3	90.7	90.7	-1.0	2.2	-1.0	2.2	1.0	1.0

a. The difference-in-difference is the change in La Paz and El Alto minus the change in other main cities (Cochabamba and Santa Cruz).

b. Triple difference is the difference between one-fifth the double difference over 1994–99 and one-half the double difference over 1992–94.

Sources: Authors' calculations from fifth (1992), sixth (1993), and seventh (1994) rounds of EIH and first (1999) round of ECH.

However, after the water concession, access during 1994–99 increased more in La Paz and El Alto. The resulting threefold change is positive overall for the richer four quintiles, suggesting that privatization increased access. By contrast, access by the poorest quintile increased at a faster rate in La Paz and El Alto than it did in other main cities, both before and after privatization; thus, the overall triple difference is small.

Penetration rates for telephone service in Bolivia overall—not only the largest cities—reveal increased access. Until 1996, the growth rate was fairly stagnant, after which cellular and Internet growth was rapid, and both fixed-line and public phone services grew. Cellular subscribers (per 100 inhabitants) grew from 0.27 in 1996 to 6.96 in 2000, surpassing the number of residential main lines per inhabitant in this period (International Telecommunication Union, or ITU 2001). Over the years, Bolivia has made an effort to extend rural telephone coverage; the capitalization contract with ENTEL, in fact, contained clauses in this regard. Rural lines grew from 0.65 lines (per 1,000 rural inhabitants) in 1997 to 2.03 lines (per 1,000 rural inhabitants) in 2000.²⁵ While the number of connections is low, these new connections can mean substantial welfare gains for rural residents.

Although technology improvements are responsible for a portion of the increases, it is likely that rapid growth rates would not have been achieved without liberalization in general and introduction of competition in cellular services in particular. In Bolivia, cellular access gains have been critical because local cooperatives charged \$1,200 to \$1,500 for access to local lines (an amount that entitles the buyer to one share of the cooperative).²⁶ In 1996, the GDP per capita was only about \$1,000, putting the cost of a local fixed line beyond the reach of many consumers; thus, cellular competition dramatically reduced these access costs.

Price Changes

Despite the popular perception that privatization causes price increases, its effect is uncertain; much depends on the process itself, as the government can award the contract on the basis of the highest bid or lowest tariff offer. In addition, the existing amount of direct government subsidies will determine whether the private firm needs to raise prices to cover losses. If cross-subsidization occurs before privatization, rebalancing can contribute to price changes. Moreover, private firms may act to reduce illegal connections, resulting in *de facto* price increases for consumers who obtained the service illegally before privatization. Competition and regulation are also important factors; for example, if private management is more efficient and

25. Rural lines from the Telecommunications Superintendent, SITTEL. See www.sittel.gov.bo.

26. See Fernando Cossio Muñoz, “Bolivia: Telecommunications Sector,” 1999, www.tradeport.org/ts/countries/bolivia/isa/isar0001.html.

the private firm faces competition or regulation, prices can fall (Estache, Foster, and Wodon 2002).

Several reasons suggest that Bolivian prices should not have increased dramatically after privatization. First, because the government did not use capitalization proceeds to cover deficits, there were fewer incentives to build high tariffs into the contracts. Second, promoting competition and implementing regulation may have helped reduce the pressure for price increases. Third, as existing firms were often cooperatives or private companies (e.g., COBEE in the electricity sector), the government's distributional goals were not always implemented through utility prices. Moreover, the autonomous nature of existing firms likely lessened the problem of illegal connections, although the household surveys do not enable one to examine such changes. Finally, in telecommunications, ENTEL, the state-owned long distance provider, was always separate from local cooperatives; thus, the typical cross-subsidization of long distance and local rates was not an issue.

The household surveys used for this chapter collected data only on household expenditure, not the prices individual households paid for infrastructure services. As a result, we had to use aggregate price indices at either the city or national level with which to assess price changes after privatization.

As figure 4.1 shows,²⁷ water prices rose in La Paz and El Alto before the 1997 concession and continued to rise until 1998. Prices rose faster in Santa Cruz, where reforms did not occur; thus, privatization resulted in slower increases in La Paz and El Alto relative to other cities. Using the weighted average price in Cochabamba and Santa Cruz to predict what price increases would have been in La Paz and El Alto without privatization, one finds that privatization lowered prices 10.5 percent, relative to the average in other cities (Barja, McKenzie, and Urquiola 2004).

Price increases for water are especially interesting because they led to a spectacular failure in the privatization process. In 1999, Aguas de Tunari, a subsidiary of Bechtel Enterprises, was the sole bidder in an auction for a water concession in Cochabamba. The city faced a chronic water shortage, with many poor households unconnected to the network, while state subsidies went mainly to the middle class and industry.²⁸

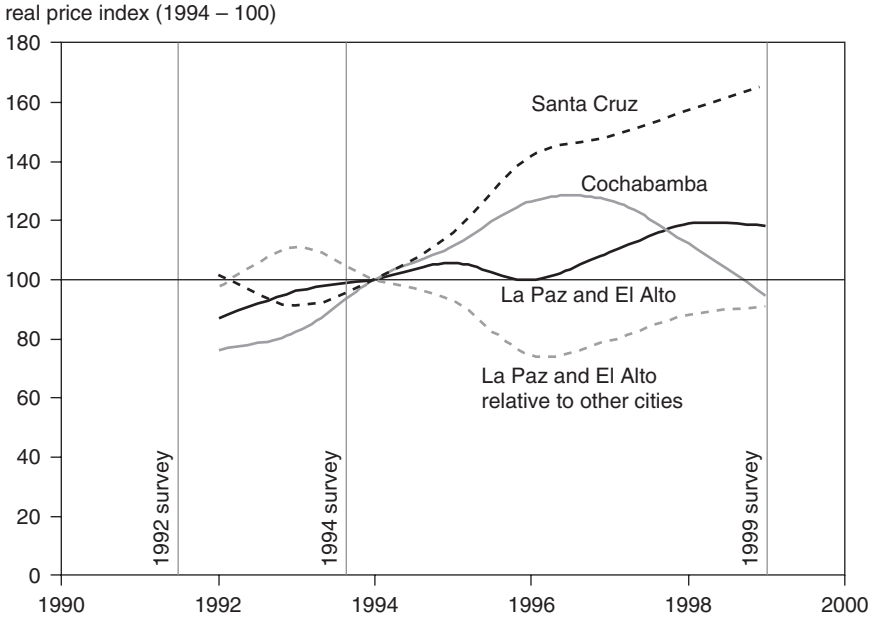
When the first monthly bills arrived in January 2000, consumer price increases averaged 51 percent (some household increases were more than 90 percent because of small increases in usage, coupled with large rise in price).²⁹ Because water prices had fallen during 1997–99 (figure 4.1), the price rise was an even greater shock to consumers. The poorest consumers—for

27. Data supplied by the Instituto Nacional de Estadística (INE).

28. See William Finnegan, "Letter from Bolivia: Leasing the Rain," *The New Yorker*, April 8, 2002.

29. See www.democracyctr.org/bechtel/waterbills/waterbills-global.htm.

Figure 4.1 Evolution of water prices in Bolivia, 1992–99 (for 10 m³)



Source: Bolivia's INE.

whom water usage consisted of only an indoor toilet and outside water tap—had an average price rise of 43 percent, with some consumers reporting a doubling of their bill.³⁰ Prices rose even more for richer consumers; the middle class had average increases of 57 percent, while commercial-user prices rose 59 percent.

The exclusive rights granted the concessionaire affected local investors' interest in private wells and distribution systems. In addition, Aguas del Tunari agreed to invest \$200 million in the popular Misicuni water provision project (30 percent of which had to come from equity and the rest from debt). The tariff increase occurred before the company had complied with the equity commitment and the debt financing had been lined up. The perception was that the firm was attempting to finance its equity share of the tariff increases.

Within this context, the so-called "water war" occurred, involving local labor strikes, demonstrations, and violent confrontations that ended with cancellation of the concession and expulsion of Aguas del Tunari from

32. See SEMAPA analysis in the Democracy Center, "Bechtel versus Bolivia: The Water Rate Hikes by Bechtel's Bolivian Company (Aguas del Tunari): The Real Numbers," August 20, 2002, www.democracyctr.org/bechtel/waterbills/waterbills-global.htm.

Cochabamba. Control of the water network reverted to SEMAPA, the municipal utility.

Figure 2.2 in this volume which shows the evolution of electricity prices during 1992–99, plots price indices relative to the overall CPI for the mean residential tariff and the minimum electricity tariff (0–20 kWh per month), the amount most relevant to poorer households.

Since the 1994–95 reforms, prices have generally risen, except for the minimum tariff in Cochabamba, which decreased 14 percent during 1994–99; since 1998, some price decreases have been realized. On average, however, prices increased 26.2 percent over the five-year period. Because prices were increasing before privatization, we extrapolated the trend of price increases before privatization (during 1992–94) to predict 1999 prices. Comparing the predicted 1999 prices to the actual ones enables one to approximate the privatization effect. Overall, privatization raised prices 5.6 percent in 1994–99, with prices increasing in La Paz and El Alto and decreasing relative to trend in Cochabamba and Santa Cruz (Barja, McKenzie, and Urquiola 2004).

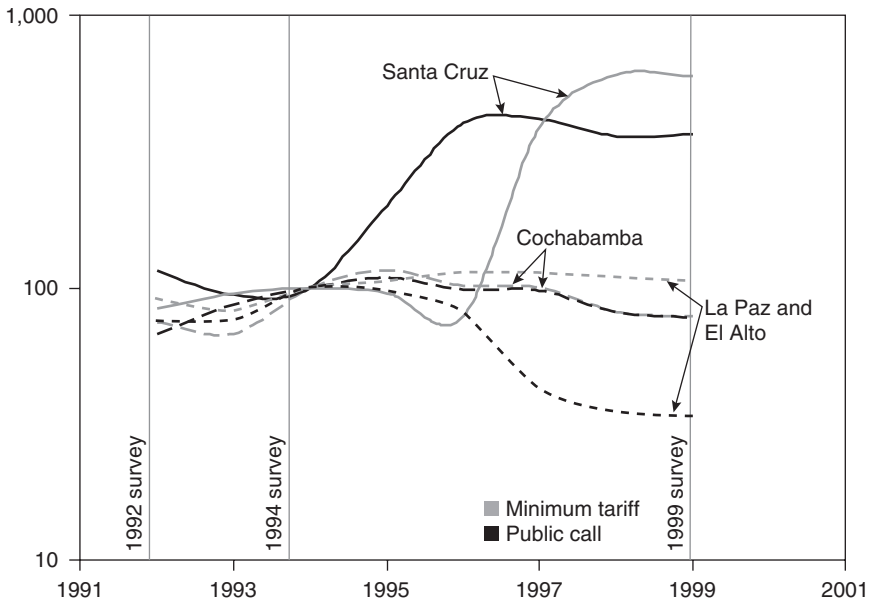
With regard to telecommunications during 1994–99, local cooperatives reacted differently (figure 4.2 and 4.3). COTAS, the Santa Cruz cooperative, raised both its minimum tariff and the price of a public phone call by more than 250 percent. By contrast, prices fell in La Paz and El Alto (which is related to COTEL, the La Paz cooperative, later falling into financial distress). Across cities and weighting for population, the average drop in the minimum tariff was 8.3 percent, while the cost of national long distance calls increased 83 percent.

Allowing the entry of ENTEL-Movil in 1996 opened the mobile market to competition. From the early 1990s to October 1996, incumbent Telecel charged a fixed monthly tariff of \$29.90 (which did not include free minutes), a per-minute tariff of \$0.41 (for both incoming and outgoing calls), and \$417 for initial connection. An aggressive marketing campaign accompanying ENTEL-Movil's entry dramatically lowered the cost of cellular services. Under ENTEL's Family Plan and Telecel's Economy Plan, connection fees for digital lines were free, the fixed monthly tariff without free minutes dropped to \$1.93 in November 1996, and the per-minute tariff increased to \$0.45. Before competition, tariffs were set in dollars; after competition, they were set in bolivianos and thus subject to depreciation. By December 1999, the dollar value of the fixed tariff dropped to \$1.67 and the per-minute tariff dropped to \$0.39. Both ENTEL and Telecel simultaneously introduced various plans and prepayment mechanisms, with the latter contributing to further penetration. Competition was so effective that, although the regulator set a price cap of \$180 for access and \$51 for use, both firms began charging average rates roughly 5 percent of this level.

These reductions, combined with availability of low-cost cellular phones, dramatically lowered access prices (particularly compared with the historical performance of local telephone cooperatives, which charged fees in excess of

Figure 4.2 Evolution of telephone prices in Bolivia, 1992–99

real price index (1994 = 100) (log scale)



Source: Bolivia's INE.

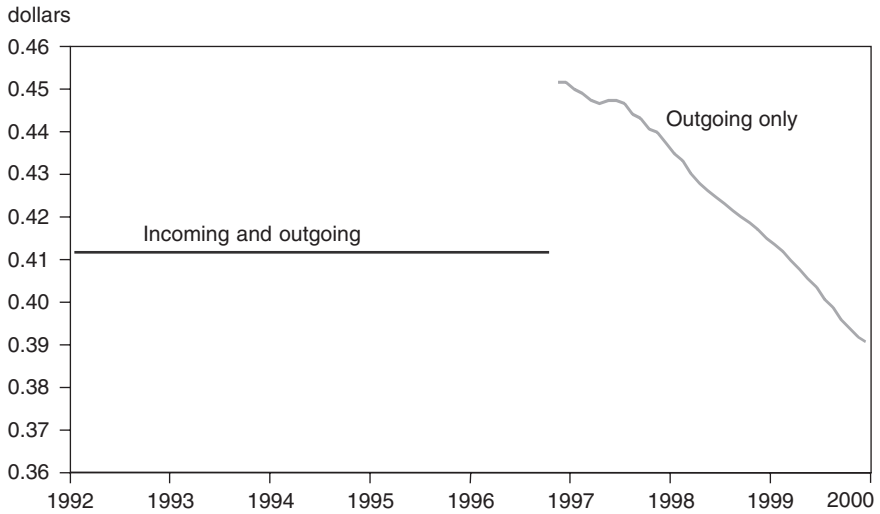
\$1,000 for a fixed connection/share). Because a new operator entered the market in late 2000 and all of these markets were liberalized in 2001, these trends are expected to continue.

Service Quality

In addition to access and price changes, service quality is a major concern for consumers. With regard to electricity, the 1994 sector law introduced regulations on distribution quality,³¹ establishing four stages of implementation. During the first stage (January 1996–October 1997), distribution firms helped establish the method for measurement and control of quality indicators. In the second stage (November 1997–April 1998), the distributor tested the method. During the third stage or transition period (May 1998 to April 2001), the firms had to comply with the quality indicators established by the rules, subject to monetary penalties. In the current fourth stage (May 2001–ongoing), the distribution firms must comply with more demanding

31. Rules for the Quality of Distribution (1995).

Figure 4.3 Change in minimum per-minute tariff in cellular telephony, 1992–99



levels of the quality indicators established by the rules, with similar financial penalties for noncompliance.

This information can only establish that the electricity sector has made recent efforts to improve quality; it does not indicate whether these levels are better than those one would have observed before privatization, especially since the firms helped to draft the quality guidelines under which they now operate. Anecdotal evidence indicates that, since capitalization, distribution problems—particularly blackouts, which may have originated in the generation sector—are down, and consumers are generally more satisfied.

With regard to telecommunications, the sector had goals for expansion, quality, modernization, and operators' fulfillment of long distance, local, and cellular services (Barja, McKenzie, and Urquiola 2004). In long distance services, ENTEL was in full compliance until 1998. In local services, the three largest cooperatives achieved the 1998 goals. In certain cases, these goals were easily attained (e.g., COTAS and COTEL percentage of digitalization achieved or COTEL and COMTECO percentage of completed calls attained). In other cases, the objectives were barely met (e.g., COTAS percentage of completed calls). Only COTEL had unmet goals by 1999. In cellular services, operators ENTEL-Movil and Telecel achieved 1998 expansion and quality goals in all cases. In fact, most goals were achieved by 1997, reflecting, in part, this sector's competitive pressures. Indeed, available data cannot account for the substantial welfare improvements that may have come about thanks to new services or such substitutes as cellular telephony.

To the extent that capitalization facilitated their arrival, one can credit this process with welfare consequences in this area.

Welfare Effects of Price and Access Change

Privatization is associated with increased access and a mix of price increase and decrease. As most consumers do not produce water, electricity, or telephone services, Deaton (1989) notes that the nonparametric estimation of Engel curves will approximate the average consumer welfare changes resulting from price changes. Disregarding access changes, household expenditure shares allocated to each infrastructure service will allow one to determine which consumers price changes affected most.

Examining expenditure shares by household expenditure decile, one finds that electricity is a necessity, with expenditure shares falling with total expenditure.³² With access rates high across all deciles, changes in electricity price will have the greatest effect on the poor. Water expenditure shares fall slightly with expenditure levels; with greater access to water, price changes will affect the poor most. Given that access to telephones is higher among richer deciles, price changes will clearly affect the rich most.

Expenditure share details the effect of price change on consumers, provided they do not adjust the quantity of the service consumed. Banks, Blundell, and Lewbel (1996) refer to this expenditure share as the first-order approximation of welfare change. If x_0 represents a household's initial total expenditure per capita, w_{j0} the initial budget share for service j , p_j the price of service j , and U the household's utility; then the first-order approximation of the relative change in utility for a price change of service j is:

$$\frac{\Delta U}{x_0} = -(\Delta \log p_j)w_{j0}. \quad (4.1)$$

Intuitively, a change in the price of service will have the greatest affect on consumers who devote a larger share of their total budget to that service. In practice, consumers often adjust the quantity consumed when prices change; thus, Banks, Blundell, and Lewbel (1996) provide a second-order approximation to welfare change, which allows for quantity response:

$$\frac{\Delta U}{x_0} = -(\Delta \log p_j)w_{j0} \left[1 + \frac{\Delta \log p_j}{2} \frac{\partial \log w_j}{\partial \log p_j} \right] \quad (4.2)$$

The elasticity $\partial \log w_j / \partial \log p_j$ is estimated by γ_{jj} / w_{j0} , where the coefficient γ_{jj} is obtained from estimating the Engel equation for household h

32. Barja, McKenzie, and Urquiola (2004, table 23), provides a detailed breakdown of budget shares, by expenditure decile.

$$w_{hj} = \alpha_j + \sum_{i=1}^k \gamma_{ij} \log p_i + \beta_j \log \frac{x_h}{n_h} + \phi_j \left(\log \frac{x_h}{n_h} \right)^2 + \lambda_j' Z_h \quad (4.3)$$

where n_h is the household size for household h , Z_h contains other demographic control variables, and p_i for $i \neq j$ is the price of good i . Because detailed information on the price of substitute goods was unavailable, we did not include other prices in estimating equation 4.3.

Equations 4.1 and 4.2 would allow for estimating the first- and second-order approximations of the welfare effects of price changes for households with access to the infrastructure service both before and after privatization. To value consumers' welfare benefit of gaining access to a service, McKenzie and Mookherjee (in chapter 2) suggest using the virtual price of the service for those who gain access. The virtual price, obtained from the Engel equation 4.3, is the price at which the household would have chosen to consume zero units of the service prior to privatization if it had had access to the service in question. For a household that gains access, the effective price change is the fall from the virtual to the postprivatization price.

Two additional issues must be resolved to estimate access value. The first is that equation 4.3 is estimated only for households with access, leading to inconsistent estimates if omitted variables correlated with access also influence demand. Therefore, a Heckman two-step selection correction is used to estimate equation 4.3.

The second issue is that, because the Bolivian household surveys are repeated cross-sections, it is impossible to identify which households gained access during 1994–99 since the 1999 survey contains households not included in the 1994 survey. In chapter 2, McKenzie and Mookherjee provide a method for estimating the average change in welfare for a decile, incorporating changes in access with repeated cross-sections, which we use here.

As table 4.7 shows, access is greater for richer households, those with larger houses, those with more household members, those who rent, and those with fewer children. These probits can be used to correct for selection in the Engel equation 4.3.

Table 4.8 presents the results estimating the Engel equation by ordinary least squares (OLS) for households with positive expenditure shares and after the Heckman two-step correction. In the case of communications services, more than 12,000 households have zero expenditure shares, compared with 2,500 with positive shares; the resulting price elasticity under the two-step method is positive and differs insignificantly from zero. In this case, we use the elasticity estimated under the OLS.

Because the surveys do not report the prices individual households pay for each service, one must use aggregate indices when estimating the welfare effects in equations 4.1 and 4.2. Only city-specific price indices are available for the central-axis cities of La Paz and El Alto, Cochabamba, and Santa Cruz; thus, this analysis is limited to these cities.

Table 4.7 Probit regressions for access to infrastructure services, 1992–99

Household variable	Water		Electricity		Communications	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Household head						
Age	0.0023	0.0053	-0.0024	0.0076	0.0094	0.0054*
Age squared	0.0000	0.0001	0.0000	0.0001	-0.0001	0.0001
Male	-0.2005	0.0321***	-0.0291	0.0466	-0.0397	0.0309
Household size	0.0408	0.0107***	0.0690	0.0170***	0.0458	0.0102***
Per-capita expenditure decile	0.1052	0.0049***	0.0950	0.0075***	0.2107	0.0053***
Number of rooms	0.1549	0.0100***	0.2924	0.0188***	0.2455	0.0083***
Dummy, if rented house	0.3787	0.0292***	0.3644	0.0440***	0.1395	0.0295***
Household members (number)						
Under 15 years old	-0.0740	0.0134***	-0.1194	0.0210***	-0.0469	0.0137***
Over 65 years old	0.0501	0.0437	-0.0728	0.0653	0.0792	0.0383**
Constant	-0.0621	0.1145	0.6178	0.1636***	-3.0524	0.1226***
Number of observations	17 581		17 581		17 581	
Pseudo-R2	0.0964		0.1281		0.2565	

* = significant at the 10 percent level

** = significant at the 5 percent level

*** = significant at the 1 percent level

Sources: Authors' calculations from fifth (1992), sixth (1993), and seventh (1994) rounds of EIH and first (1999) round of ECH.

Table 4.8 Engel equation estimations^a

Variable	Water		Electricity		Communications	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
OLS regression results						
Log price	0.175	0.146	-0.118	0.320	-0.156	0.178
Log expenditure per capita	-1.512	0.244***	-2.749	0.398***	-1.286	1.061
Log expenditure per capita squared	0.077	0.021***	0.122	0.035***	0.092	0.086
Log household size	-0.427	0.041***	-0.741	0.067***	-0.491	0.131***
Heckman two-step results						
Log price	-0.582	0.260**	-0.162	0.319	0.289	0.280
Log expenditure per capita	-4.726	0.512***	-0.844	0.408**	-4.624	1.851**
Log expenditure per capita squared	0.305	0.042***	-0.013	0.036	0.335	0.146**
Log household size	-1.027	0.089***	-0.527	0.080***	-1.369	0.245***
Lambda	-2.016	0.275***	3.364	0.025***	-0.660	0.197***

** = significant at the 5 percent level

*** = significant at the 1 percent level

OLS = ordinary least squares

a. Dependent variable equals expenditure share for specified infrastructure service.

Note: Regressions also include dummy for male head, city dummies, and proportion of the household aged 0–4, 5–9, 10–14, and 65 and older.

Sources: Authors' calculations from fifth (1992), sixth (1993), and seventh (1994) rounds of EIH and first (1999) round of ECH.

For telecommunications, we use the city-specific change in the minimum tariff during 1994–99 as the price change for households with access. For electricity, we present results under two scenarios: (1) using actual change in the city-specific mean tariff rate during 1994–99, and (2) using only the increase in tariff rates relative to that predicted by the 1992–94 trend. For the water concession in La Paz and El Alto, we use the price change relative to the average price in Santa Cruz and Cochabamba; for the second water concession in Cochabamba in 2000, we use the average 43 percent price change reported for poorer households.

Table 4.9 presents the estimated joint welfare effects of communications and electricity price and access changes. The estimated value of gaining access to telephones is 80 percent of per capita monthly expenditure (PCME) for the poorest deciles and up to 180 percent of PCME for the richest deciles. By contrast, price increases in Santa Cruz and decreases elsewhere had a welfare effect of less than 2 percent of PCME since budget shares allocated to telecommunications are small. The overall effect of price and access changes in communications is positive for all but the top decile, for which access increase was insufficient to offset price increases in Santa Cruz. Deciles 5 through 9 benefited the most from expanded access and price changes, and their average welfare effect was about 5 percent of one month's per capita expenditure.

During 1994–99, the average price of electricity increased in all three cities, which negatively affected consumers with access. Consumers in the poorer deciles were hit hardest, with an average cost of 1.4 percent of PCME for the bottom decile. If one allows for only part of the price increase to have resulted from privatization (scenario 1), then the direct privatization effect on consumers with access is, at most, a welfare loss of 0.5 percent of PCME. Poorer deciles value gaining access to electricity more, with the welfare gain estimated at 150 to 200 percent of PCME for the poorest deciles. Because increased access concentrated more on the poor, the overall effect of privatization is viewed as positive and largest for the poorest deciles. During 1994–99, these groups had an average welfare gain of 17 percent from electricity access and price changes, whereas the richest decile, for which access was already above 99 percent, had an overall welfare loss of 0.4 percent of PCME.

Table 4.10 presents results for welfare changes from the water concessions in La Paz and El Alto and Cochabamba. For the La Paz and El Alto concession, two scenarios are offered. The first assumes that privatization is responsible for all increased access that occurred, while the second only values increased access relative to access increases in Santa Cruz and Cochabamba. Gaining access to water is valued at 11 to 25 percent of PCME for the poorest five deciles, while the relative price decrease has only minor welfare effects. Overall, privatization is viewed as having benefited the poor most, particularly if one ascribes all increases in access to it.

By contrast, Cochabamba's failed privatization was a welfare loss for consumers. Prices increased, and the short-lived nature of the privatization

Table 4.9 First- and second-order approximations to welfare change
(as percent of per capita household expenditure)

1994 expenditure decile	Households with access (both periods)		Households who gain access		Overall mean effect	
	First- order approx- imations	Second- order approx- imations	First- order approx- imations	Second- order approx- imations	First- order approx- imations	Second- order approx- imations
Communications						
1	0.59	0.62	53.10	80.64	0.23	0.34
2	1.81	1.88	20.87	39.55	0.13	0.13
3	1.73	1.79	56.88	88.25	0.50	0.70
4	1.35	1.41	54.03	82.77	1.80	2.69
5	1.79	1.86	57.25	83.17	4.06	5.80
6	0.77	0.84	85.41	120.17	4.05	5.65
7	0.47	0.55	99.98	131.57	3.55	4.65
8	-0.09	-0.02	88.97	124.42	2.62	3.71
9	-0.40	-0.31	146.99	182.68	8.38	10.51
10	-0.86	-0.77	142.51	181.82	-7.44	-9.27
Electricity						
Results based on part of price change attributable to privatization						
1	-0.50	-0.50	139.04	195.54	12.80	18.19
2	-0.27	-0.27	102.95	151.32	1.46	2.26
3	-0.23	-0.23	96.95	144.58	4.19	6.35
4	-0.21	-0.21	115.29	163.85	2.30	3.36
5	-0.23	-0.23	88.68	130.94	2.83	4.29
6	-0.20	-0.20	84.54	128.42	1.75	2.76
7	-0.18	-0.18	93.21	133.31	1.59	2.34
8	-0.15	-0.15	83.37	124.34	1.51	2.33
9	-0.19	-0.18	78.16	113.02	0.71	1.12
10	-0.15	-0.15	61.51	91.99	0.04	0.13
Results assuming all price change attributable to privatization						
1	-1.44	-1.43	139.04	195.54	11.97	17.36
2	-1.02	-1.02	102.95	151.32	0.76	1.56
3	-0.99	-0.99	96.95	144.58	3.48	5.64
4	-0.96	-0.95	115.29	163.85	1.60	2.65
5	-0.99	-0.98	88.68	130.94	2.11	3.57
6	-1.00	-1.00	84.54	128.42	0.97	1.98
7	-0.92	-0.92	93.21	133.31	0.86	1.62
8	-0.89	-0.89	83.37	124.34	0.78	1.60
9	-0.89	-0.89	78.16	113.02	0.02	0.42
10	-0.69	-0.68	61.51	91.99	-0.50	-0.41

Sources: Authors' calculations from fifth (1992), sixth (1993), and seventh (1994) rounds of EIH and first (1999) round of ECH.

Table 4.10 Welfare changes from water privatizations (as percent of per capita household expenditure)

1994 expenditure decile	Households with access (both periods)				Households who gain access				Overall mean effect	
	First-order approximations	Second-order approximations	First-order approximations	Second-order approximations	First-order approximations	Second-order approximations	First-order approximations	Second-order approximations	First-order approximations	Second-order approximations
	1	0.290	0.293	14.48	24.83	4.12	6.93	0.94	1.48	0.94
2	0.218	0.222	5.48	11.48	0.83	1.58	0.31	0.50	0.31	0.50
3	0.193	0.196	11.60	17.49	2.01	2.96	0.46	0.63	0.46	0.63
4	0.170	0.174	5.08	10.81	1.30	2.63	0.43	0.77	0.43	0.77
5	0.181	0.185	8.19	12.82	1.29	1.94	0.87	1.29	0.87	1.29
6	0.194	0.198	5.31	9.09	1.15	1.86	0.47	0.70	0.47	0.70
7	0.202	0.206	4.52	7.39	0.85	1.29	0.17	0.17	0.17	0.17
8	0.196	0.200	6.52	10.12	0.60	0.83	0.18	0.19	0.18	0.19
9	0.195	0.199	2.53	4.65	0.42	0.62	0.26	0.33	0.26	0.33
10	0.159	0.163	6.18	8.89	0.42	0.54	0.15	0.16	0.15	0.16

Results for Cochabamba

1999 expenditure decile	Mean effect		Maximum effect	
	First-order approximations	Second-order approximations	First-order approximations	Second-order approximations
1	-0.99	-0.95	-3.69	-3.65
2	-1.08	-1.04	-3.52	-3.49
3	-0.55	-0.52	-2.30	-2.26
4	-0.69	-0.66	-2.72	-2.68
5	-0.95	-0.92	-3.04	-3.00
6	-0.76	-0.72	-1.98	-1.95
7	-0.75	-0.71	-3.77	-3.73
8	-0.38	-0.34	-1.03	-0.99
9	-0.50	-0.46	-1.01	-0.97
10	-0.57	-0.53	-2.12	-2.08

Sources: Authors' calculations from fifth (1992), sixth (1993), and seventh (1994) rounds of EIH and first (1999) round of ECH.

Table 4.11 Inequality and poverty measures of privatization

Measure	Inequality			Poverty: Foster-Greer- Thorbecke index			
	Gini coefficient	Atkinson indices			a = 0	a = 1	a = 2
		A (0.5)	A (1)	A (2)			
1994 measure (in four main cities)	0.442	0.164	0.278	0.660	0.625	0.259	0.136
After telecommunications privatization:							
First-order approximation	0.455	0.171	0.293	0.641	0.572	0.240	0.129
Second-order approximation	0.464	0.176	0.303	0.641	0.566	0.240	0.128
After electricity privatization:							
<i>Based on price change attributable to privatization</i>							
First-order approximation	0.439	0.161	0.275	0.650	0.612	0.250	0.130
Second-order approximation	0.442	0.163	0.277	0.648	0.607	0.249	0.130
<i>Based on entire price change</i>							
First-order approximation	0.440	0.162	0.275	0.652	0.615	0.253	0.132
Second-order approximation	0.442	0.163	0.278	0.649	0.610	0.251	0.132
1994 measure (in La Paz and El Alto)	0.434	0.158	0.269	0.633	0.691	0.305	0.168
After water privatization:							
<i>Assuming all access increase attributable to privatization</i>							
First-order approximation	0.427	0.153	0.260	0.626	0.683	0.295	0.160
Second-order approximation	0.422	0.150	0.255	0.621	0.677	0.289	0.155
<i>Assuming only increased access in Santa Cruz and Cochabamba is attributable to privatization</i>							
First-order approximation	0.432	0.156	0.266	0.631	0.691	0.302	0.165
Second-order approximation	0.431	0.156	0.265	0.629	0.688	0.299	0.164
1999 measure (in Cochabamba)	0.378	0.116	0.210	0.437	0.290	0.086	0.036
After water privatization:							
First-order approximation	0.378	0.116	0.210	0.437	0.300	0.088	0.037
Second-order approximation	0.378	0.116	0.210	0.437	0.300	0.088	0.037

Sources: Authors' calculations from fifth (1992), sixth (1993), and seventh (1994) rounds of EIH and first (1999) round of ECH.

meant that the water-network expansions agreed to under the concession contract were not realized. Nevertheless, our estimates of the average welfare losses are not as large as some press reports have suggested.³³

Table 4.10 shows that the estimated average cost of a 43 percent price rise is, at most, 1 percent of PCME. For the 1999 household survey, the maximum expenditure share for water observed in Cochabamba was 10.5 percent, with an average expenditure share of 1.6 percent and the 95th percentile at 5.4 percent. Table 4.11 reports the maximum welfare losses in each decile, which is the welfare loss for households with largest water expenditure shares in each decile. The maximum welfare loss of a 43 percent price rise for the households sampled is 3.8 percent of PCME. Although some households had larger price increases, most households' expenditure shares were too low for even

33. See, for example, William Finnegan, "Letter from Bolivia: Leasing the Rain," *The New Yorker*, April 8, 2002.

a doubling of price to result in the water bill reaching one quarter of income. Thus, the numbers reported in the press represent the potential maximum effect on a limited number of consumers, while the average consumer had much smaller welfare losses.

Poverty and Inequality

The consumer welfare changes estimated here are household-level money metric measures of welfare change if one assumes no income effects (Banks, Blundell, and Lewbel 1996). McKenzie and Mookherjee (chapter 2) therefore suggest that these estimated changes can be used to evaluate the effect of privatization on inequality and poverty.

The approach first calculates the preprivatization Gini coefficient; Atkinson inequality indices; and Foster, Greer, and Thorbecke (1984) measures of poverty, using preprivatization household per capita expenditures. It then estimates counterfactual inequality and poverty measures by adding the estimated per capita change in consumer welfare to preprivatization household expenditure and recalculating the Gini coefficient and other measures. Use of repeated cross-sections means that one is unable to identify the specific households that gained access to the privatized service; thus, in this case, McKenzie and Mookherjee provide a method for calculating the counterfactual inequality and poverty measures.

Table 4.11 uses this method to present the overall effect of each privatization on inequality and poverty. Privatization of electricity, for example, reduced inequality slightly and poverty 1 to 1.5 percent—mainly because of the poor's increased access. Privatization of telephone services had larger effects; while it increased inequality, it reduced headcount poverty 5 to 6 percent.

The explanation for increased inequality and decreased poverty is that access increased mainly for Bolivia's middle deciles, which increased inequality; however, because the country has a high level of poverty—even households in deciles 5 and 6 lie below the poverty line—gain in access reduced poverty. As a result, the distribution-sensitive poverty measure of Foster, Greer, and Thorbecke ($\alpha = 2$) shows a lesser reduction in poverty.

The successful water concession in La Paz and El Alto is also viewed as having reduced inequality and poverty. Increased access to water benefited the poor primarily, while water prices decreased slightly, relative to those in nonconcession cities. Despite media attention and widespread protest, water privatization in Cochabamba apparently had little effect on inequality; as a result, only an additional 1 percent of households fell below the poverty line. As with estimated welfare effects, the water expenditure shares of most households were too small for price changes to have dramatically affected household poverty levels.

Macroeconomic Consequences

Since 1999, the Bolivian economy has been in recession. It began with external shocks that hit the export and construction sectors, further aggravated by reduced investment and aggregate demand. This macroeconomic environment created two distinct periods in which to analyze capitalization reforms' performance. In turn, capitalization significantly affected macroeconomic variables and was part of a broader economic transformation. The most visible consequence was increased foreign direct investment (FDI); observed since 1994, it can be explained, in part, by capitalized firms' activities. Capitalization-related FDI reached 7.5 percent of GDP by 1998, and total FDI peaked at 11.9 percent in 1999. This increase helped to raise total investment from 14.9 percent of GDP in 1994 to a maximum of 23.2 in 1998. This investment focused mainly on energy and infrastructure sectors, which gained importance relative to such traditional activities as mining. Moreover, FDI resilience to the downturn helps to explain why Bolivia's recession has, by some measures, been less severe than those in neighboring countries.

Since 1995, FDI has been greater than domestic private investment and contributed to total private investment, surpassing government investment during 1995–2000.³⁴ This is an important factor, considering the vision of private sector–led growth that has accompanied the capitalization process and the traditionally greater importance of government investment. In addition, FDI strengthened the balance of payments accounts and enhanced their sustainability.

However, this process ran out of steam with the recession and end of capitalization-related investment commitments. By 2001, total investment dropped to 13.9 percent of GDP, with a tendency for total government investment to decrease slower than private-sector investment, implying a return to foreign debt financing. Although FDI has remained strong, private domestic investment has fallen rapidly, providing evidence of capital flight.

In addition to seeking to stimulate investment, the decision to capitalize was considered a second-generation reform, with the usual aim of leaving the private sector in charge of productive activities in an environment of open markets and competition. The state retained responsibility for regulation, legal administration, ensuring macroeconomic stability, and social-sector investment—all within an environment of decentralization and greater local participation.

Gradually, the composition of government investment came to reflect these priorities. Although total investment decreased as percent of GDP, the social sectors' participation rose from 2.2 percent in 1994 to 3.7 percent in 2001. Investment in production increased from 0.7 to 1.4 percent of GDP, largely reflecting greater support of the agricultural sector. However, in-

34. See Barja, McKenzie, and Urquiola (2004, table 29), for a detailed breakdown of the source and structure of investment over the 1990–2001 period.

vestment in extractives production fell from 1.8 percent in 1994 to about 0 percent in 1999, mainly because of withdrawal from hydrocarbons production. Decline in infrastructure (from 3.9 to 2.9 percent of GDP) partially reflects withdrawal from the electricity, telecommunications, and transportation sectors. However, one cannot attribute these changes exclusively to capitalization, given the restrictions foreign lenders and heavily indebted poor country (HIPC) obligations imposed on government investment. Capitalization also affected state revenue. Government income increased through tax collection (taxes and royalties on hydrocarbons were added after 1996). By contrast, since 1995, income from the sale of hydrocarbons decreased substantially.

The net effect of these changes was a substantial lowering of Bolivia's fiscal deficit, particularly if considered separate from pension reform (which came about the same time as capitalization). By 1996, the deficit was low, and the government even attained a modest surplus (excluding pension consideration) in 1999–2000.³⁵ With the recession, the situation deteriorated severely; by 2002, the deficit (including pension costs) had reached 9 percent of GDP.

To summarize, capitalization reforms were part of a broader economic restructuring that indirectly affected households in multiple ways. This process underscores the increased importance of social components in public expenditure.

Political Economy and Capitalization

Implementation of capitalization had significant effects on Bolivia's political economy, four of which we highlight below. We also hypothesize why this reform has proven unpopular, despite technical standards that would suggest success.

The Promise of Capitalization

Bolivia's transition from a state-led to a market-driven economy, initiated in 1985, focused initially on liberalization of key prices and promotion of market allocation mechanisms, with the goals of ending hyperinflation and returning to macroeconomic stability.

During 1985–89, the Paz Estenssoro administration focused on achieving and defending stability; strict fiscal discipline; and structural reforms, including tax reform and a move toward independent monetary authorities. These measures achieved some intended results; for example, negative GDP growth in 1985 recovered to 3.8 percent in 1989, with an investment level of 11 percent of GDP.

35. See Barja, McKenzie, and Urquiola (2004, figure 11), for details on evolution of the fiscal deficit.

The Paz Zamora administration (1989–93) emphasized change (at least in principle) from stability to growth, within the general outlines of the economic model introduced in 1985. This administration's key initiatives were an Investment Law (to promote domestic and foreign investment), Hydrocarbons Law and Mining Code (to attract foreign investment via joint ventures with YPFB and COMIBOL), and Privatization Law (which provided a framework for initiating privatizations with small state firms generally owned by public regional development corporations). To this end, the government organized an office devoted to reordering state enterprises, establishing their number and characteristics in preparation for eventual privatization. By 1993, growth reached 4.3 percent, with a 15.7 investment rate.

The consensus remained that, despite having achieved stability, Bolivia needed significantly higher growth to reduce poverty substantially. In the free-market setting adopted, this need implied further promotion of FDI and technological change. Since 1985 stabilization, domestic private investment had advanced slowly; domestic firms generally had not yet developed the capacity to compete in global markets.

Moreover, macroeconomic stability was repeatedly questioned, given that various levels of government were heavily involved in production and public investment remained the principal growth engine. In addition, this investment had to meet multiple needs in electricity, water, sewage, telecommunications, transportation, and oil exploration as well as growing priorities in health and education. This situation, coupled with international pressure (e.g., World Bank), made it clear that privatization was the path to follow.

During 1993–97, the Sanchez de Lozada administration was more aggressive in structural reform. Capitalization was only a part of overall changes that included greater local participation and pension reform. Emphases were twofold: (1) transfer of productive activities to the private sector, and (2) sharing of social responsibilities with local jurisdictions. The first required sector-by-sector reform to establish the conditions under which the private sector would participate, and the second required government reform. While the first was mostly efficiency oriented, the second was directed to distributional issues. This plan responded to a vision of economic development in which the private sector would lead investment and growth, and the state would regulate markets and increase efficiency in providing public and quasi-public goods.

Initially, the capitalization mechanism promised that a 51 percent share of each firm would remain in Bolivian hands. This would accomplish the dual objectives of democratizing business ownership and stimulating investment and broad-based growth. Along with regulation, the promise was one of growth and efficiency under private-sector leadership, coupled with social equity embodied in an effort to avoid further wealth concentration.

At the time of implementation, the promise of majority control by Bolivians at large had to be abandoned. Foreign enterprises demanded at least

a 50 percent share and control of each company; without this concession, it would have been difficult to allay their fear of politically based interference and intervention. Majority private control, the argument went, guaranteed managerial and technological improvements. In addition, that foreign firms' payments would be invested (rather than fill government coffers) would relieve long-standing capital constraints and promote increased coverage rates, quality, and employment.

This argument was directed toward reducing the fear that the government, awash in newfound money, would immediately spend it on social or infrastructure projects that, however well-intentioned, would fail to have an enduring positive effect on growth and responsible financial management.

Conflicts of the Process

Approval of the Capitalization Law in March 1994 authorized the executive power to contribute state firms' assets to create mixed enterprises, known as SAMs (*Sociedades Anónimas Mixtas*). The law authorized transfer of portions of these firms to their workers and the population at large. In addition, it allowed the government to sell capital increasing shares at international auctions.

The law's approval was feasible because the governing party enjoyed a congressional majority through a coalition with smaller parties.³⁶ This majority was key to approving all other relevant laws mentioned above, which enabled the executive to specify their application through extensive detailed regulatory decrees (*decretos reglamentarios*). The opposition parties later claimed that the laws the government promoted, including capitalization law, were prepared and approved without regard to any opposition or debate.³⁷

One critical issue was the position of organized labor. On the one hand, Central Obrera Boliviana (COB), the broadest labor organization, expressed opposition to the entire process. On the other, the government decided to turn workers into partial owners to gain their support.

From the outset, COB, much weakened since the 1980s, rejected the idea of capitalization, arguing instead for strengthening state firms' finances and management. Despite its unwavering position, it could not prevent direct contact between the government and worker and employee unions

36. The Nationalist Revolutionary Movement (MNR) (Movimiento Nacionalista Revolucionario), the main political party in government, acted in coalition with the Civic Solidarity Union (UCS) (Unión Cívica Solidaridad), Free Bolivia Movement (MBL) (Movimiento Bolivia Libre), and Tupaj Katari Revolutionary Movement (MRTK) (Movimiento Revolucionario Tupaj Katari).

37. Mainly the Leftist Revolutionary Movement (MIR) (Movimiento de Izquierda Revolucionaria) and Nationalist Democratic Action (ADN) (Acción Democrática Nacionalista).

in firms to be capitalized. While these initially remained loyal to COB, their leaders initiated direct contact with the government, seeking to achieve the best deal for their members.

Capitalization began with ENDE, perhaps in part because its workers were not as organized as those in other state firms. In any event, they were the first to agree to partial ownership in exchange for supporting (at least not actively opposing) the process. ENTEL workers were the second group to fall in line, after negotiating an agreement that guaranteed benefits and job security. Similarly, YPFB capitalization was made viable, and workers obtained a significant share in Transredes.

In the case of ENFE, the government guaranteed job security for a seven-month period, but workers obtained a relatively small ownership share. The firm's sale price was well below book value, an outcome that workers perhaps foresaw. The LAB union posed the strongest opposition to capitalization but supported it once job security was guaranteed.

Industry-specific conflicts arose in the telecommunications sector when the government sought to transfer ENTEL (with a period of exclusivity) in the long distance market and introduce local-sector competition. Independent cooperatives that provided local phone services strongly opposed abandoning their monopolies. In response, the government asked that they transform into fully private firms in order to attract private investment and compete in open markets. The cooperatives rejected the request, continuing to demand a period of exclusivity in local service. The government complied, but imposed price-cap regulation, together with expansion and quality goals.

Criticisms

Not surprisingly, the capitalization process spawned considerable criticism. Four much debated issues were that:

- The state enterprises to be capitalized had been run to benefit only a small group of bureaucrats and politicians and that, even before capitalization, these firms had been a source of corruption and rent-seeking behavior. State-enterprise workers rejected this notion, arguing that earlier corruption and inefficiency had been introduced or aggravated by the free-market reforms the government now wanted to implement further.
- Bolivians would always have a majority stake in new enterprises (i.e., never less than 51 percent). The government eventually settled for retaining 50 percent of equity, divided between workers and private pension funds. Since management's 50 percent was concentrated while the remainder was dispersed, management effectively controlled the

firms. This upset some citizens, who claimed the promise of domestic control had been broken. The government objected to this characterization, arguing that investors wanted 51 percent, but that, thanks to its negotiation, they settled for less.

- Foreign management would allow the transfer of technological and managerial skills, which would reduce corruption. This affirmation caused strong reaction among workers since state firms (some more than others) had historically propelled modernization in different sectors. Union leaders claimed that factors exogenous to the firms, such as the 1980s debt crisis, accounted for why their sources of funding had dried up. Indeed, lack of investment capital and foreign funding was the key justification for capitalization.
- State enterprises might be transferred hastily. Several observers noted that the government may have created the conditions for a “fire sale” by publicizing the poor state of certain firms. People suspected the government would have to absorb substantial debt and that, in the case of oil and gas, investors would be rewarded with risk-free reserves.

Change of Government

The Banzer-Quiroga administration (1997–2000)³⁸ campaigned on the promise to undo the capitalization process. After taking office, it proposed changes in contracts and functioning of the regulatory system, which created unease in the affected sectors and among potential investors. The World Bank recommended that contracts not be altered, and the American Embassy advocated on behalf of US firms holding contracts.

Thus, the Banzer-Quiroga government coexisted with capitalization, but constantly criticized the arrangement; key officials complained that government firms had been given away and that their transfer limited government income and reduced expenditure and social investment. It alleged that capitalization was the main cause of the recession that started in 1998–99, accounting for the government’s inability to spend its way out of it.

MNR, the ruling party during capitalization and the then current opposition party, retorted that capitalization had not met all expectations, in part, because it lacked the necessary continuity. The MNR argued that reform was left in the hands of those who did not understand or support capitalization. It also made the case that external factors caused the recession, which would have been worse had capitalization not occurred.

38. President Hugo Banzer served four years out of his five-year term. He resigned due to ill health amid significant opposition; after his death, Vice President Jorge Quiroga assumed office for the remaining year.

Nevertheless, the MNR admitted that the reforms might require adjustments, particularly the strengthening of laws and regulation. For example, while capitalization and regulation may have led to increased natural gas reserves (from 5 to 53 trillion m³), adjustments were necessary to improve the government's revenue share and prevent the emergence of vertical monopolies.

Why Was Capitalization Unpopular?

The conceptualization and implementation of capitalization involved controversy and acrimony, and constant public carping between proponents and opponents may well have been a major source of the program's unpopularity. Additional hypotheses can be grouped into (1) unfulfilled expectations; (2) high-profile failures; (3) ownership and corporate governance issues; and (4) problems induced by associated structural reforms, particularly pension reform.

First, the administration that implemented capitalization may have oversold it, having made excessive claims about the employment growth that would be generated and the financial dividends that would eventually accrue to the population at large. Performance on these fronts, while perhaps not poor, proved disappointing compared to the government's stated expectations.

For example, intuition leads one to expect employment declines with privatization, to the extent that state firms have too many workers to operate efficiently. Our analysis shows that declines were modest, given the size of the country's labor force. An economist's conclusion, therefore, might be that employment outcomes were not poor, especially since these firms' investment focused on capital-intensive nontradables.

The general population was led to believe that capitalization would generate large, rapid improvements in the quantity and quality of available jobs. In fact, the rate of employment growth during postcapitalization (even before the current recession) did not differ qualitatively from rates during earlier periods of stability, which may have disappointed the average voter.

Similarly, citizens may have been led to expect that foreign and domestic private investment would boom with capitalization. While investment increased, it declined significantly with the recession and the end of foreign investment commitments under capitalization—to the extent that the state's role is again becoming larger than that of the private sector (especially if investment in oil and gas is not considered), implying the need for greater public indebtedness.

Second, high-profile failures among foreign firms have increased public suspicion about the entire privatization and capitalization process. This was the case for VASP, the Brazilian airline that failed in its administration of LAB. VASP departed amid allegations of asset stripping and accounting

fraud. The case of the Aguas del Tunari consortium led to the “water war” described above and the end to water-related concessions.

The third issue concerns corporate governance. Despite improvement in output, productivity, and consumer welfare, the Bolivian population suspects that capitalized enterprises are run mainly with the interests of the majority (foreign) owners in mind and that the regulatory system has been unable to adequately restrain this tendency. Of course, news of the deluge of US corporate scandals has accorded these problems further salience.

With respect to ownership, the Bolivian population expected that, through its share in capitalized enterprises (about 45 percent), it would rapidly come to share again in profit flows. Firms have not paid dividends as large as those predicted, which have directly affected the elderly. People suspect—fed by political opponents’ assertions—that the firms have found ways to transfer profits to their home countries rather than pay them out in Bolivia.

Negative popular perception was a particular headache for the Sanchez de Lozada administration, whose party initiated implementation of capitalization. This administration’s return to power occurred after an acrimonious election in which the MNR captured only about 20 percent of the vote, but, by gaining first place, nonetheless put together a coalition in parliament; in short, the administration was vulnerable. Like the preceding Banzer-Quiroga government, it was buffeted by periodic waves of protest, particularly from rural unions, including those tied to coca-growing regions.

A key campaign promise was to return the Bonosol (the old-age payment described above) to its initial level of about \$240. Because of the low flow of dividends, however, the Common Capitalization Fund (FCC), which pays this benefit, could not afford it. As a short-term solution, the government forced individuals, through individual retirement accounts (FCI), to buy FCC commitments. This arbitrary measure was much debated (it could be viewed as a confiscation and forceful redistribution of private property by the very administration that had earlier been its staunch defender).

More generally, the recession and a large budget deficit severely constrained the administration’s ability to spend and stimulate the economy. The deficit was tied to the pension reform that the original Sanchez de Lozada administration had introduced, along with capitalization.

Before reform, Bolivia’s social security system consisted of a basic pension fund and several complementary funds, all of which were pay-as-you-go. Coverage (about 12 percent of the economically active population) and the worker-to-retiree ratio (3:1) were low. Moreover, financial transparency was lacking, investments were subject to political interference, and hyperinflation of the 1980s had substantially eroded reserves. Management costs—about 17 percent of contributions—were high, as were evasion and debt. By 1995, the system had become insolvent. The National Pension Secretariat estimated that the government would have to absorb a pension system deficit, which, by 2016, would reach 0.6 percent of GDP, and reaching 4.3 percent by 2060.

In 1996, the Pension Law introduced the ICF and CCF system, both administered by private administrators. The Pension Law also created a transition regime characterized as follows:

- The national treasury finances the benefits of current pensioners and those who fulfill requirements under the previous system.
- Persons, who contributed to the former system but who do not yet qualify for retirement, switch to the new system with pension adjustments.
- Agreements with strategic sectors (e.g., military, police, judiciary, and universities) require treasury financing.
- The later Caracollo and Patacamaya agreements, in response to social unrest, resulted in a substantial increase in the average pension, which also require treasury financing.

By 2002, the new system had nearly doubled coverage (still low by international standards), mobilized savings to more than \$1 billion, and introduced greater transparency in fund management. However, transition costs have been substantially higher than expected. In 2002, the direct financial cost of reform represented 5 percent of GDP, an amount not expected to decrease for another decade. Transition costs, in turn, put the government under substantial fiscal pressure. The administration attempted to raise taxes in February 2003 but after substantial violence, was forced to withdraw the initiative.

A national discussion ensued on whether Bolivia should sell natural gas to the United States, Mexico, and possibly other countries and, if it did, whether to run the pipeline through Peru or Chile.³⁹ For many Bolivians, this commercial deal added insult to injury, with respect to the perceived damage caused by capitalization. At issue was the belief that Bolivians should be the first to benefit from the country's natural resources (in this case, through the installation of domestic natural gas networks; conversion of vehicles to natural gas; and installation of industrial plants, thereby adding local value). Another issue was the belief that petroleum-related rents from capitalization should effectively reach the Bolivian people through investments in education, health, and infrastructure. In both cases, the widespread perception was that the government represented corporate and political, rather than popular, interests. A third, shorter-term issue was pressure for more oil and gas rents to help the government reduce its fiscal deficit.

39. Bolivia lost its coastal territories to Chile in the 1879 war. For this reason, many Bolivians strongly opposed pipeline construction through Chile, even though technical studies suggested that it was the optimal commercial option. In the end, clear information on the precise cost differential was never provided.

In the end, these issues helped catalyze and unify all opposition to the Sanchez de Lozada government, which, in October 2003, began to lose control of the country in the face of widespread protests, strikes, and road blockages. Attempts to reassert authority backfired, resulting in dozens of deaths, increased opposition, and finally the resignation of Sanchez de Lozada (who was replaced by his vice president, Carlos Mesa). These conflicts were both complex and multifaceted;⁴⁰ thus, it is impossible to pinpoint the exact role the opposition to capitalization—or even the natural gas export controversy—played in the eventual collapse of the government.

One of the new government's first actions was to declare that any decision on natural gas exports would be made only after a referendum. In addition, the government promised a new Constitutional Convention (*Asamblea Constituyente*) to redefine the Bolivian state to make it more representative of people's interests. Other short-term goals included increased taxes on private oil-sector firms and a stronger role for YPF, the original state-run oil company.

With regard to the gas industry, the public was told that the enormous expansion in Bolivia's proven and expected reserves since capitalization would generate great wealth for the country. On closer examination, however, citizens might wonder how this wealth would ever reach them; for example, the companies in which the Bolivian population owns shares—mainly Chaco, Andina, and Transredes—are arguably no longer central industry players; thus, the touted windfall gains may, in fact, accrue to firms in which they have no stake.

The Bolivian population has gained from relatively high royalties on gas production and an ex-post high price on the gas sold to Brazil (this price was negotiated before); as in the 1990 legislation, royalties were set equal to 50 percent of wellhead value. However, the 1996 law reduced the royalty rate on new wells to 18 percent. Thus, in the future, royalties will become a less important income source.

In principle, profit taxes and introduction of a surtax are to compensate for these drops; however, in practice, these revenue sources have not—and are not expected to—fully make up for the shortfall. For that, the country will need substantially greater export volumes.

In addition, the Bolivian public perceives that capitalized firms are adept at tax evasion. Recently, for example, a prominent politician made the charge (which was, to our knowledge, left uncontested and unexplained by the capitalized firms) that the Bolivian Catholic University pays more taxes than any capitalized oil enterprise.

The gas industry has provided the concerned public with other examples of alleged corporate malfeasance in collusion with government officials.

40. Many other issues played a role, including land tenure and interregional and ethnic conflicts.

For example, in the negotiations with Brazil, the giant San Alberto and San Antonio fields were classified as new (hence paying substantially lower royalties); however, YPFB workers insisted these fields had long been discovered. While the fields' status was never clarified entirely, a large portion of the Bolivian public had the impression that excessive concessions had been made.

Summary and Conclusions

Bolivia's response to its 1982–85 recession and instability was initiating a transition from a state-led to a market-driven economy. By 1989, it had liberated key prices in the economy, and by 1993, it had a privatization law in place. However, the state continued as the main investor in the economy, and remained dependent on foreign debt. Although growth resumed, it did so at rates that would not significantly reduce poverty.

The 1993–97 period—the most aggressive in terms of structural reform—concentrated on two redefinitions: (1) the state-market frontier, as privatization and regulation replaced government firms, and (2) central-local frontiers within the state, as local jurisdictions were given greater funding and responsibilities. These redefinitions implied that the private sector (particularly the foreign one) would lead investment and growth, while the state would regulate markets and increase efficiency in providing public and quasi-public goods.

In addition to the capitalization mechanism used to attract foreign investment, FDI replaced government foreign debt as the engine of growth. Growth increased somewhat, reaching 5.3 percent by the end of 1998. At that time, a series of external shocks hit, beginning with the Asian crisis and continuing with the Brazilian and Argentine crises. Although the domestic response to these external events remains a matter of debate, the economy was pulled into a recession that persists to date. By the end of 2002, private investment had fallen substantially, forcing a return to government (debt-financed) investment as the main source of growth—this time within an environment where limited resources can only be directed toward production of public and quasi-public goods.

This bit of history demonstrates that any evaluation of capitalization must consider the mechanism as part of a structural reform aimed at broader objectives. It also highlights two periods under which capitalization and regulation had to perform. The first period, 1994–98, featured reform implementation and initial positive results within an environment of stability and economic growth. The second period, 1999–present, is characterized by reform consolidation in an environment of economic recession and increasing political difficulties.

A complete evaluation of capitalization and privatization is difficult; admittedly, this chapter provides only initial insights into the issue. At the

simplest level, the key goal of capitalization was to attract foreign investment into the affected sectors, and evidence suggests the process met with success at this level.

Combined with regulation, additional positive outcomes were increased access to utilities services and significant expansions in proven gas reserves. The benefits of both outcomes did not bypass the poorer segments of Bolivian society. In fact, welfare improvements for households were, in certain cases, greatest in lower-income quintiles. In addition, productivity increased nearly across the board, and most firms have remained moderately profitable.

On the negative side, employment decreased (although decreases were the partial flipside of productivity increases and were small relative to the economy overall). In addition, prices for certain utilities increased; with the exception of the Cochabamba water concession, price increases were overwhelmed by increased access in the welfare calculations.

The reader should note several caveats to these conclusions:

- It is difficult to disentangle the effects of privatization and capitalization from introduction of regulation.
- It is impossible to fully isolate the effects of these processes from those of concurrent events, such as introduction of new technologies and enhanced competitive forces. Moreover, the economic slowdown that started in 1999 introduced substantially strained performance of the capitalized sector. Without this event, our assessments of these reforms might have differed notably.
- Many of these results, particularly those regarding consumer welfare, refer only to the population in the department capitals. Access and welfare in general remain significantly lower in the rest of the country.

Despite these concerns, our assessment suggests that the reforms were fairly successful. That popular opinion does not agree with this conclusion may have resulted from the government's having oversold reforms, and promising more (e.g., in terms of job creation) than it could reasonably deliver. Moreover, the reputation of reform has been hurt by high-profile failures and a perceived weakness in Bolivia's regulatory and corporate governance frameworks.

We speculate that a key lesson from the Bolivian experience is that private ownership should be kept as a credible threat and a real option to any other firm organization and in any activity. This threat allows privatization to generate spillovers; for example, several cooperatives have improved their management and become more competitive. Finally, Bolivian experience reaffirms the adage: In many sectors, introducing private participation

and market forces is no panacea; the specifics under which privatization is implemented matter greatly.

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Appendix 4A

Household Surveys

For household and individual-level data, including socioeconomic characterizations, we used three rounds (fifth, sixth, and seventh in 1992, 1993, and 1994, respectively) of the Integrated Household Survey (EIH) (Encuesta Integrada de Hogares) and one round (first in 1999) of the Ongoing Household Survey (ECH) (Encuesta Continua de Hogares). The EIH was collected in department capitals and had a sample size of 5,829 households in 1992, 4,270 households in 1993, and 6,128 households in 1994. Although the ECH has national coverage, for comparability, we used only the 1,324 households, which corresponded to the same department capitals as the EIH.

These surveys contain essential access and consumption information. Earlier rounds of the EIH contained certain information on utility access and expenditures, but lacked comparable questions on other expenditure items (meaning that these surveys cannot be used in consumer welfare calculations that require expenditure shares).

Because the telecommunications, telephone, and water reforms occurred in 1995 and 1996, the 1994 survey is considered “before” and the 1999 survey an “after” observation. We also focus on the 1992 survey and use annualized changes over the 1992–94 period to control for annualized changes over the 1994–99 privatization period. This comparison is aided by the country’s having had a similar economic performance and relatively stable political structure during both periods. The 1993 wave of the EIH was used only in the Engel curve regressions to provide more points of temporal and spatial price variation over which to estimate price elasticities.

For employment and wage information, firms in the privatized sectors considered (i.e., water, electricity, and telecommunications) are relatively small employers in Bolivia; thus, the household surveys offer only small samples of workers in these industries. The 1999 survey asked respondents to state both the sector and the firm they worked for. In the electricity sector, no respondent declared that s/he worked for the electricity firms mentioned in the survey section. Indeed, many respondents worked in the electricity sector as electricians or electric appliance vendors. In light of this reality, administrative information on employment and wage levels were collected from firms and regulatory agencies, providing the basis for our analysis of privatization’s labor-market effects. Additional administrative information on quality-related issues was collected directly.

Appendix 4B

Access Definitions and Utilities Expenditure

The household surveys included various questions with regard to utilities access. In all cases, access must be measured based on whether households have the utility in question, rather than their having the option to connect. In Argentina, Ennis and Pinto (2002) found average take-up rates for electricity and water were 99.9 and 97.4 percent, respectively; thus, determining access based on what households are using should be a reasonable approximation. Based on the household survey questions, we define measures of access that are fully consistent across the surveys listed in appendix 4A (unless otherwise noted).

Access to Water. A household is considered connected to the water network and therefore has access if it declares it has a water connection either inside its dwelling or otherwise within the building the dwelling is a part of. Households obtaining water from a public faucet, well, delivery truck, river, lake, or other sources are not considered to have access to the water network.

Expenditure on Water. The surveys directly ask for total monthly expenditure on water from all sources.

Access to Electricity. The 1992 and 1994 EIH directly ask whether the dwelling has electricity, while the 1999 ECH asks whether the household uses electricity for lighting. A household is therefore defined as having access if it has electricity or uses electricity for lighting. Most use it for lighting, and given the 1999 access rates of nearly 100 percent, we do not believe the 1999 measure is much understated compared to earlier measures.

Expenditure on Electricity. The surveys directly ask for total monthly expenditure on electricity service.

Access to Telephone. The 1994 EIH directly asks whether a household has a telephone, while the 1999 ECH asks whether the household has a fixed-line or cellular telephone service. A household with a telephone or telephone service is defined as having access. The 1992 and 1993 EIH do not contain a comparable question; thus, telephone access is available only for 1994 and 1999. Only the 1999 survey asks for expenditure on telecommunications separately; therefore, we used expenditure on communications.

Access to and Expenditure on Communications. All surveys asked consumers for expenditure on communications, including telephone and mail expenses. Households reporting positive communications expenditure were defined as having access to communications, which was a proxy for telephone access. Although using communications expenditure is likely to overstate telephone access somewhat, the change in access to communications between 1994 and 1999 has a 0.945 correlation at the decile level with changes in access to telephones over the same period. This measure should therefore be a good proxy.

