

Foreign Direct Investment and Economic Growth in Bolivia, 1990-1998

Prepared by

Nikolai Flexner*
Economic Policy Division
Central Bank of Bolivia

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Abstract

This paper employs ordinary least squares (OLS) estimation to examine the determinants of foreign direct investment (FDI) and the effect of FDI on per capita GDP growth in Bolivia over the period 1990:1-1998:4. The regression results find that the real effective multilateral exchange rate, the ratio of external debt to GDP, and a dummy representing capitalization inflows significantly impact FDI, while FDI, along with the terms-of-trade, the ratio of private sector credit to GDP, and the ratio of government spending to GDP are shown to have a statistically significant impact on per capita GDP growth. The exclusion of capitalization inflows from total FDI in the FDI determinants model has very little impact on the overall results.

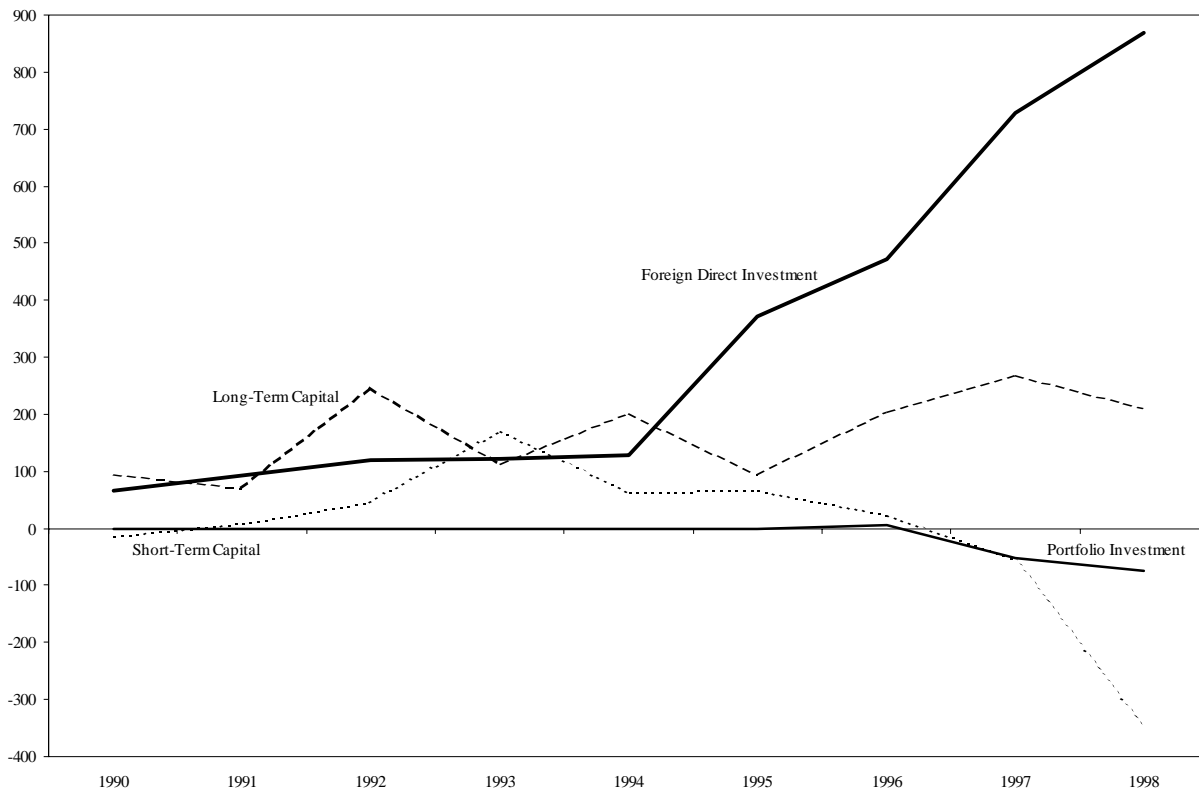
Additional sections of the paper examine FDI in historical context and the composition of FDI by breaking down FDI flows by sector and country of origin. Historically, FDI inflows have been concentrated in the hydrocarbon and mining sectors. However, inflows to these and other sectors were low when compared to other countries in the region, likely in response to political and economic stability. In recent years FDI in the mining sector has declined, while FDI in the hydrocarbon and service sectors has surged to unprecedented levels. These two sectors received 80.4 percent of all FDI over the period 1990-98. Finally, the United States continues to be the principal source of FDI in Bolivia. Over the 1990-98 period FDI originating in the United States represented 40.7 percent of all FDI in Bolivia. Other important sources of FDI in the 1990s have been the Southern Cone countries of Argentina, Brazil, and Chile, and increasingly Europe due to the participation of a number of European companies in the capitalization process.

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1. Introduction

Bolivia, like many other developing countries, has experienced a sharp increase in foreign direct investment (FDI) in the 1990s. The driving forces behind the surge in FDI inflows have been the deep structural reforms adopted under the government of Dr. Víctor Paz Estenssoro (1985-89), the implementation of a broad set of economic reforms in the early to mid-1990s, and, most importantly, the capitalization of the principal state-owned enterprises (SOEs) carried out under the government of Gonzalo Sánchez de Lozada (1993-97). By the early 1990s the deep and sustained reforms had begun to yield modest inflows of FDI, while the capitalization process in the second half of the 1990s has caused FDI to surge to record levels. In 1998 FDI reached the unprecedented level of \$872 million in nominal terms and continues to be the principal source of capital flows to Bolivia due to the virtual nonexistence of portfolio investment in Bolivia's underdeveloped capital markets (Figure 1).

Figure 1. Composition of Net Capital Inflows (in millions of U.S. dollars)



Sources: Central Bank of Bolivia, *External Sector Bulletin*, various issues.

The dramatic increase in FDI in recent years has raised a number of important questions, two of which we will examine in detail in this paper. First, what are the primary factors responsible for the upsurge in FDI in recent years? And, second, what has been the effect of the increase in FDI on economic growth in Bolivia? These two questions are tackled using a simple ordinary least squares (OLS) procedure. In the case of the first question

regressions are re-estimated excluding capitalization inflows from the FDI total. This specification will provide a clearer examination of FDI determinants in a more traditional FDI setting void of capitalization inflows. Additional sections of the paper will look at FDI inflows from a historical perspective and examine the composition of FDI flows by sector and country of origin.

Foreign investment plays a crucial role in developing countries like Bolivia for a number of reasons. Most importantly, FDI has been shown to positively impact economic growth by increasing total investment (Table 1) and improving productivity in the host economy through the diffusion of advanced technology and management skills. In one study examining a cross-section of twelve Latin American countries for the period 1950-85, FDI was shown to be a significant determinant of economic growth and was estimated to be three to six times more efficient than domestic investment (De Gregorio, 1992). Further evidence presented in a recent study by Borensztein et al. (1998) of a sample of 69 developing countries over the period 1970-1989 finds that FDI produces a crowding-in effect, with each additional dollar of FDI generating between \$1.5 and \$2.8 in total investment. However, the authors conclude that FDI will only positively impact economic growth when the stock of human capital in the host country meets a minimum threshold which allows it to efficiently absorb and utilize the inflows of modern technology. Lastly, a strong case can be made that FDI is more productive than domestic investment, as any firm entering a domestic market must somehow compensate for the inherent advantages enjoyed by the domestic firm by possessing compensating advantages such as superior technology or products, or firm-level economies of scale.

Table 1. Foreign Direct Investment as a Source of Capital, 1990-98 (In millions of U.S. dollars)

	Foreign Direct Investment		Private Domestic Investment		Public Domestic Investment		Total Investment	
	Total	% of Total Investment	Total	% of Total Investment	Total	% of Total Investment	Total	% of GDP
1990	67.0	0.10	294.6	0.44	315.4	0.47	677.0	0.14
1991	95.7	0.10	410.8	0.44	420.5	0.45	927.0	0.17
1992	122.1	0.11	410.0	0.39	531.6	0.50	1063.6	0.19
1993	123.6	0.12	468.2	0.44	480.6	0.45	1072.3	0.19
1994	130.2	0.13	345.4	0.35	513.3	0.52	988.8	0.17
1995	374.3	0.27	502.7	0.36	519.7	0.37	1396.7	0.21
1996	474.1	0.28	607.5	0.36	588.7	0.35	1670.3	0.23
1997	730.5	0.32	997.1	0.44	548.3	0.24	2275.9	0.29
1998 (p)	872.0	0.33	1235.6	0.47	502.9	0.19	2610.5	0.30

Sources: Central Bank of Bolivia; IMF, *International Financial Statistics CD ROM* (January 1999); and UDAPE, *Dossier of Social and Economic Statistics for Bolivia*, 1998.

Notes: (p) preliminary. Due to rounding components of total investment may not add up to 100 percent.

Among the possible adverse effects associated with FDI is the potential volatility of these flows in the long run. Although long-term capital inflows (cold money) are generally believed to be less volatile than short-term capital inflows (hot money), a recent study by Claessens et al. (1995) of five industrial countries and five developing countries finds evidence suggesting that long-term capital flows are often just as volatile as short-term capital flows, and highlights the difficulties in distinguishing between FDI and other long-term flows. Additionally, distortionary

trade or tax regimes may inhibit the ability of FDI to act as a positive means of advanced technology transfer. For instance, protectionist trade policies may lead to tariff hopping, in which exporters are inclined to enter the host countries domestic market by way of FDI. Similarly, tax or other incentives presented to foreign investors with the aim of developing a strategic industrial sector in the host country may encourage FDI to enter industries in which it lacks a competitive advantage in the domestic or global market. Under these scenarios, the response of FDI flows to a distorted set of economic incentives may lead to a misallocation of resources, undermine the ability of FDI to act as a channel for the transfer of modern technology, and produce lower levels of productivity in the host economy.

The remainder of the paper is organized as follows. Section 2 gives a brief historical overview of FDI; Section 3 examines the composition of recent FDI flows; Section 4 offers a brief analysis of the data used in our empirical investigation; Sections 5 and 6 present our models and empirical results for the determinates of FDI and the effect of FDI on per capita GDP growth, respectively; Section 7 discusses the specification tests carried out on our models; and Section 8 offers some concluding remarks.

2. Historical Overview of Foreign Direct Investment in Bolivia

2.1. Direct Investment following the 1952 Revolution

As Table 2 indicates, the first measurements of FDI in Bolivia are available from the International Monetary Fund (IMF) beginning in 1955, and from 1960 forward on an annual basis. Direct investment flows to Bolivia from 1960 to roughly the early 1990s were minimal when compared to other countries in Latin America due in large part to the political and economic instability that Bolivia experienced during this period. A brief comparison with two of its Andean neighbors (themselves not immune to instability) demonstrates the virtually negligible role of FDI in Bolivia during this period. Between 1960 and 1990 FDI averaged \$7.6 per capita annually in Ecuador, \$3.4 per capita in Peru, and only \$2 per capita in Bolivia. While Ecuador and Peru all saw substantial increases in FDI in the 1970s, FDI in Bolivia shrank by more than 50 percent from an average of \$7.6 million a year in the 1960s to \$3.7 million a year in the 1970s. Meanwhile, FDI in Ecuador increased nearly fivefold from an average of \$14.1 million per year in the 1960s to \$68.3 million in the 1970s while Peru saw FDI increase more than 800 percent from \$8.2 million to \$66 million over the same period.

Table 2. Foreign Direct Investment in Bolivia, 1955-89 (In millions of U.S. dollars)

Year	Total	Year	Total
1955	2.6	1975	53.4
1960	16.5	1976	-8.1
1961	11.4	1977	-1.2
1962	10.1	1978	11.5
1963	5.8	1979	35.0
1964	1.5	1980	47.0
1965	12.5	1981	75.7
1966	2.0	1982	31.1
1967	0.5	1983	7.0
1968	6.5	1984	7.0
1969	9.1	1985	10.0
1970	-75.9	1986	10.0
1971	1.9	1987	38.1
1972	-10.5	1988	-10.1
1973	4.6	1989	-24.4
1974	25.9		

Source: IMF, *International Financial Statistics*, various issues.

The small amounts of FDI that did enter Bolivia in the 1960s and 1970s resulted primarily from American investment and were concentrated in the hydrocarbon and mining sectors. Following the Revolution of 9 April 1952 the government of Paz Estenssoro allowed foreign capital to enter Bolivia, and in 1953 made favorable changes to the petroleum sector legislation. By the end of the decade these changes had lured ten United States petroleum companies to Bolivia. The majority of investments made following these changes occurred after the arrival in 1955 of the Bolivian Gulf Oil Corporation, which began the construction of a gas pipeline to Argentina and invested substantial sums in a large natural gas deposit discovered in the mid-1960s. Meanwhile, though the government nationalized the three largest mining interests following the Revolution, the government never threatened to nationalize the mining interests owned by American company W. Grace Co., allowing inflows of foreign capital to continue unabated (Morales and Sachs, 1990).

In 1965 the government of President René Barrientos deepened the economic reforms begun under Paz Estenssoro by liberalizing the investment code for foreign capital. This change allowed United States Steel to rent the Matilde zinc mine from COMIBOL (the state mining corporation), producing an influx of foreign capital which helped COMIBOL achieve its first profits in 1966. Meanwhile the Bolivian Gulf Oil Corporation was given further concessions so that it could complete its oil pipeline from Tarija and Santa Cruz to the Pacific coast via the altiplano.

The generally supportive atmosphere foreign investors received following the 1952 Revolution came to an abrupt end in September 1969 when Luis Adolfo Siles Salinas was overthrown in a coup d'état led by General Alfredo Ovando Candia. In a populist prescription designed to win political favor, Ovando nationalized the Bolivian Gulf Oil Corporation in October 1969. As shown in Table 2, this move had a profound impact on FDI, as

foreign investors pulled \$75.9 million out of Bolivia in 1970, producing the biggest yearly outflow of FDI ever recorded in Bolivia (Morales and Sachs, 1990).

In 1970 Ovando was deposed in a coup d'état led by General Juan José Torres (1970-71). The slowly improving economic and social conditions gave the populist military regime of Torres the confidence to deepen the anti-foreign capitalist policies adopted under Ovando by radically altering a number of favorable foreign investment policies adopted between previous Bolivian governments and the United States. Torres not only annulled a special contract signed between COMIBOL and a United States mining company to extract tin from the Catavi tin mine tailings, but then went a step further and forced U.S. Steel to relinquish its contractual rights to run the Matilde zinc mine.

In August 1971 Torres was overthrown in a coup d'état led by the military party Bolivian Socialist Phalange (FSB) and the MNR, and Coronel Hugo Banzer assumed power. The government of Banzer further liberalized the investment code, moved to improve the poor relations with the United States that had developed under Torres, and devalued the exchange rate in 1972, a decision that encouraged comparatively large capital inflows of FDI in the mid-1970s (Table 2).

The 40 percent devaluation of the peso in late 1972 was caused in large part by the nationalization of the Bolivian Gulf Oil Corporation's assets in 1969, a move that provoked upward pressures on the peso.¹ This overvaluation hurt the mining sector, which suffered not only from Banzer's incentive-based focus on the hydrocarbon, agro-industry, and service sectors located around Santa Cruz in the eastern lowlands, but also from both taxation and the exchange rate misalignment. Consequently many of its resources were shifted to the non-tradable manufacturing and service sectors. Although the hydrocarbon sector experienced a contraction in export earnings during the period of overvaluation (1969-72), its export earnings were still relatively high during the Banzer years due to two important factors. First, the overvaluation of the peso led to an increase in capital intensive activities associated with the hydrocarbon sector such as oil refining, and secondly, the OPEC oil embargo in the mid-1970s produced a fourfold increase in international oil prices.

The period immediately following the military regime of Banzer provides an interesting paradox with respect to foreign investment. From 1978 to 1982 Bolivia had eight military governments and three civilian governments, yet the levels of FDI achieved during this period were among the highest ever recorded in Bolivia until the mid-1990s. These high levels were due in particular to strong inflows into the mining and hydrocarbon sectors. Increased investment in the mining sector resulted from the 1979 easing of two restrictive taxes which had discouraged foreign investment. The first such tax was the *regalía* tax which was adopted in 1965 and imposed a tax on presumed income, while the second was an export tax adopted immediately following the devaluation in 1972 (Morales and Sachs, 1990). These two measures helped to counteract Resolution 24 of the Cartagena Accord adopted by members of the Andean Pact in the early 1970s which restricted the rights of foreign investors to invest

¹ In spite of the devaluation in 1972, Bolivia still maintained a persistently overvalued exchange rate throughout the 1970s.

in manufacturing firms and to remit profits to their home countries. Meanwhile, the hydrocarbon sector continued to benefit greatly from increased FDI following the oil boom in the mid-1970s, and the opening of the natural gas pipeline to Argentina in 1972.

The strong FDI flows experienced during the better part of the Banzer regime, and into the early 1980s, would eventually decline as foreign investors realized that the average real GDP growth of 5.4 percent achieved during the Banzer years masked mounting external debts, and an overvalued exchange rate, among other economic weaknesses. These weaknesses worsened markedly as a result of the political chaos that reigned following the Banzer presidency and would eventually provide the basis for the deep economic crisis Bolivia confronted in the mid-1980s.

By the end of 1983 inflation had soared to 275.6 percent annually and the combination of increasingly high international interest rates and a sharp drop in commodity prices led to a 6.55 percent contraction in real GDP (Morales and Sachs, 1990). By the second quarter of 1984 the large fiscal deficit, lack of access to foreign borrowing (which had dried up in 1982) needed to finance government expenditures, the inability to reform the tax system, political instability, the rapid expansion of the money supply, and a number of other factors combined to trigger a hyperinflationary period which would last until September 1985. In the context of hyperinflation, which averaged 20,000 percent between August 1984 and August 1985, and reached an annualized rate of 60,000 percent between May 1985 and August 1985, Bolivia witnessed a substantial contraction in FDI flows (Sachs, 1987).

Unable to halt inflation, President Hernán Siles Suazo was replaced in early elections by former president Víctor Paz Estenssoro. On 29 August 1985 the new government of Paz Estenssoro implemented the NEP, a stabilization program that ended the hyperinflation within days of its implementation. However, the stabilization program and other economic reforms failed to jump-start FDI, which recorded negative levels in 1988 and 1989 (Table 2). It was only in the early 1990s that FDI began to increase significantly due to the adoption of a set of second generation reforms which included the deepening of the original NEP reforms under the government of Jaime Paz Zamora (1989-93) and the adoption of the Plan de Todos (Plan for All), whose centerpiece was capitalization, under the presidency of Sánchez de Lozada.²

2.2. The Capitalization Period

On 21 March 1994 the Bolivian Congress adopted the Capitalization Law laid out by the government of President Sánchez de Lozada with the stated objective of transferring the six principal SOEs in Bolivia from state control into private hands. These six companies—YPFB (oil and gas), ENDE (electricity), ENFE (railways), ENTEL (telecommunications), LAB (aviation), and EMV (mining and smelting)—represented roughly 12.5 percent

² The most important of these second generation reforms are the Investment Law (17 September 1990), Privatization Law (24 April 1992), Capitalization Law (21 March 1994), Popular Participation Law (20 April 1994), the Sectoral Regulation Law (28 October 1994), Electricity Law (21 December 1994), Telecommunications Law (5 July 1995), Hydrocarbon Law (30 April 1996), Pensions Law (29 November 1996), Mining Code (17 March 1997), Stock Market Law (31 March 1998), Property and Popular Credit Law (15 June 1998), and the Securities Law (25 June 1998).

of GDP. Their capitalization was undertaken with the primary objective of increasing savings and investment in Bolivia, as well as investment in human capital, in order to generate higher growth rates and reduce poverty (Graham, 1997). In order to achieve these objectives the government adopted a modified version of more traditional privatization schemes which it dubbed capitalization. Under the capitalization scheme the six SOEs were put up for sale by international tender and the winning bidder gained management control and a 50 percent equity stake in the capitalized enterprise. In contrast to traditional privatization schemes where the winning tender is paid to the government, the capitalization program required the successful bidder to invest the money in the company itself over a stated time period, effectively doubling its net worth. The remaining 50 percent of the shares were divided equally among all adult Bolivians and deposited with one of two new private pension fund managers.

Table 3. Foreign Direct Investment Commitments Resulting from Capitalization

Sector/Firm	Foreign Investor	Date of Purchase	Purchase Price
Electricity			
Corani	Dominion Energy (USA)	June 29, 1995	\$58,796,300
Guaracachi	Energy Initiatives (USA)	June 29, 1995	\$47,131,000
Valle Hermoso	Constellation Energy (USA)	June 29, 1995	\$33,921,100
Telecommunications			
ENTEL	STET International (Italy)	September 28, 1995	\$610,000,000
Aviation			
LAB	VASP (Brazil)	October 19, 1995	\$47,470,000
Railways			
Andean Rail Network	Cruz Blanca (Chile)	December 15, 1995	\$13,251,000
Eastern Rail Network	Cruz Blanca (Chile)	December 15, 1995	\$25,853,099
Hydrocarbons			
Empresa Petrolera Andina	YPF and Pérez Companc (Argentina), Pluspetrol Bolivia (Spain)	December 5, 1996	\$264,777,021
Empresa Petrolera Chaco	Amoco Bolivia Petroleum Company (USA)	December 5, 1996	\$306,667,001
Transportadora Boliviana de Hidrocarburos	Enron Transportadora (USA), Shell Overseas Holding Ltd. (Britain/Netherlands)	December 5, 1996	\$263,500,000
Total			\$1,671,366,521

Sources: Ministry of Capitalization, *Capitalization: The Bolivian Model of Economic and Social Reform*, 1996; and The Economist (1997, p. 30).

The FDI commitments resulting from the capitalization process are presented in Table 3. As Table 3 shows the capitalization process has produced investment commitments of nearly \$1.7 billion.³ The resulting inflows have caused FDI to surge from 0.6 percent of GDP in 1990 to 10.2 percent in 1998, making Bolivia the largest recipient in percentage terms of FDI in Latin America (Table 4). During the period 1995:2-1998:4 inflows from capitalization represented 42.8 percent of all FDI, and preliminary estimates indicate that capitalization flows will surge to 55.7 percent of all FDI flows in 1999.⁴ These capitalization inflows have helped to finance a sharp increase

³ The tin and antimony smelter, EMV, originally scheduled to be divested under the capitalization program, was privatized in December 1999. Due to strong opposition by miners at the Huanuni and Colquiri mines, the capitalization, and later privatization of Vinto, as EMV is commonly known, had been delayed on a number of occasions. Meanwhile, the privatization of the refinery unit of the state oil and gas company YPFB was completed in mid-November 1999.

⁴ A number of Bolivian companies were also privatized in the early to mid-1990s, but the resulting FDI inflows were minimal when compared to those of capitalization. In the first round of privatization over the 1992-93 period, 24 companies were privatized raising approximately \$18.7 million from solely domestic investors (Requena, 1996). The second round of privatization was carried out over the 1995-96 period and produced the sale of 49 of the 72 companies scheduled for privatization, raising nearly \$97.5 million, of which \$58.3 million came in the form of FDI. The foreign investors were EMEL of Chile which purchased the Cochabamba Light and Electricity Company (ELFEC) for \$50.3 million, and the Gloria Group of Peru which purchased the industrial milk plants (PIL) in La Paz and Cochabamba for \$1.8 and \$6.2 million, respectively.

in the current account deficit. From 1990 to 1994 the current account deficit represented on average 3.5 percent of GDP. However, since 1995 the trade deficit has widened every year, reaching 7.9 percent of GDP in 1998.

Table 4. Primary Recipients of Foreign Direct Investment in Latin America, 1990-98
(In percent of GDP)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Argentina	1.3	1.3	1.8	1.0	1.1	1.7	1.7	2.1	2.1
Bolivia	0.6	1.0	1.6	2.2	2.2	5.6	6.4	9.2	10.2
Brazil	0.2	0.3	0.5	0.3	0.6	0.7	1.4	2.4	4.1
Chile	1.9	2.4	2.2	2.3	5.1	4.6	6.8	7.0	6.4
Colombia	1.2	1.1	1.7	1.9	2.4	2.8	3.8	5.9	3.0
Ecuador	1.2	1.4	1.4	3.3	3.2	2.6	2.6	3.5	4.2
Mexico	1.0	1.5	1.2	1.1	2.6	3.3	2.8	3.2	2.5
Peru	0.1	-0.0002	0.3	1.6	6.1	3.4	5.3	3.1	3.1
Venezuela	0.9	3.6	1.0	0.6	1.4	1.3	3.1	6.3	4.7

Sources: IMF, *International Financial Statistics*, various issues; and Central Bank of Bolivia, *External Sector Bulletin*, various issues.

3. Composition of Foreign Direct Investment

3.1. Sectoral Location

Data on the sectoral location of FDI in Bolivia are available from 1990 forward. The principal recipients of FDI have been the business and services sector (service sector), and the hydrocarbons sector, both of which have benefited greatly from capitalization inflows.

The gas pipeline to Brazil and increasing levels of hydrocarbon exploration and production will play vital roles in Bolivia's ability to maintain stable levels of FDI well into the twenty-first century. The hydrocarbon sector has been the primary destination of FDI since the Central Bank of Bolivia began recording FDI inflows in 1990, receiving 52 percent of all FDI flows over the 1990-98 period. The sharp increase in FDI inflows to the hydrocarbon sector has been sparked by the adoption of the Hydrocarbons Law on 30 April 1996, the capitalization of YPFB, and the construction of a pipeline to Brazil giving producers efficient access to the Brazilian market. It is forecast that natural gas exports will increase from 1.6bn cubic feet per year in 1997 to 5.2bn in 2001 as the \$1.8 billion pipeline between Bolivia and southern Brazil reaches full capacity, making the hydrocarbon industry Bolivia's leading export earner. In 1997 the government auctioned off twenty oil exploration contracts for a total of \$449.4 million over a period of three years for the right to oil and gas production. These auctions and recent discoveries should help insure that Bolivia is able to utilize the gas pipeline at full potential while encouraging continued FDI in order to take advantage of the opportunities presented by the gas pipeline and maintain adequate identified reserves.

In 1998, the hydrocarbon sector received 59.8 percent of all FDI inflows, due in part to an additional \$97.6 million invested in the oil pipeline linking Bolivia with Brazil (Table 5). In 1999 the hydrocarbon sector is expected to receive 69.5 percent of total FDI inflows, more than quadrupling the amount received by the electricity sector, the second leading recipient of FDI. Further estimates indicate that the hydrocarbon sector will receive 73.2

percent of all non-capitalization flows in 1999, making this sector a crucial ingredient in the maintenance of stable FDI flows, especially when capitalization flows to all sectors dry up in 2004.

Table 5. Foreign Direct Investment in Bolivia by Sector, 1990-99 (In millions of U.S. dollars)

	Business and Services		Electricity		Hydrocarbons			Industry	Mining	Totals			Annual Total
	Private	Capitalization	Private	Capitalization	Private	Capitalization	Pipeline	Private	Private	Capitalization	Pipeline		
1990	9.9	-	-	-	50.8	-	-	0.7	5.7	67.0	-	-	67.0
1991	12.5	-	-	-	75.1	-	-	2.0	6.1	95.7	-	-	95.7
1992	28.4	-	-	-	83.0	-	-	2.0	8.7	122.1	-	-	122.1
1993	3.0	-	-	-	65.6	-	-	14.5	40.5	123.6	-	-	123.6
1994	20.5	-	-	-	62.6	-	-	18.7	28.6	130.2	-	-	130.2
1995	92.6	55.4	-	-	124.8	-	-	53.5	47.9	318.9	55.4	-	374.3
1st Quarter	6.1	-	-	-	17.5	-	-	6.2	14.8	44.6	-	-	44.6
2nd Quarter	29.0	-	-	-	20.6	-	-	45.4	6.9	101.9	-	-	101.9
3rd Quarter	0.4	50.3	-	-	30.9	-	-	1.7	16.4	49.4	50.3	-	99.7
4th Quarter	57.1	5.1	-	-	55.8	-	-	0.1	9.8	122.8	5.1	-	127.9
1996	56.6	143.8	-	-	118.0	-	-	100.2	55.5	330.3	143.8	-	474.1
1st Quarter	0.9	26.9	-	-	31.0	-	-	20.6	19.3	71.8	26.9	-	98.7
2nd Quarter	33.6	24.9	-	-	31.0	-	-	55.2	10.6	130.4	24.9	-	155.3
3rd Quarter	7.7	46.5	-	-	32.3	-	-	16.5	16.5	73.0	46.5	-	119.5
4th Quarter	14.4	45.5	-	-	23.7	-	-	7.9	9.1	55.1	45.5	-	100.6
1997 (p)	52.7	124.1	7.5	29.9	170.5	152.7	129.1	19.4	44.6	294.7	306.7	129.1	730.5
1st Quarter	12.0	47.4	2.0	12.3	26.0	60.0	-	2.2	6.3	48.5	119.7	-	168.2
2nd Quarter	16.5	29.8	2.0	7.2	29.4	35.5	36.3	5.5	14.1	67.5	72.5	36.3	176.3
3rd Quarter	9.2	26.1	2.0	6.3	46.7	34.0	20.7	5.0	19.2	82.1	66.4	20.7	169.2
4th Quarter	14.9	20.8	1.5	4.2	68.4	23.2	72.1	6.7	4.9	96.4	48.2	72.1	216.7
1998 (p)	91.0	130.1	22.8	53.0	126.3	297.3	97.6	15.8	38.2	294.0	480.4	97.6	872.0
1st Quarter	13.3	35.4	2.1	7.7	28.1	59.9	29.5	5.9	10.5	60.0	103.0	29.5	192.4
2nd Quarter	12.8	27.9	5.6	11.3	44.1	75.3	13.5	1.1	20.4	84.0	114.5	13.5	212.0
3rd Quarter	49.1	35.9	9.6	20.0	37.9	86.8	29.6	8.8	2.7	108.1	142.7	29.6	280.4
4th Quarter	15.9	30.9	5.4	14.1	16.2	75.3	25.1	0.1	4.5	42.1	120.3	25.1	187.4
1999 (e)	15.2	53.9	28.1	85.3	226.5	278.3	16.2	22.0	23.4	315.0	418.0	16.2	749.1
1st Quarter	6.7	15.1	12.7	27.3	79.8	55.8	16.2	2.4	6.0	107.6	98.2	16.2	222.0
2nd Quarter	2.7	11.5	3.1	14.9	60.3	74.8	-	11.2	8.5	85.8	101.2	-	187.0
3rd Quarter	2.8	12.7	4.6	20.0	41.3	69.7	-	4.0	4.3	57.0	102.4	-	159.4
4th Quarter	3.1	14.6	7.7	23.2	45.2	78.1	-	4.4	4.7	65.1	115.9	-	181.0
Total	382.4	507.3	58.4	168.2	1,103.2	728.3	242.9	248.8	299.2	2,092.0	1,404.3	242.9	3,739.2

Source: Central Bank of Bolivia.

Notes: (p) preliminary, (e) estimate. Due to rounding sectoral components of FDI may not add up to the total shown.

Outside the hydrocarbon sector the main destination of FDI has been the service sector. Since 1995 this sector has benefited from a huge influx of FDI following the capitalization of the state telephone company ENTEL (Tables 3 and 5). Prior to the commencement of capitalization inflows FDI in the service sector represented only 16 percent of all FDI flows over the 1990:1-1995:2 period. However, by 1996 FDI in the service sector had climbed to 42.3 percent of total FDI inflows. This acceleration resulted primarily from capitalization inflows to ENTEL (as well as LAB and the railway sector), which by themselves represented 30.3 percent of all FDI inflows in 1996. In spite of its recent strong performance FDI in the service sector is expected to decline from a high of \$200.4 million in 1996 to \$69.2 million in 1999 as both private and capitalization flows shrink in size.

The service sector, most notably telecommunications and transportation, could potentially prove very attractive to foreign investors if Bolivia were to take advantage of its geographical location to evolve into a telecommunications and transportation hub for South America. However, in the near term, the monopolies present in ENTEL and ENFE, as well as Bolivia's poor transportation infrastructure, will restrict the potential contribution of the service sector to the growth and stability of FDI inflows. Continued public investment in transportation infrastructure and the opening of the telecommunications market in September 2001 should enhance both FDI and competition in this sector in the long-term.

Direct investment in the mining sector has steadily declined in recent years. The increasingly low levels are the result of (1) the Bre-X Minerals gold scandal in Indonesia in early 1997 which has significantly reduced worldwide

investment in mineral exploration; (2) slumping international mineral prices, most notably for gold, which reached a twenty year low in 1999; (3) regular changes in the rules of the game governing investment; (4) the insecure nature of contracts given the poor state of the judicial system; (5) indirect taxes equal to 22.45 percent levied on capital goods imports destined for mineral exploration and production; and (6) continuing conflicts with Chile over the transportation of minerals to Chilean ports.

A recent report by the Ministry of International Trade and Investment (1998) highlights the impact of the above-mentioned measures. It estimates that there were 87 foreign owned mining companies operating in Bolivia who received foreign investment during the 1992-97 period. However, in spite of these seemingly positive numbers, only 4 of the 87 companies actually made investments in 1997 while the majority of the remaining companies have pulled their operations out of Bolivia. The effects of this cycle of (1) initial investment; (2) foreign and particularly domestic obstacles to continued investment; and (3) the eventual closure of operations are illustrated in Table 5. From a high of \$55.5 million in 1996, FDI has shrunk to \$38.1 million in 1998, and estimates indicate that these levels could drop still further to \$23.5 million by 1999.⁵

Direct investment flows into the electricity sector were only just beginning in 1997 and are expected to be strengthened in coming years by capitalization inflows and the recent purchases by foreign companies of four companies in this sector. These flows should continue to steadily increase, eclipsing flows to the service sector by 1999, due to increasing levels of FDI in the Bolivian Power Company (COBEE), the La Paz Electricity Company (ELECTROPAZ), the Cochabamba Light and Electricity Company (ELFEC), and the transportation unit of ENDE (ETE), which are all foreign owned, in addition to continued capitalization commitments.⁶

In the industrial sector FDI peaked in 1996 at \$100.2 million, declining to \$15.9 million by 1998. Like the mining sector no capitalized companies are represented in this sector. Thus, FDI in the industrial sector will be driven solely by non-capitalization flows in the coming years. The leading investors are expected to be Sudamericana de Seda of the United States, Grupo Gloria of Peru through its investments in the La Paz and Cochabamba PIL plants, and C.D.C. of Britain.⁷

3.2. Country of Origin

Data on FDI inflows by country of origin are available from the Central Bank beginning in 1990.⁸ As Table 6 illustrates the principal sources of these FDI flows have been the United States, Latin America, and increasingly Europe.

⁵ In spite of the recent decline in mining investment, FDI in this sector is projected to increase sharply in the coming years as development of the San Cristóbal mine comes online. The Andean Silver Corporation is expected to invest hundreds of millions of dollars to develop San Cristóbal, one of the world's largest open pit silver and zinc deposits.

⁶ ETE was sold to the Spanish consortium Unión Fenosa for \$39.9 million; NRG Energy of the United States and Vittenfall of Sweden purchased 95 percent of the shares in COBEE for \$171.6 million; ELFEC was sold to EMEL of Chile for \$50.3 million; and ELECTROPAZ was purchased by Iberdrola of Spain for \$65.3 million.

⁷ Ministry of International Trade and Investment (September 1998, Table 5).

Table 6. Foreign Direct Investment in Bolivia by Country of Origin, 1990-98 (In millions of U.S. dollars)

	1990	1991	1992	1993	1994	1995	1996	1997	1998 (p)
North America/Caribbean	41.96	70.29	108.08	71.32	77.67	134.57	166.97	284.55	306.90
Canada	-	-	-	-	-	-	36.17	4.00	4.28
Mexico	-	-	-	-	-	-	-	-	0.09
United States	41.96	70.29	108.08	71.32	77.67	134.57	130.80	280.55	302.53
South/Central America	17.62	12.12	7.16	35.30	32.76	218.32	163.51	161.75	284.97
Argentina	14.32	11.82	4.51	9.60	6.76	10.37	30.00	124.67	207.36
Brazil	1.67	0.25	1.62	7.34	6.00	32.78	70.60	4.69	34.50
Chile	-	-	-	0.07	2.00	174.15	46.90	8.52	23.01
Colombia	-	-	-	14.13	11.00	0.72	0.01	15.72	0.28
Costa Rica	-	-	-	-	-	-	-	-	2.89
Panama	-	-	-	-	-	-	-	1.56	12.28
Paraguay	-	-	-	-	-	-	-	0.04	0.10
Peru	1.63	0.06	-	2.16	2.00	0.31	16.00	6.55	4.53
Uruguay	-	-	-	-	-	-	-	-	0.02
Venezuela	-	-	1.02	2.00	5.00	-	-	-	-
Europe	5.94	11.02	5.10	12.95	15.00	19.35	120.62	271.97	244.64
Austria	-	-	-	-	-	-	-	-	0.52
Belgium/Luxembourg	-	-	-	-	-	-	-	4.72	8.01
England	-	-	-	-	-	2.65	0.30	38.07	14.70
France	-	-	-	-	-	-	4.20	2.20	11.78
Germany	5.94	11.02	5.07	12.95	15.00	4.70	5.90	-	-
Ireland	-	-	-	-	-	-	-	-	0.04
Italy	-	-	-	-	-	-	80.00	148.12	109.65
Netherlands	-	-	-	-	-	1.12	0.12	1.31	44.13
Spain	-	-	-	-	-	9.90	30.10	76.78	42.79
Sweden	-	-	-	-	-	-	-	0.51	9.67
Switzerland	-	-	0.03	-	-	0.99	-	0.26	3.36
Asia	0.34	0.42	0.36	2.00	2.56	0.05	0.40	2.45	8.40
Japan	0.34	0.42	0.36	2.00	2.56	0.05	0.40	0.25	0.61
North Korea	-	-	-	-	-	-	-	-	0.79
South Korea	-	-	-	-	-	-	-	2.20	7.00
Others	1.10	1.88	1.46	2.03	2.23	2.00	22.64	9.78	27.08
Australia	-	-	-	-	-	-	13.10	-	1.51
Barbados	-	-	-	-	-	-	-	-	1.97
Caiman Islands	-	-	-	-	-	-	0.50	1.50	18.64
New Zealand	-	-	-	-	-	-	-	4.64	-
Virgin Islands (Britain)	-	-	-	-	-	-	-	0.48	4.54
Virgin Islands (U.S.)	-	-	-	-	-	-	-	3.17	0.41
Others	1.10	1.88	1.46	2.03	2.23	2.00	9.04	-	-
Total	66.96	95.73	122.15	123.60	130.23	374.30	474.14	730.50	871.99

Source: Central Bank of Bolivia.

Note: (p) preliminary

In 1990 United States FDI in Bolivia represented roughly 62.7 percent of all FDI. According to a recent FDI survey (discussed in Section 4) the United States was the leading investor in the hydrocarbon, mining, industrial, and electricity sectors in 1998, with the only exception being the service sector, where capitalization flows from STET International of Italy to ENTEL eclipsed those from the United States. Although United States FDI has increased more than seven times over between 1990 and 1998, its share in total FDI slipped to 34.7 percent in 1998. This reduction in percent share has resulted from an increase in Latin American and European investment, sparked by the capitalization process.

Since 1990 FDI from Latin America has represented 31.2 percent of total annual FDI flows, while the strongest and most consistent investors have been the Southern Cone countries of Argentina, Brazil, and Chile, as well as the countries comprising the Andean Community (Table 6).⁹ Prior to capitalization the majority of Argentine investment was represented in the hydrocarbon sector, while Brazilian companies focused on mining and

⁸ The data likely fail to include a number of foreign investors prior to 1998.

⁹ The Andean Community is comprised of Bolivia, Colombia, Ecuador, Peru, and Venezuela.

commercial agriculture (especially the soybean industry). The large increase in FDI in 1995 resulted from \$174.2 million in Chilean investments primarily in banking, soft drinks, and other business activities. These flows alone represented 79.8 percent of all Latin American investment and 46.5 percent of total investment in 1995. Meanwhile, flows from Latin America since 1996 have been motivated by YPF and Pérez Companc of Argentina, Cruz Blanca of Chile, and VASP of Brazil, who began to meet their capitalization investment requirements in the hydrocarbon, railway, and airline industries, respectively (Table 3).

Until capitalization inflows began in 1995 the role of FDI from outside the Americas was very small. Of the twenty countries outside this region which invested between 1990 and 1998, only six made investments between 1990 and 1995, and these investments only amounted to 10.4 percent of total investment over the period. Although investment from outside the Americas has increased substantially since 1996, to an average of 34.1 percent of total FDI over the period 1996-98, this increase has been driven almost entirely by unsustainable capitalization inflows. Since 1995 the Netherlands, England, Spain, and Italy have all played increasingly important roles through their investments in a number of capitalized companies (Table 3), while France has invested in the hydrocarbon and water systems industries and Germany has invested in the industrial sector.¹⁰ Additionally, Australian companies have invested primarily in the mining industry, and when combined with American and Canadian interests the investments of these three countries alone represent nearly all investment in the mining sector.

Direct Investment from Asia has been the weakest performer with respect to regional investment with the only investors being Japan, and North and South Korea. The low levels of Asian investment are driven in part by (1) the minimal strategic significance of Bolivia for many Asian companies, especially outside of natural resources; (2) the lack of participation by Asian companies in the capitalization process; and (3) the lack of concessionary terms many Asian companies have been offered in other parts of the world.

4. Data

All regression data are quarterly and cover the period 1990-1998. The biggest constraint to carrying out a study on FDI in Bolivia is the availability and quality of data on a quarterly basis, especially in the case of FDI. Until 1998 there were few mechanisms in place to measure inflows of FDI and the Investment Law adopted on 17 September 1990 does not require that foreign investors or the recipient companies declare FDI inflows. In mid-1998 the Ministry of International Trade and Investment, the Central Bank of Bolivia, the National Institute of Statistics (INE), and the Bolivian Private Business Confederation (CEPB) created a quarterly survey which was distributed to companies believed to be receiving foreign investment inflows.¹¹ Although this survey represents a positive step, the fact that non-capitalized companies are under no legal obligation to declare their investment

¹⁰ In June of 1997 Suez Lyonnaise des Eaux of France and Soc. Com. de la Plata and Meller y Arousa of Argentina were awarded the 30-year concession to operate Aguas del Illimani which is in charge of the distribution of water in La Paz and El Alto. It has been estimated that these two companies will invest roughly \$362 million in their operations over the 30-year period. See Ministry of International Trade and Investment (March 1998, pp. 24-5).

¹¹ According to the Ministry of International Trade and Investment 331 companies were estimated to have been recipients of FDI between 1992 and 1997. Of these 331, there were 23 located in the hydrocarbon sector, 87 in the mining sector, 61 in the industrial sector, and 160 in the service sector. See Ministry of International Trade and Investment (March 1998, Annex A).

inflows means that those measuring FDI will continue to rely on guesswork and piecemeal solutions such as press reports and surveys.¹²

The lack of consistent and reliable FDI data is highlighted by the fact that the Central Bank, Ministry of International Trade and Investment, IMF, and World Bank regularly have conflicting FDI figures (Table 7). We have elected to utilize two sources for data on foreign direct investment. The regressions rely upon the Central Bank's figures from 1995 forward and those from the IMF for the earlier periods, as the Central Bank only began to compile quarterly data in 1995. In the remainder of the paper all statistics, figures, and tables refer to annual FDI data compiled by the Central Bank.

Table 7. Comparison of Sources for Foreign Direct Investment, 1990-98
(In millions of U.S. dollars)

	Central Bank of Bolivia	Ministry of International Trade and Investment	IMF	World Bank
1990	67.0	-	27.2	28.1
1991	95.7	-	52.0	54.0
1992	122.1	169.0	93.1	95.0
1993	123.6	128.8	123.8	147.0
1994	130.2	173.9	130.2	147.2
1995	374.3	335.4	392.7	376.0
1996	474.1	424.5	474.1	476.1
1997	730.5	635.7	730.7	603.5
1998	872.0	872.0	872.4	...

Sources: *External Sector Bulletin*, various issues (Central Bank of Bolivia), *Inversión en Bolivia: 1992-1998* (Ministry of International Trade and Investment), IMF, *International Financial Statistics CD ROM* August 1999 (IMF), and *Global Development Finance: Country Tables* (World Bank).

Unless otherwise noted, all data on FDI refer to gross inflows. We elected to use gross data instead of net data because (1) we are interested in measuring the effects of FDI on the host country; and (2) outflows of FDI are insignificant in the period covered by our model. Due to the almost negligible effect of FDI prior to 1990, and the poor quality of the available data, we elected to avoid earlier periods in our model. Finally, interpretation of all FDI figures should be approached with caution. FDI figures from the early 1990s to the present are regularly updated, while the FDI inflows presented in Table 2 are prone to error given the inadequacy of the mechanisms used to measure FDI in the past.

5. Primary Determinates of Foreign Direct Investment

5.1. Model Specification

In recent years there has been very little empirical work studying the determinants of FDI in developing countries. Jun and Singh (1995) pool a group of data for 31 countries between 1970-93 and find that in the low FDI group in which Bolivia is placed the chief determinants of FDI are socioeconomic stability (measured as lost work days) and political risk. Meanwhile, a recent study by CEPAL (1998) examined the impact of a number of variables

¹² For a more detailed analysis of the statistical challenges and complications presented by FDI, refer to CEPAL (1998).

on FDI in Bolivia over the 1972-95 period. Only the ratio of international reserves to external debt proved to be significant, while pooled data for a large sample of Latin American countries highlighted real GDP, FDI stock, trade liberalization, and inflation as important determinants of FDI.

In our model inflation was chosen to gauge macroeconomic stability. The ability to control inflation should reduce investment risks and enhance FDI. Another important indicator of economic stability is the ratio of external debt to GDP which, in similar fashion to the ratio of international reserves to external debt utilized by CEPAL, provides a strong indicator of a country's level of solvency. Other important indicators are the real effective multilateral exchange rate which measures the profitability of the tradable-goods sector and the value of repatriated profits, and the ratio of government consumption to GDP, which provides a good measure of a government's degree of involvement in the public sector. Intuitively, one would expect a reduction in government consumption, through privatization or other means, to stimulate FDI. Finally, the capitalization dummy was chosen to capture the impact of the capitalization process on FDI inflows.

To measure the primary determinants of FDI in Bolivia the following ordinary least squares (OLS) regression has been constructed using quarterly data for the period 1990:1-1998:4. The equation is a semi-logarithmic function given by:

$$FDI/GDP_t = \alpha_1 + \alpha_2 REER_t + \alpha_3 DEBT/GDP_t + \alpha_4 DCAP_t + \alpha_5 (\log) GOVSPENDING/GDP_t + \alpha_6 \pi_{t-1} + u_t \quad (1)$$

where FDI/GDP represents the ratio of real FDI to real GDP, REER is the real effective multilateral exchange rate, DEBT/GDP is the ratio of real external debt to real GDP, the log of GOVSPENDING/GDP is the ratio of real government spending to real GDP, and DCAP is a dummy variable designed to measure the effect of capitalization inflows on FDI. It takes a value of one for the period 1995:3-1998:4, and a value zero for the remaining periods in the model. Lastly, π is inflation lagged one period and u is a random error. The data are described in the Appendix and the regression results are presented in Table 8.

Table 8. Determinants of Foreign Direct Investment, 1990:1-1998:4

Independent Variable ^a	Dependent Variable: FDI/GDP		
	(1)	(2)	(3) ^b
Real effective multilateral exchange rate	0.0495* (1.9790)	0.0520* (1.6742)	0.0823*** (2.9202)
External debt/GDP	-0.1904*** (-3.3191)	-0.1868*** (-3.0828)	-0.1190*** (-2.9308)
Capitalization dummy	3.4253*** (4.5549)	3.4348*** (4.2855)	- -
Log (Government spending/GDP)	- -	-0.1515 (-0.0983)	1.3255 (0.5012)
Inflation (lag 1)	- -	-0.0674 (-0.6967)	0.0674 (0.6969)
Constant	10.0452* (1.8717)	10.1227 (1.4340)	-2.6528 (-0.2775)
R ²	0.8733	0.8710	0.5391
R ² -Adjusted	0.8614	0.8488	0.4776
Durbin-Watson	2.3075	2.2953	2.0594
Number of Observations	36	35	35
Test for Unit Root in Residuals^c			
Augmented Dickey-Fuller	-3.4350	-3.30217	-3.4277
MacKinnon Critical Value (1%)	-2.6321	-2.63440	-2.6344
Phillips-Perron	-6.8767	-6.80667	-6.1646
MacKinnon Critical Value (1%)	-2.6300	-2.63210	-2.6321
Johansen Cointegration Test^d			
<i>Number of Cointegrating Equations</i>	<i>Likelihood Ratio</i>		
None	48.2471*	130.8312**	123.7988**
At most 1	21.0407	68.1306*	65.2783*
At most 2		35.5081	36.5269

Notes: t-statistics given in parentheses. Asterisks indicate level of statistical significance at the *10 percent, **5 percent, and ***1 percent levels respectively. Equations estimated using OLS.

^aPlease see Appendix 1 for definitions and sources of variables.

^bEquation estimated excluding capitalization inflows from the FDI variable.

^cResidual series tested with one lag, excluding trend and intercept terms.

^d*(**) indicates rejection of no cointegration hypothesis at 5% (1%) significance level.

5.2. Estimation Results

With the exception of the ratio of government spending to GDP and inflation in Regression 3, all the variables in Table 8 exhibit their expected sign. The coefficients for the real effective multilateral exchange rate, the ratio of external debt to GDP, and the capitalization process are significant across specifications. The coefficients for government spending and the inflation rate are found to be insignificant in both Regressions 2 and 3.

The results for real effective multilateral exchange rate indicate that an increase in the real effective multilateral exchange rate (which represents a depreciation of the Boliviano) would lead to an increase in FDI. This result is

consistent with those obtained in other studies. In one study by Goldberg and Klein (1997) a real depreciation of Southeast Asian currencies against the yen was shown to increase FDI flows from Japan to Southeast Asia. Possibly the most important channel through which a depreciation of the real exchange rate encourages FDI inflows in a developing country such as Bolivia is through its reduction of domestic labor costs relative to foreign production costs. In this context, a depreciation of the Boliviano would increase the demand for labor and employment, thus raising the return on capital and increasing FDI.¹³

Given the robustness of the capitalization dummy in the first two regressions the general equation was re-estimated excluding capitalization inflows from the FDI variable. This specification allows us to measure the impact of the remaining variables in a more representative environment in which the better part of FDI inflows are not determined by capitalization commitments. The exclusion of capitalization inflows in Regression 3 of Table 8 has a minimal impact on the overall results. Both government spending and the inflation rate remain insignificant (while taking on the incorrect sign), the statistical significance of the real effective multilateral exchange rate improves from 1 percent to 10 percent, and the explanatory power of the ratio of external debt to GDP remains high.

6. Foreign Direct Investment and Economic Growth

6.1. Model Specification

The empirical growth literature has identified a number of variables that are typically correlated with economic growth.¹⁴ Among the available variables we have chosen to use is the ratio of government consumption to GDP, which has been used in previous growth studies to measure the extent of fiscal adjustment. The basic argument is that a reduction in government consumption reduces the level of distortionary taxation and may also help to reduce a crowding-out of private sector investment, measures which positively impact economic growth. Other variables we have chosen include the terms-of-trade, which provides a good measure of the economic impact of variations in import and export prices, and inflation, which has proven to be a good indicator of macroeconomic stability. In recent years a number of empirical studies have suggested that inflation may have adverse effects on economic growth.¹⁵ While a recent study by Bruno and Easterly (1998) found that inflation had little relation to growth at annual rates below 40 percent, Barro (1996), in a cross-country regression of over 100 countries from 1960 to 1990, found that an average annual inflation rate of 10 percent reduces real per capita GDP growth by 0.3-0.4 percentage points per year. We also include the ratio of private sector credit relative to GDP. King and Levine (1993) find a strong positive relationship between this ratio and per capita GDP growth. Lastly, the ratio of FDI to GDP and a dummy for the capitalization period are incorporated into the model to see if FDI, and more recently the large capitalization inflows, have significantly impacted economic growth.¹⁶

¹³ It should be noted that Bolivia has experienced an appreciation of its real effective multilateral exchange rate in recent years. To test whether FDI has played a role in the appreciation Granger causality tests (not presented) with lag intervals from 1 to 3 were estimated for 1990:1-1998:4 and 1995:3-1998:4. The results indicate causality from the real effective multilateral exchange rate to FDI, but reject the possibility of reverse causality.

¹⁴ See, for instance, De Gregorio (1992), Barro (1996), Easterly et al. (1997), Borensztein et al. (1998), and IMF Staff Country Report (1998).

¹⁵ See, for example, Bruno and Easterly (1998), and Barro (1996).

¹⁶ An education variable was not included in the equation. Data limitations and the fact that education levels change slowly over time make it difficult for our short-term specification to capture the effect of education on per capita GDP growth.

In order to measure the effect of FDI on economic growth we will use OLS estimation controlling for serial correlation for the following semi-logarithmic model which covers the period 1990:1-1998:4 using quarterly data:

$$GROWTH_t = \alpha_1 + \alpha_2 FDI/GDP_{t-1} + \alpha_3 DCAP_t + \alpha_4 TOT_t + \alpha_5 CREDIT/GDP_t + \alpha_6 (\log) GOVSPENDING/GDP_t + \alpha_7 \pi_{t-1} + u_t \quad (2)$$

where GROWTH represents the percent variation in real per capita GDP over each period, FDI/GDP is the ratio of real FDI to real GDP, DCAP is a dummy variable representing capitalization inflows during the period 1995:3-1998:4, TOT represents the ratio of export prices to import prices (terms-of-trade), CREDIT/GDP is the ratio of real private domestic credit to real GDP, GOVSPENDING/GDP is the ratio of real government spending to real GDP, π measures the quarterly percent change in the Bolivian consumer price index lagged one period, and u is a random error. The variables are described in the Appendix and the results are presented in Table 9.

Table 9. The Effect of Foreign Direct Investment on Real Per Capita GDP Growth, 1990:1-1998:4

Independent Variable^a	Dependent Variable: Real Per Capita GDP Growth	
	(1)	(2)
FDI/GDP (lag 1)	0.0275* (1.7581)	- -
Capitalization dummy	- -	0.0956 (0.5822)
Terms-of-trade	0.0790*** (3.1277)	0.0786*** (3.1342)
Private sector credit/GDP	0.0611** (2.0206)	0.0656** (2.1564)
Log (Government spending/GDP)	-0.7931* (-1.8063)	-0.7512* (-1.7491)
Inflation rate (lag 1)	-0.0095 (-0.2856)	-0.0082 (-0.2541)
Constant term	-5.4897* (-1.7649)	-5.6925* (-1.8438)
AR(1)	0.40	0.40
R ²	0.5253	0.5172
R ² -Adjusted	0.4198	0.4099
Durbin-Watson	1.6384	1.6162
Number of Observations	34	34
Test for Unit Root in Residuals^b		
Augmented Dickey-Fuller	-4.5446	-4.5281
MacKinnon Critical Value (1%)	-2.6369	-2.6369
Phillips-Perron	-4.7556	-4.7020
MacKinnon Critical Value (1%)	-2.6344	-2.6344
Johansen Cointegration Test^c		
<i>Number of Cointegrating Equations</i>	<i>Likelihood Ratio</i>	
None	185.2735**	149.2005**
At most 1	111.2997**	82.5057**
At most 2	61.2538	44.0169*
At most 3		19.5695

Notes: t-statistics given in parentheses. Asterisks indicate level of statistical significance at the *10 percent, **5 percent, and ***1 percent levels respectively.

^aPlease see Appendix 1 for definitions and sources of variables.

^bResidual series tested with one lag, excluding trend and intercept terms.

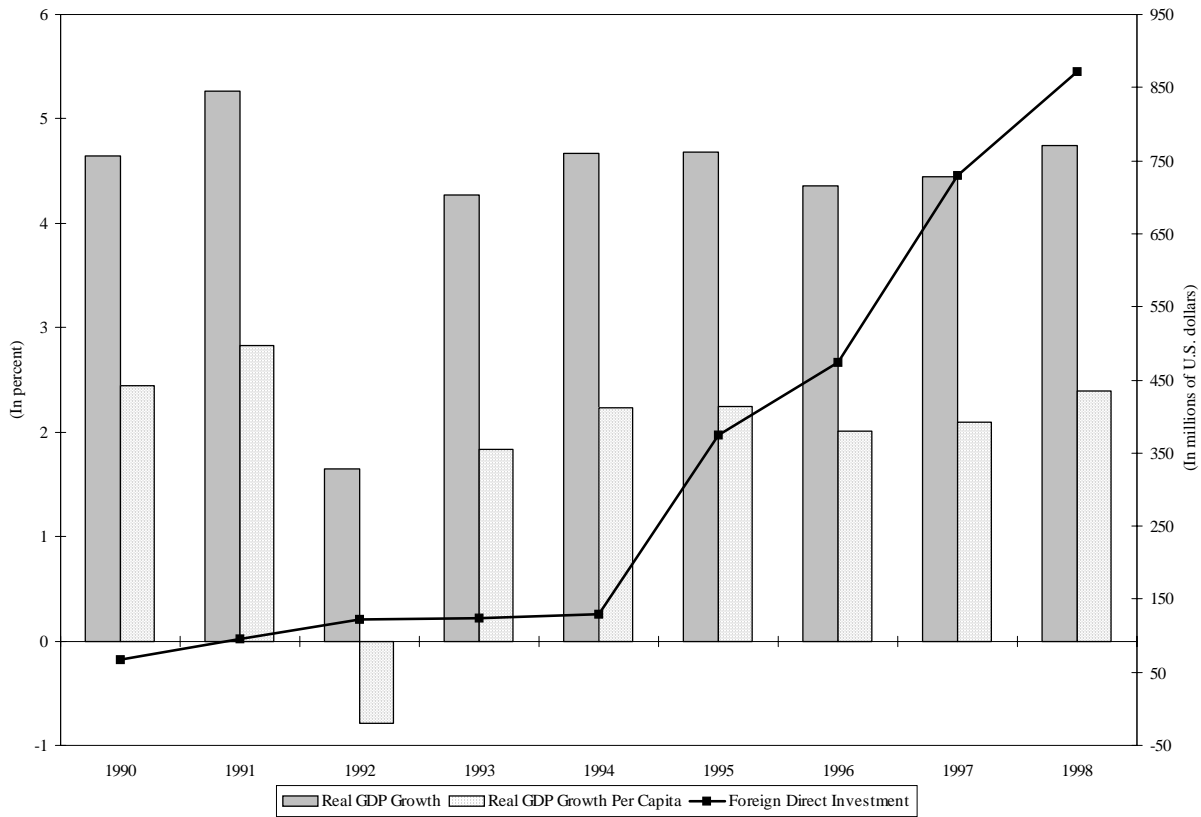
^c*(**) indicates rejection of no cointegration hypothesis at 5% (1%) significance level.

6.2. Estimation Results

All variables take on their expected sign. Our results indicate that FDI has had a statistically significant (10 percent level) impact on per capita GDP growth while capitalization inflows have had an insignificant impact. Substituting the capitalization dummy variable for FDI in Regression 2 of Table 9 has very little impact on the

overall results.¹⁷ Although many expected capitalization inflows to produce higher levels of growth, Figure 2 reveals that real per capita GDP growth has been largely stagnate in recent years, while the level of real per capita GDP growth attained in 1998 was below levels achieved in 1990 and 1991. The low level of significance of the FDI to GDP ratio and the insignificance of capitalization inflows reflect the importance of time. The time period covered in our model is relatively short while the impact of FDI on growth is not immediate. Technology must be adopted and diffused, and management and production techniques must be enhanced, processes that are only just beginning to take shape in Bolivia.¹⁸

Figure 2. Foreign Direct Investment and Economic Growth in Bolivia, 1990-98



Sources: Central Bank of Bolivia, *External Sector Bulletin*, various issues; and the National Institute of Statistics.

The results for the terms-of-trade specification are robust across both specifications, emphasizing the importance of variations in export and import prices on per capita GDP growth. These variations are an important source of economic instability in less-developed countries such as Bolivia where the majority of export earnings are

¹⁷ As noted in Section 4, quarterly FDI figures from the IMF were utilized in our models prior to 1995. As Table 7 shows IMF data for 1990-1992 underestimate figures supplied by the Central Bank of Bolivia, a situation that may produce an underestimation of the FDI coefficient reported in Regression 1 of Table 9.

¹⁸ Taking this into account Equation 1 of Table 9 was re-estimated with FDI lagged from 2 to 10 periods, as well as without a lag. With the exception of FDI lagged one period, all remaining lag lengths (results not reported) produced statistically insignificant results.

derived from volatile primary commodities. The regressions in Table 9 also show a significantly negative effect between government spending and per capita GDP growth. This result emphasizes the importance of credible and permanent fiscal adjustment as a key component in per capita GDP growth. Finally, the ratio of private sector credit to GDP is significant in both regressions. The assumption underlying this measure is that greater allocation of credit to the private sector will increase financial depth and development, and subsequently economic growth.

As predicted by theory, inflation has a negative, though insignificant effect on the growth rate of GDP per capita in Table 9. The insignificance of this variable likely results from the relatively low levels of inflation Bolivia has experienced in our model specification. Over the nine year period included in our model inflation averaged only 10.3 percent per year, and has dropped sharply in recent years. Whereas, inflation averaged 504.7 percent between 1960-87, and 38.1 percent over this same period if one were to exclude the hyperinflationary period of 1984-85. This helps to explain why a recent study by the IMF (IMF Staff Country Report, 1998) using annual data for the period 1960-97 found that inflation had a robustly negative effect on per capita GDP growth.

7. Econometric Specification

7.1. Unit Root Tests

Classic econometrics assumes that models are linear and that the data series in these models are stationary. Thus, the first test we carried out was an Augmented Durbin-Watson (ADF) test to determine the order of integration of our variables. The results presented in Table 10 show that both our dependent variables (per capita GDP growth, and FDI/GDP) are stationary, or I(0) (the ratio of FDI to GDP is I(1) in the ADF test). The ratio of external debt to GDP, and the ratio of private sector credit to GDP are integrated of order 2 (the Phillips-Perron test indicates that the ratio of external debt to GDP is I(1)), and a number of variables in our model are integrated of I(1), meaning that they are stationary in their first differences.

Table 10. Augmented Dickey-Fuller (ADF) and Phillips-Perron Unit Root Tests

	External Debt/GDP	FDI/GDP	FDI/GDP (Excluding Capitalization Inflows)	Government Spending/GDP	Inflation
ADF: Level	-1.8105	-2.2133	-3.5035	-12.0554	-4.4160
ADF: 1st Difference	-3.1692	-8.2529	-5.9109	-	-
ADF: 2nd Difference	-5.6969	-	-	-	-
<i>MacKinnon Critical Value (1%)^a</i>	-4.2712	-4.2605	-4.2605	-4.2505	-4.2505
<i>MacKinnon Critical Value (5%)</i>	-3.5562	-3.5514	-3.5514	-3.5468	-3.5468
Phillips-Perron: Level	-1.8963	-4.5842	-6.1240	-5.4647	-4.6659
Phillips-Perron: 1st Difference	-5.6589	-	-	-	-
Phillips-Perron: 2nd Difference	-	-	-	-	-
<i>MacKinnon Critical Value (1%)</i>	-4.2505	-4.2412	-4.2412	-4.2412	-4.2412
<i>MacKinnon Critical Value (5%)</i>	-3.5468	-3.5426	-3.5426	-3.5426	-3.5426

	Private Sector Credit/GDP	Real Effective Multilateral Exchange Rate	Real Per Capita GDP Growth	Terms-of-Trade
ADF: Level	-1.4324	-1.8672	-5.1501	-2.7594
ADF: 1st Difference	-1.8628	-5.7330	-	-5.3414
ADF: 2nd Difference	-5.8708	-	-	-
<i>MacKinnon Critical Value (1%)</i>	-4.2712	-4.2605	-4.2505	-4.2605
<i>MacKinnon Critical Value (5%)</i>	-3.5562	-3.5514	-3.5468	-3.5514
Phillips-Perron: Level	-1.0399	-1.9562	-3.7247	-2.0186
Phillips-Perron: 1st Difference	-3.2297	-5.9421	-	-6.3729
Phillips-Perron: 2nd Difference	-10.1968	-	-	-
<i>MacKinnon Critical Value (1%)</i>	-4.2605	-4.2505	-4.2412	-4.2505
<i>MacKinnon Critical Value (5%)</i>	-3.5514	-3.5468	-3.5426	-3.5468

Note: The variables were tested with a trend and intercept term, as well as a lag of one.

^aThe MacKinnon critical value noted refers to the value obtained in the ADF test in which the hypothesis of a unit root is rejected.

One variable that exhibits a random walk is the real effective multilateral exchange rate. Although a strict interpretation of this result implies that price levels (or the exchange rate) must eventually fall to zero, restrictions imposed by cointegration help to qualify this result. That is to say, if two variables follow a random walk but are cointegrated, then the resulting equilibrium relationship and the restrictions it imposes do not allow the variables to diverge greatly from this equilibrium in the long run. In addition to the evidence presented in this paper, a number of other recent papers have shown the presence of unit roots in exchange rates. In one such study by Lothian and Taylor (1996), the authors failed to reject the unit root hypothesis for both the dollar-sterling and franc-sterling real exchange rates for the 1946-90 and 1974-90 periods.

7.2. Cointegration

The purpose of cointegration is to avoid the problems of spurious correlation, which are common in time series data. The cointegration technique is used to see whether a linear combination of variables of the order “d” generates a disturbance term which is integrated of a lower order than the variables being analyzed. If in fact the disturbance term is I(0) the variables in the regression are cointegrated and will move in proportion to one another over the long run.

Despite the fact that a number of variables exhibit non-stationary or random walk stochastic processes, linear combinations of these variables in our regressions may in fact be stationary. In order to investigate whether the linear combinations of our variables are stationary we applied both the Johansen and ADF cointegration tests. The advantage of these tests is that if the residuals in our regressions are indeed stationary, we can rule out spurious correlation in our regressions and apply traditional regression methodology to our time series data.

Utilizing a Johansen cointegration test with a linear deterministic trend and one lag we examined all the regressions in both of our models for cointegration. Our results presented in Tables 8 and 9 indicate that all of our regressions are cointegrated, with at least one cointegrating equation in each of our specifications.

Two alternative and quicker methods to check for cointegration are the ADF and Phillips-Perron unit root tests. The results of these tests for unit roots in the residuals are presented in Tables 8 and 9. As the tables indicate, the ADF values exceed the MacKinnon critical value of 1 percent in all cases, indicating that the regressions are cointegrated and non-spurious. The results achieved in these two tests allow us to avoid using the differenced terms of the non-stationary variables in our model, a situation that could produce a loss of valuable long-term information in our time series data.

7.3. Serial Correlation and Heteroskedasticity

A common occurrence in time series regressions is that the residuals in these regressions are correlated with their own lagged values. To investigate the possibility of serial correlation in our regressions we utilized the Breusch-Godfrey serial correlation LM test. The results of our tests (not presented) indicate the presence of first-order serial correlation in our regressions measuring the effect of FDI on real per capita GDP growth. Consequently we have chosen to add a Markov first-order autoregressive specification to our model. The AR(1) specification allows us to improve both the efficiency and reliability of the coefficients as well as their standard errors.

With respect to heteroskedasticity we ran a White heteroskedasticity test for each regression in Tables 8 and 9. Our results (not presented) indicate that all the regressions have consistent standard errors and covariances.

8. Conclusions

Historically FDI inflows have largely originated from the United States and been concentrated in the hydrocarbon and mining sectors. Inflows to these and other sectors have until recently been highly volatile and relatively small due in large part to persistent political and economic instability. However, in recent years Bolivia has experienced relatively high degrees of political and economic stability, and used this stability to undertake a broad set of structural reforms. These reforms have helped to eliminate many of the distortions present in the Bolivian economy, leading to higher and more stable levels of FDI since the early 1990s.

In recent years these FDI inflows have largely been concentrated in the service and hydrocarbon sectors. These two sectors received 80.4 percent of all FDI over the period 1990-98 while benefiting greatly from capitalization

inflows. The electricity sector began to receive FDI in 1997 and these flows are expected to grow in 1999 in response to capitalization commitments. Meanwhile, FDI in the industrial and mining sectors has slumped in recent years, and neither sector participated in the capitalization process.

The United States continues to be the principal source of FDI in Bolivia. Over the 1990-98 period FDI originating in the United States represented 40.7 percent of all FDI in Bolivia. Other important sources of FDI in the 1990s have been the Southern Cone countries of Argentina, Brazil, and Chile, and increasingly Europe due to the participation of a number of European companies in the capitalization process. Argentine, Brazilian, and Chilean companies all played important roles in the capitalization process, and FDI originating from these three countries represented 89.3 percent of Latin American FDI and 27.9 percent of total FDI in Bolivia over the 1990-98 period.

Regression results estimated using simple OLS regressions indicate that the driving factors behind FDI inflows have been the real effective multilateral exchange rate, the ratio of external debt relative to GDP, and a dummy representing the capitalization period. Excluding the capitalization inflows from our model and re-estimating the general equation has little impact on the overall results. The results indicate that macroeconomic stability, as expressed by the real effective multilateral exchange rate, and the ratio of external debt to GDP will prove to be key determinants of FDI in the post-capitalization period. Additionally, reforms must be maintained and deepened. For instance, continued reform of the judicial system should help to insure that private contracts are respected and enforced, reducing the uncertainty and contractual complications that helped to produce low levels of FDI in the past.

The paper finds that the key factors influencing economic growth in Bolivia are the ratio of FDI to GDP, the terms-of-trade, the ratio of private sector credit to GDP, and the ratio of government consumption to GDP. The capitalization dummy variable was shown to have an insignificant impact on per capita GDP growth. In spite of economic and political stability, as well as continued reforms, Bolivia's growth rate still remains below the levels necessary to substantially impact poverty reduction. Although many believed that the capitalization process and the resulting increase in FDI would stimulate growth, the results are less than overwhelming, as illustrated in Figure 2. However, these results must be taken in context given the strong and influential impact a number of internal and external factors have on per capita GDP growth. Additionally, the time period considered in the regressions is relatively short, especially so for the capitalization dummy. It is very possible that strong growth effects from capitalization inflows will only be felt years from now given the differing paces of technology adoption and diffusion in distinct sectors of the Bolivian economy.

Appendix. Definitions and Sources of Data

- Capitalization dummy: Takes value of one for the period 1995:3-1998:4, and a value of zero for the remaining periods.
- External debt: Medium- and long-term external public debt. Taken from the *Statistical Bulletin*, Central Bank of Bolivia.
- Foreign direct investment: Gross foreign direct investment. Data from *International Financial Statistics CD ROM* (August 1999), for 1990:1-1994:4; and Central Bank of Bolivia for 1995.1-1998:4.
- Government spending: Total expenditure of federal government (excluding capital spending). Data obtained from the Ministry of Finance; author's calculations for the period 1990:1-1993:4.
- Inflation: Quarterly percentage change in the consumer price index. Measured as the percent change between the final-month CPI for that quarter and that for the previous quarter. Obtained from *Statistical Bulletin*, Central Bank of Bolivia.
- Private sector credit: Total domestic credit proportioned to the private sector by commercial and specialized banks. Data taken from *Statistical Bulletin*, Central Bank of Bolivia.
- Real GDP: Obtained from the National Institute of Statistics for 1990:1-1997:4; and the Central Bank of Bolivia for 1998:1-1998:4.
- Real effective multilateral exchange rate: Index of real exchange rate with principal trade partners. Countries included in index are: Argentina, Brazil, Chile, Germany, Great Britain, Japan, Peru, and the United States. Taken from the *External Sector Bulletin*, Central Bank of Bolivia.
- Real GDP per capita: Calculated from the above GDP data and population figures supplied by the National Institute of Statistics.
- Terms-of-trade: Ratio of export prices to import prices. Data obtained from the National Institute of Statistics.

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