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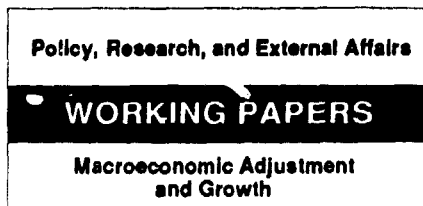
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Adjustment Policies and Investment Performance in Developing Countries

Theory, Country Experiences, and Policy Implications

Luis Servén
and
Andrés Solimano

Adjustment without growth has been, for many developing countries, the outcome of the debt crises of the 1980s. Macroeconomic stability, policy credibility, and adequate external financing are among the key ingredients for achieving a strong investment response to adjustment measures.



WPS 606

This paper — a product of the Macroeconomic Adjustment and Growth Division, Country Economics Department — is part of a larger effort in PRE to investigate the response of private investment to macroeconomic adjustment measures. Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Emily Khine, room N11-061, extension 39361 (63 pages).

Serven and Solimano analyze the response of private and public investment to external shocks, macroeconomic adjustment, and structural reform in three sets of countries: (1) countries that pursued structural reform and liberalization in Latin America in the 1970s (Chile) or the 1980s (Mexico and Bolivia); (2) countries that experienced severe macroeconomic instability and did not pursue macroeconomic reform (Argentina and Brazil); and (3) East Asian countries with high-growth, outward-oriented, state-active economies that adjusted to the shocks of the 1980s and maintained high growth, low inflation, and remarkable macroeconomic stability (Korea, Singapore, and Thailand).

Drawing on the literature and their econometric analysis of the determinants of private investment in developing countries using cross-country data for 1972-87, Serven and Solimano conclude (among other things) that:

- Macroeconomic stability and policy credibility are essential for achieving a strong investment response. Investment is likely to be limited under great macroeconomic uncertainty or if policy measures are perceived as inconsis-

tent or suspected to be only temporary — in which case investors prefer to wait and see before committing resources to irreversible fixed investments.

- The sequence of adjustment measures is thus important. Trade liberalization measures undertaken while macroeconomic instability persists are likely to be viewed as purely transitory, and thus might actually distort the investment pattern.

- Even well-designed, consistent adjustment programs might have to overcome a lack of credibility, especially in their early stages. If enough external resources are available, the private sector may be more confident about the viability of adjustment efforts, which could facilitate investment recovery.

- Even if policy changes are perceived as permanent, inadequate infrastructure may pose a significant obstacle to the recovery of private investment. The implementation of well-targeted public investments in infrastructure projects can stimulate the private sector's response to adjustment measures.

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Adjustment Policies and Investment Performance in LDCs:
Theory, Country Experiences, and Policy Implications

by
Luis Servén
and
Andrés Solimano*

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1. Introduction

Adjustment without growth has been, for many developing countries, the outcome of the debt crisis of the eighties. The adaptation to the reduced availability of external financing has not led to a significant increase in domestic savings, but to a reduction in private and public investment rates. Without a sufficient recovery of investment, a sustained resumption of growth is unlikely. In such conditions, the attempts at structural reform of many countries may be endangered, as in the absence of an investment response their intended efficiency gains cannot materialize, and thus the only visible result of the reforms is their adverse short-run social and distributive cost.

The decline in external financing is not the only factor behind the investment slowdown. In many cases, the fiscal adjustment required to reduce the external imbalance or to bring down inflation has taken the form of a reduction in public investment. Also, the increased macroeconomic instability associated with the external shocks of the eighties has made the economic environment more uncertain, and hence more adverse, for investment decisions. One important source of uncertainty has been the external debt overhang, especially in highly indebted countries, which may also have contributed to discourage investment through its 'implicit tax' effect, as part of the future returns on investment must be collected by the creditors in the form of debt repayment.

In general, the macroeconomic adjustment and reform efforts of most countries have not been rewarded with an adequate response of private investment. Even when substantial progress has been made in the correction of macroeconomic imbalances and in the restoration of profitability -- often

through drastic cuts in real wages -- the impact on private investment has been very weak and slow.

In this paper we investigate the contribution of these factors to explaining the recent investment performance in developing countries. The paper is organized as follows. First, in Section 2 we present the empirical record of investment in LDCs in the 1970s and 1980s. The response of private and public investment to external shocks, macroeconomic adjustment and structural reform is analyzed by comparing three sets of countries. The first group includes countries that have pursued structural reform and liberalization in Latin America either in the 1970s (Chile) or in the 1980s (Mexico, Bolivia). The second group is composed by Argentina and Brazil, that in the 1980s have experienced severe macroeconomic instability. Moreover, these countries have not attempted the kind of structural reforms pursued by the first group. The third group consists of three 'success stories' in East Asia: Korea, Singapore and Thailand. These high-growth, outward oriented, state-active economies were able to adjust to the adverse external shocks of the 1980s while keeping a record of high growth, low inflation and, in general, a remarkable degree of macroeconomic stability. In Section 3 we discuss the literature on macroeconomic policies and private investment, examining the effect of monetary, fiscal and exchange rate policy on private investment, and emphasizing some economic and institutional features specific to LDCs (e.g., the degree of intervention in financial markets, the possible complementarities between public and private investment, the high reliance on imported capital goods) that may affect the transmission mechanisms through which standard macropolicy measures influence private investment. In the

fourth section we examine in more depth the recent literature on credibility, uncertainty and irreversibility in investment decisions. We discuss how such factors can contribute to determine the investment response to a given set of economic incentives, which is the key element in the transition from stabilization and reform to sustainable growth. In Section 5 we present an econometric analysis of the determinants of private investment in developing countries using cross-country data for the period 1972-1987 for a selected group of LDCs. Finally, Section 6 presents some concluding remarks.

2. Investment in Developing Countries, 1970-1988

2.1 - The overall picture

Between 1970 and 1988, investment rates in developing countries exhibit two distinct patterns, with 1982 the point of demarcation (figure 1). For seventy-eight developing countries, the average share of investment in GDP (in constant prices) increased from about 22 percent in 1970 to 25 percent in 1981, and for most of this period investment rates were historically high. With the rise in international real interest rates in 1981 and the onset of the debt crisis in 1982, the rate of investment fell sharply. Investment started to fall earlier for the highly indebted countries than for other developing countries, and the decline was also larger (see table 1). For all groups of developing countries, the decline in investment was accompanied by a slowdown in growth (tables 1 and 2).

The fall in investment has been so severe that some countries may not even be fully replacing depreciating capital. For example, in Africa the minimum investment needed to replace depreciated capital is estimated at 13

Figure 1 Share of investment in GDP for developing countries (unweighted averages)

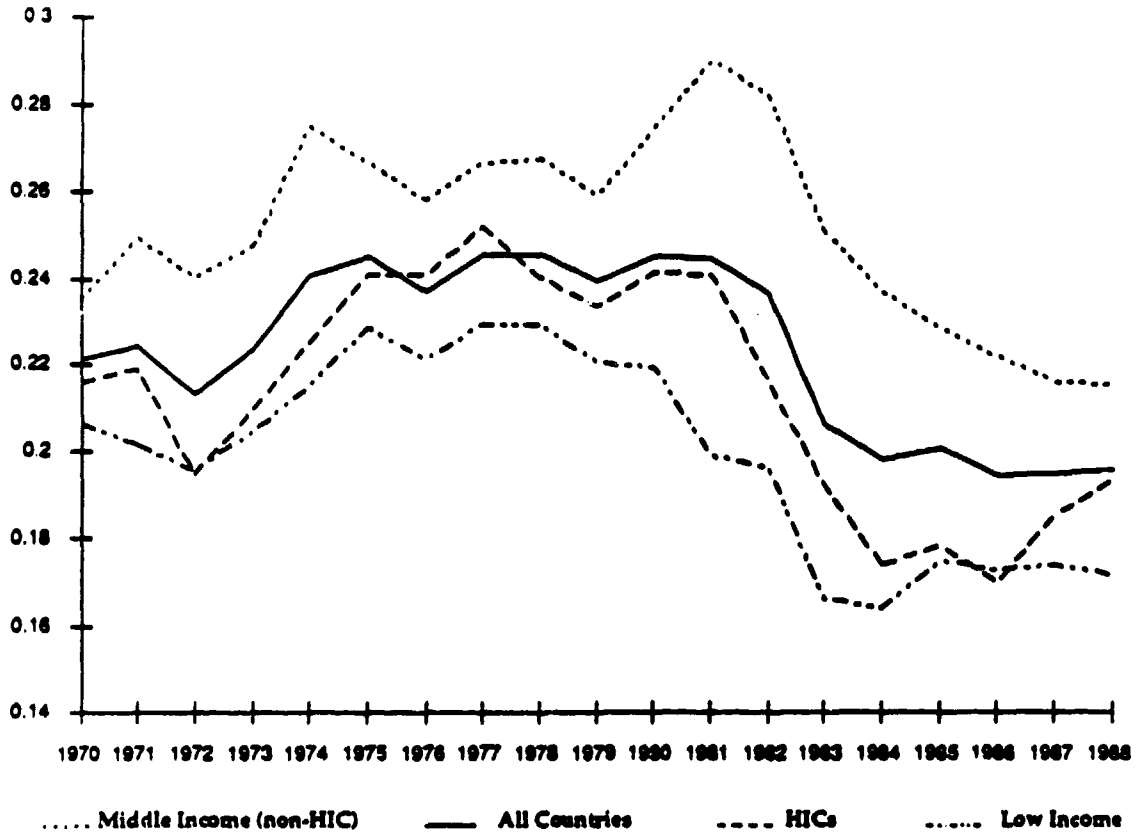


Table 1 Investment, saving, and growth in developing countries, 1970-88

<i>Indicator</i>	<i>Group</i>	<i>1970-80</i>	<i>1981-82</i>	<i>1983-84</i>	<i>1985-88</i>
Gross domestic investment (percentage of GDP at current prices)	All	21.6	24.0	20.2	19.6
	Highly indebted	22.8	23.0	18.0	18.4
	Middle income	25.5	28.6	24.4	21.9
	Low income	19.7	20.3	17.0	17.4
Gross domestic saving (percentage of GDP at current prices)	All	16.1	13.7	13.9	14.9
	Highly indebted	20.3	20.1	19.8	20.2
	Middle income	18.3	17.5	17.7	17.8
	Low income	12.5	7.6	8.0	9.9
Resource balance deficit (percentage of GDP at current prices)	All	6.4	10.3	6.2	4.6
	Highly indebted	2.5	2.9	-1.7	-1.8
	Middle income	7.2	11.1	6.7	4.0
	Low income	7.2	12.7	8.9	7.3
Gross domestic investment (percentage of GDP at constant prices)	All	23.4	24.1	20.6	19.6
	Highly indebted	23.1	22.3	17.1	16.3
	Middle income	25.7	28.6	24.9	22.1
	Low income	21.5	20.7	17.8	18.0
Rate of growth of real GDP (percentage per year)	All	4.7	2.7	1.8	3.3
	Highly indebted	5.0	-0.3	-0.4	2.7
	Middle income	6.1	4.5	3.9	3.2
	Low income	3.5	2.5	0.5	3.5

Table 2 Growth and investment

<i>Region</i>	<i>Real GDP growth</i>		<i>Investment ratio</i>	
	<i>1965-88</i>	<i>1980-88</i>	<i>1965-88</i>	<i>1980-88</i>
Sub-Saharan Africa	3.3	0.5	17.6	15.9
Asia	6.3	7.4	27.7	31.1
Europe/Middle East/ N. Africa	4.6	2.8	28.4	27.3
Latin America and Caribbean	4.5	1.6	19.7	17.9

Source: *Short-term Outlook*, International Monetary Fund, 1989, Table 15.

percent of GDP, and seven countries in sub-Saharan Africa had investment rates below that level in 1987. Similarly, the minimum investment rate to replace capital in Latin America is estimated at 14 percent, and three countries were below that level in 1987.¹

Investment declined both because of the reduced availability of financing and lower demand for investment. There were important changes in the resource balance deficit (defined as the difference between domestic investment and domestic savings) following the debt crisis in 1982 (table 1). The decline in the resource balance deficit (because of lower external financing) was not matched by a sufficient increase in domestic savings, and so the deficit was almost entirely reflected in reduced investment. Investment demand declined for several reasons. Public investment contracted because of the deterioration in fiscal conditions as a result of the cut in foreign lending and the lack of adjustment in other fiscal expenditures, the rise in international and domestic interest rates, and accelerating inflation; and also because in some cases it was unsustainably high and of dubious productivity. Private investment was discouraged by the slower or negative growth and by the increase in macroeconomic instability associated with the adverse external shocks, the uncertainty about the new configuration of relative prices and incentives, and the inability of governments to stabilize the economy. In addition, the debt overhang may have discouraged investment both through the uncertainty it created and through its implied "tax" on

¹W. Easterly, "Fiscal Adjustment and Deficit Financing during the Debt Crisis," in Dealing with the Debt Crisis, edited by I. Husain and I. Diwan. (Washington, D. C.: the World Bank, 1989).

future output and the accompanying credit rationing in international capital markets.

Analysis of a set of twenty-nine countries shows that the share of private investment in GDP (in current prices) was relatively stable until 1980 and then declined, followed by a modest recovery after 1985 (figures 2 and 3).² The decline was larger in the highly indebted countries than in the other countries. Public investment as a share of GDP and of total investment rose until 1980 and then fell after 1982, two years later than private investment (table 3). Unlike private investment, public investment rates declined steadily until 1988.

2.2 Private Investment and Macroeconomic Adjustment: Some Country Stories

In this section we organize the discussion of the behavior of private investment during the course of adjustment around three groups of countries in Latin American and in East Asia. The first group is composed by Chile, Mexico and Bolivia. These three share the adoption of decisive stabilization policies oriented to eliminate basic macroeconomic imbalances together with policies of structural reform oriented to liberalize foreign trade, and to deregulate credit and labor markets along free-market lines. The second group we consider is constituted by Argentina and Brazil, two countries that in the 1980s have been unable to stabilize the economy and correct, in a sustainable

²The breakdown of investment into private and public components draws on G. Pfeffermann and A. Madarassy, "Trends in Private Investment in Thirty Developing Countries," IFC Working Paper No. 6, 1989. They calculated private investment by subtracting from the national accounts data the investment of the consolidated public sector. The latter was obtained from World Bank reports and government sources.

Figure 2 Public and private investment for 29 Countries (unweighted average, percent of GDP)

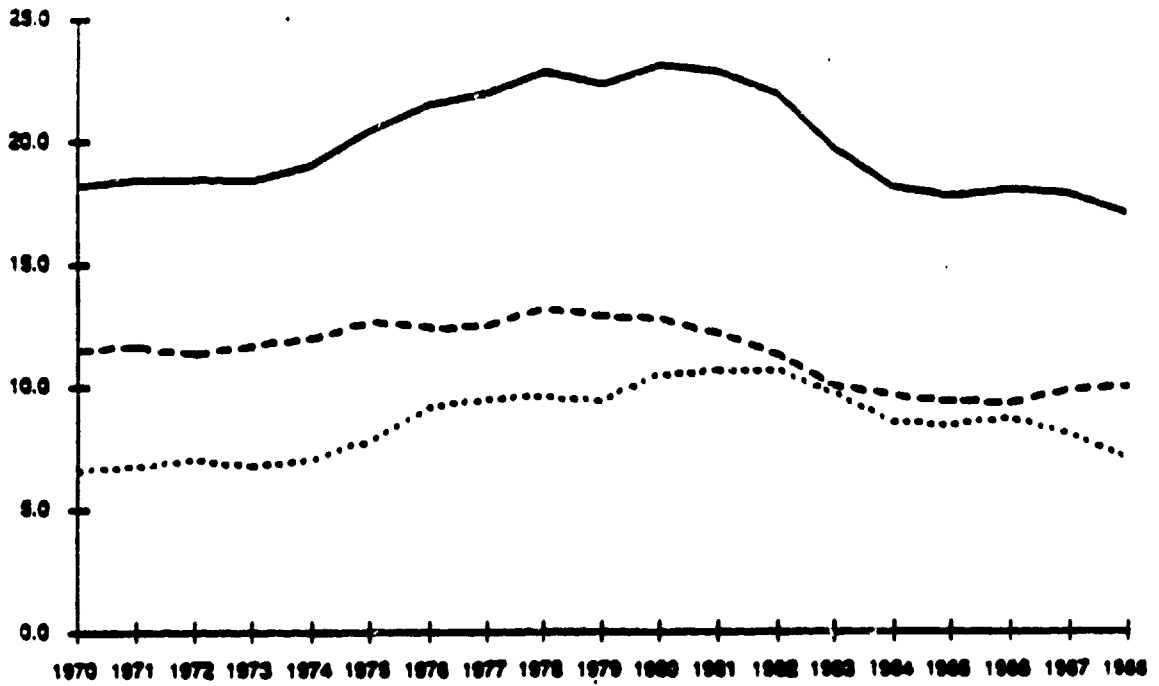
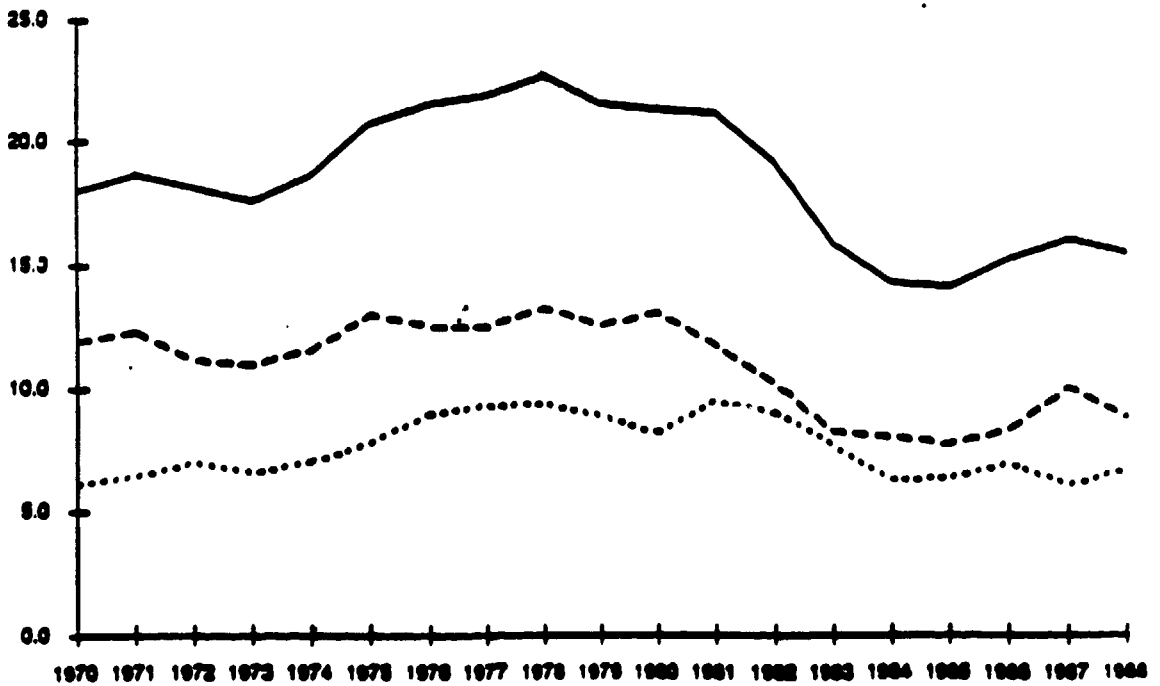


Figure 3 Public and private investment for 13 HICs (unweighted average, percent of GDP)



— Gross Domestic Investment - - - Private Domestic Investment Public Domestic Investment

Table 3 Public and private investment for a group of 29 developing countries, 1970-88 (percentage of GDP at current prices)

<i>Group</i>	<i>1970-80</i>	<i>1981-82</i>	<i>1983-84</i>	<i>1985-88</i>
29 countries				
Total	20.3	22.2	19.8	17.6
Private	12.2	11.7	9.7	9.6
Public	8.2	10.5	9.0	8.0
13 highly indebted countries				
Total	20.1	20.2	15.1	15.2
Private	12.3	10.9	8.1	8.7
Public	7.8	9.2	7.0	6.5

Sample: Argentina*, Bangladesh, Bolivia*, Brazil*, Chile*, Colombia*, Costa Rica*, Ecuador*, Guatemala, Hungary, India, Indonesia, Kenya, Korea, Malaysia, Mexico*, Nigeria*, Pakistan, Peru*, Philippines*, Portugal, Sri Lanka, Thailand, Tunisia, Turkey, Uruguay*, Venezuela*, Zambia, Zimbabwe.

* Highly Indebted Countries.

Source: "Adjustment Lending Policies for Sustainable Growth," Policy and Research Series #14, The World Bank.

way, basic macroeconomic imbalances, and that have not attempted comprehensive structural reforms and liberalization of the type adopted by the countries in the first group. The third group consists of three success stories in East Asia and includes Korea, Singapore and Thailand, namely economies that have managed to sort out the external shocks and the debt crisis of the eighties without sacrificing high growth and domestic macroeconomic stability.

Adjusting cum Liberalizing Countries in Latin America: Chile, Mexico and Bolivia

This group of three Latin American countries share several common features regarding macroeconomic policies and structural reforms. At the level of macroeconomic policy, they implemented either in the seventies (Chile) or in the middle and late eighties (Bolivia and Mexico) restrictive fiscal and monetary policies oriented to reduce high inflation rates and unsustainable current account deficits³. The three of them used fiscal adjustment (with better results in terms of permanent deficit correction in Chile and Mexico) as a centerpiece of the stabilization effort. The comprehensive use of incomes policies for stabilization purposes was present just in the Mexican "Pacto de Solidaridad Económica" of late 1987 though in the cases of Chile and Bolivia some form of exchange rate stabilization and/or

³Bolivia's inflation between 1984-85 was a case of hyperinflation rather than high-chronic inflation.

wage controls were used to help disinflation at different times during the course of stabilization.⁴

On the front of structural reforms the three countries implemented (to a different extent) trade liberalization, financial deregulation, privatization and labor market flexibilization. The degree, timing and results of these policy reforms varied in each country, though there was a general free-market orientation in the three cases. Some of the policies such as trade liberalization and labor market flexibilization (coupled with wage controls) were used as anti-inflationary devices in addition to their intended nature of long run transformations required to improve economic efficiency and speed-up economic growth.⁵ A common feature of the reforms -- particularly in Chile and Mexico--is that they were implemented by strong governments whose reputation in avoiding policy reversals was at stake.⁶

Following the swings of the world economy in the 1980's these three countries suffered the cycle of over-borrowing, the sharp cutoff of foreign lending and the onset of the debt crisis. In Chile the bulk of the external debt was originally contracted by the private sector, while in Mexico and Bolivia the public sector was the actor that borrowed abroad most heavily.

⁴For a reference on the Chilean experience with stabilization in the last two decades see Corbo and Solimano (1990). The Bolivia story with stabilization and reform is told in Morales (1990). For a comparative analysis of stabilization experiences in Latin America and in other regions, see Solimano, (1990).

⁵Rodrik (1990) calls attention, however, to the weak links between trade liberalization and growth both at an analytical and empirical level.

⁶The crisis of 1982-83 put under heavy stress some of these policies in Chile. Some reversals took place, such as increases in tariffs and direct intervention of the financial system. However, as the crisis receded, tariffs were lowered again and the financial system gradually deregulated.

Given this background, what have been the salient features in the behavior of private and public investment in these three economies? As table 4 shows, total investment in the period 1985-88 declined by 4 to 5 points of GDP with respect to the pre-crisis period 1978-81. Public investment declined by almost 5 points of GDP both in Mexico and Bolivia over the same period. In contrast, in Chile the level of public investment in 1985-88 was higher than before the debt crisis. Private investment rates are still below their pre-crisis level both in Bolivia and Chile, though the data shows a recovery in private investment in Chile and Mexico towards the late 1980s. In Bolivia, however, no upsurge of private investment has taken place in the aftermath of stabilization.

What accounts for this performance of investment? What is the role played by the foreign debt crisis that hit these three countries in the behavior of investment? Was a decline in investment the toll paid for correcting the macro disequilibria in these economies? What difference do the structural reforms and a more stable macro environment make for a quicker response of private investment?

These are certainly difficult questions, though some hypotheses may be advanced. First, it is clear that the pattern of investment followed the "debt cycle." Public investment in Mexico and private investment in Chile increased sharply during the borrowing-led boom of the late seventies and early eighties. In 1982, when the access to external lending was abruptly cut off and the countries were forced to a rapid reduction in the current account deficit through tight demand policies along with real devaluation, investment fell sharply. Thus the adjustment was carried out basically through cutting

FIGURE 4

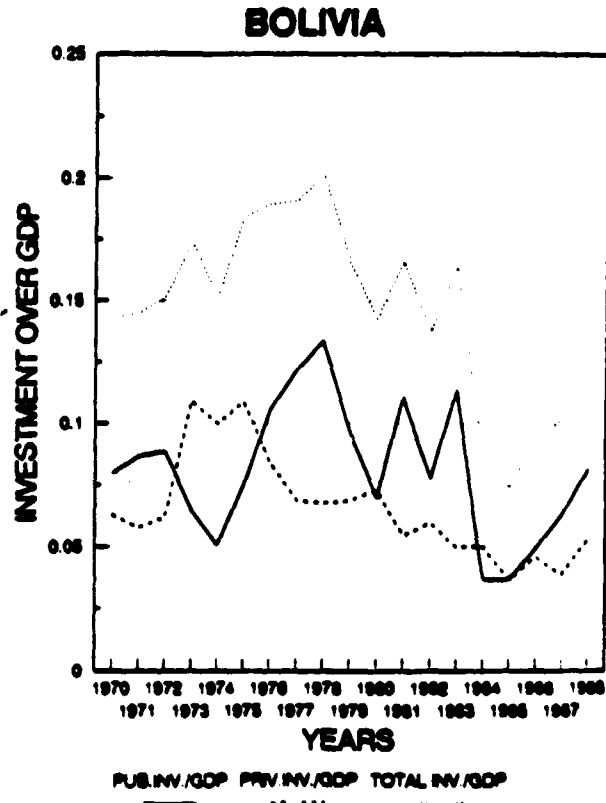
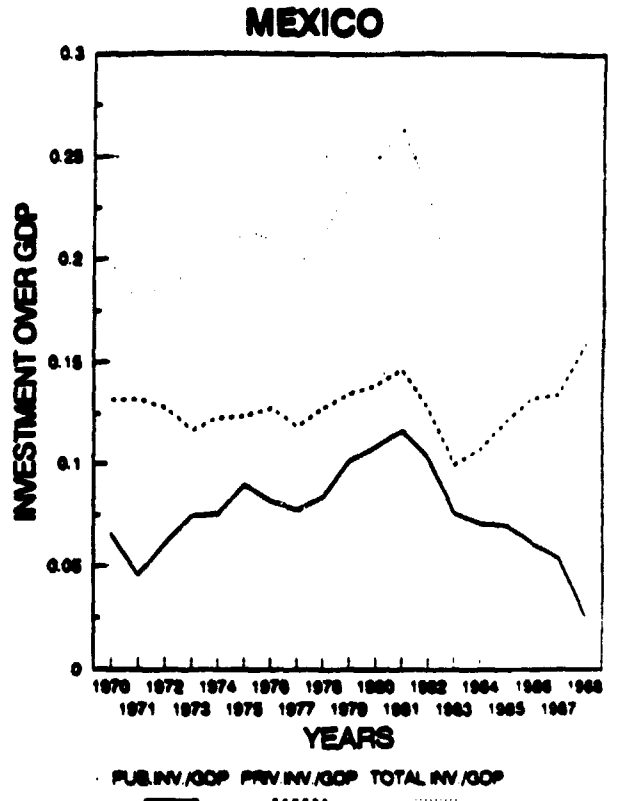
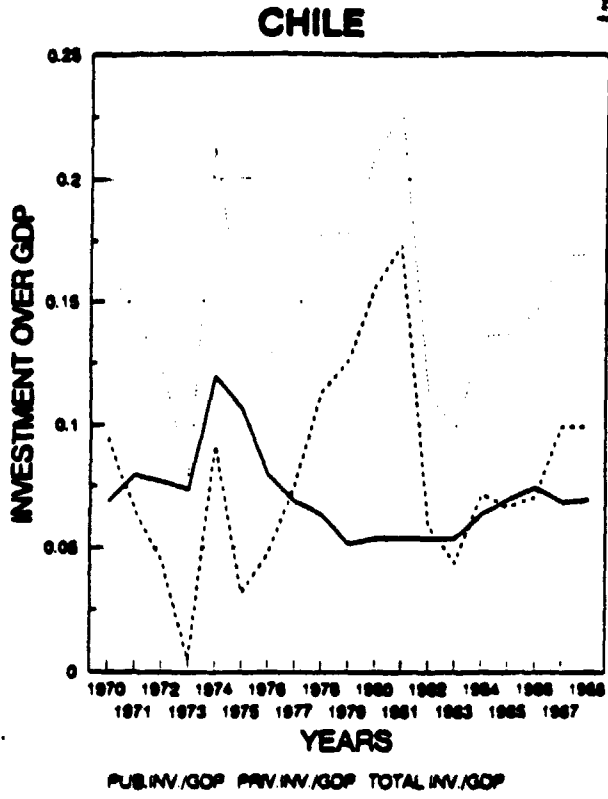


TABLE 4

PUBLIC AND PRIVATE INVESTMENT AND MACROECONOMIC INDICATORS

ANNUAL AVERAGES(S) CHILE

VARIABLE	1978-81	1982-84	1985-88
TOTAL INVESTMENT (% OF GDP)	19.83	11.37	15.55
PUBLIC INVESTMENT (% OF GDP)	5.60	5.73	7.10
PRIVATE INVESTMENT (% OF GDP)	14.23	5.63	8.45
REAL GDP GROWTH (%)	7.31	-3.85	5.20
INFLATION (GDP DEFLATOR)	35.97	18.11	23.61
CURRENT ACC BALANCE (% OF GDP)	-0.61	-0.13	-5.82
FOREIGN DEBT (% OF GDP)	46.21	88.24	113.80
REAL EXCH. RATE (1988 = 100)	102.75	107.36	179.81

SOURCES: Investment: Pfeffermann, S.P. and Rodriguez, A. (1989)
Other variables from World Bank Database

PUBLIC AND PRIVATE INVESTMENT AND MACROECONOMIC INDICATORS

ANNUAL AVERAGES(S) MEXICO

VARIABLE	1978-81	1982-84	1985-88
TOTAL INVESTMENT (% OF GDP)	24.83	19.50	19.88
PUBLIC INVESTMENT (% OF GDP)	10.30	8.33	5.28
PRIVATE INVESTMENT (% OF GDP)	13.73	11.17	13.73
REAL GDP GROWTH (%)	8.66	-0.48	6.46
INFLATION (GDP DEFLATOR)	22.27	78.16	92.68
CURRENT ACC BALANCE (% OF GDP)	-4.66	0.88	0.12
FOREIGN DEBT (% OF GDP)	30.84	55.32	66.76
REAL EXCH. RATE (1988 = 100)	103.42	128.51	147.68

SOURCES: Investment: Pfeffermann, S.P. and Rodriguez, A. (1989)
Other variables from World Bank Database

PUBLIC AND PRIVATE INVESTMENT AND MACROECONOMIC INDICATORS

ANNUAL AVERAGES(S) BOLIVIA

VARIABLE	1978-81	1982-84	1985-88
TOTAL INVESTMENT (% OF GDP)	16.93	12.97	16.19
PUBLIC INVESTMENT (% OF GDP)	10.30	7.63	5.78
PRIVATE INVESTMENT (% OF GDP)	6.63	5.33	4.38
REAL GDP GROWTH (%)	6.83	-3.72	6.46
INFLATION (GDP DEFLATOR)	24.67	561.67	2928.77
CURRENT ACC BALANCE (% OF GDP)	-10.77	-5.69	-9.22
FOREIGN DEBT (% OF GDP)	92.94	133.61	147.11
REAL EXCH. RATE (1988 = 100)	98.82	78.68	79.55

SOURCES: Investment: Pfeffermann, S.P. and Rodriguez, A. (1989)
Other variables from World Bank Database

investment demand rather than by increasing domestic savings, a trend already detected in the previous section.

The response of private investment in the aftermath of the crisis of 1982-83 differed in the three countries under scrutiny. Private investment recovered in Chile and Mexico in the second half of the 1980s, a rather puzzling phenomenon in the case of Mexico, since there it took place in spite of very high real interest rates. In addition, the recovery of private investment occurs when both countries carry-out an important resource transfer abroad.⁷ In contrast, in Bolivia the response of private investment in the aftermath of stabilization has been much weaker than in Chile and Mexico. A fragile macroeconomic equilibrium (internalized by the private sector) and high real interest rates seem to be the chief factors behind the slow recovery of private investment in Bolivia. Morales (1990) explains the high real interest rate in Bolivia in the aftermath of stabilization by two factors: the policy of tight money, and microeconomic problems in the banking and financial sector. Risk factors and credibility problems on the permanence and consolidation of the reforms also may have played a role in the observed high real interest rates.

What can we conclude on the effects of the reforms on the performance of private investment in these economies? The experience of these countries in the 1980s shows clearly that the reforms may enhance private investment if they are accompanied by a stable macro environment. High real interest rates (reflecting, in part, the existence of underlying macro imbalances) and other

⁷An econometric analysis of the behavior of private investment in Chile in the 1980s appear in Solimano (1990b). For a discussion of the recovery of private investment in Mexico in the mid-late 1980s see Ortiz (1990).

fundamental imbalances, tend to harm private investment. Chile in the second half of the 1980s is a good example of how fiscal balance, moderate real interest rates and competitive real exchange rates provide a good framework for private investment to respond to the incentives generated by the structural reforms.⁸ On the contrary, in the case of Bolivia, where disinflation is consolidated but the fiscal accounts and the financial system are regarded as in rather fragile condition (Morales, 1990), expectations of policy reversal have a depressing effect on private investment⁹.

A second factor that is important for the structural reforms to be associated with a positive response of private investment is the adequate availability of external financing. In the three cases there is a debt overhang and the countries carry out a sizeable resource transfer abroad. From simple savings-investment identities we can conclude that without a corresponding increase in domestic savings a high level of investment can hardly be achieved. In addition, the foreign debt service acts like an implicit tax on investment.

A third factor, generally down-played in the academic literature but to which investors in the real world seem to pay a lot of attention, refers to

⁸The development plans of the late sixties in forestry and agro-industrial activities, and the new land-property structure following the agrarian reform are also elements behind the strong export response of agricultural goods in Chile in the mid to late 1980s.

⁹Regarding a supportive macroeconomic environment for private investment, the Mexican case is in between Chile and Bolivia. The fiscal reform has been by far more comprehensive in Mexico than in Bolivia. However, real interest rates in Mexico have remained much higher than in Chile.

the favorable "business climate" generated with the liberalization process¹⁰. In fact, privatization measures as well as other liberalizing policies adopted in these countries reflect a renewed faith in free markets and private initiative. The distinctive feature is that governments now perceive these principles as the "new engine to growth".

Two non-adjusting cases in Latin America: Argentina and Brazil

Brazil and Argentina stand in the Latin American landscape of the 1980s as two countries that have not been able to stabilize their economies, in particular to abate a stubborn process of high inflation that in some episodes (e.g., Argentina in 1989) slide into outright hyperinflation. Brazil managed to grow at an impressive 7% per year between 1940 to 1980, and her development strategy was that of a dirigiste state supported, in the sixties and seventies, by foreign direct investment and abundant external credits. Brazil's external borrowing in the seventies largely went to finance her ambitious development plans that required high investment rates to speed-up rapid growth. In contrast, since the early seventies Argentina started to experience a noticeable economic decline, reflected in a slowdown of growth and in mounting economic and political instability. Toward the end of the 1970s and in the context of an ill-conceived exchange rate-based stabilization

¹⁰Keynes (1936), ch.12, referred to it as "the state of confidence, is a matter to which practical men always pay the closest and most anxious attention. But economists have not analyzed it carefully..."

plan, foreign borrowing was (basically) used to finance the acquisition of foreign assets by nationals e.g., capital flight.¹¹

The adverse external shocks of the early eighties and the onset of the debt crisis severely hit Argentina and Brazil. The correction of the external and fiscal imbalances took the form of an acceleration of inflation and a slowdown in growth. In contrast with Mexico and Bolivia (Chile undertook its structural reforms in the mid-1970s), domestic authorities in Argentina and Brazil did not seize the opportunity of the crisis to attempt comprehensive structural reforms in the public sector, the trade regime or other areas. The bulk of the energies of the domestic governments in these countries were devoted to fight inflation and to the management of their large external debt.¹² Argentina was the pioneer with heterodox stabilization with the launching of the Austral Plan in mid 1985, followed by Brazil with the Cruzado in early 1986. After initial success those plans were followed by a resumption of inflation and the repeated use of price controls and emergency fiscal measures to curb (transitorily) escalating inflation. Examples were the Bresser Pereira and Summer Plans in Brazil in 1987-88 and the Primavera Plan and other partial attempts in Argentina. The situation worsened in 1989 for both economies as the inflation rate approached hyperinflationary levels in a context of domestic recession and political disarray.

It is certainly not surprising to find a poor investment record in the 1980s in countries like Argentina and Brazil affected by large economic

¹¹See C.A Rodriguez (1989) for an analysis of the foreign debt problem in Argentina.

¹²See Heyman (1990), Kiguel and Liviatan (1990), and Cardoso (1990) on these two experiences with stabilization.

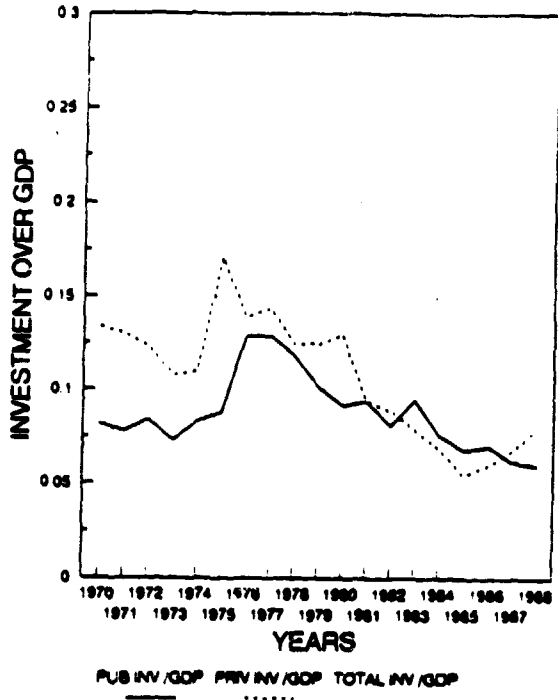
instability. However, there are some differences between these two experiences. As table 5 illustrates, the drop in investment rates is far larger in Argentina than in Brazil. In fact, in Argentina total investment in the period 1985-88 is nearly 9 points of GDP lower than in the period 1978-81; this drop in total investment is decomposed in a reduction of private investment by 5 percentage points of GDP and a cut in public investment by 4 percentage points of GDP. Moreover, this decline in investment has continued (on average) in the second half of the 1980s, in contrast to other Latin American countries. In Brazil the drop in total investment is less serious than in Argentina (its share in GDP is 3 points lower in the period 1985-88 than in 1978-81) and private investment started to recover after 1984 though public investment is still below its pre-crisis level.

Argentina provides an almost text-book (though dramatic) case where protracted economic instability is a powerful deterrent to private investment. As figure 5 shows, the downward trend in private investment -- as well as in public investment -- started in Argentina already in the mid-seventies. Clearly, the preference for investing resources abroad rather than at home was at work before the debt crisis, and to a large extent is responsible for the absence of recovery afterwards. On top of that lack of private investment, the data shows a public investment decline in the 1980s, a phenomenon tied to the fiscal crisis that Argentina suffers.¹³

¹³It is already a well known story that the quality of public services has deteriorated sharply in Argentina in recent years. No doubt that this is related to the inability of the state to improve the collection of fiscal revenues from the tax system.

FIGURE 5

ARGENTINA



BRAZIL

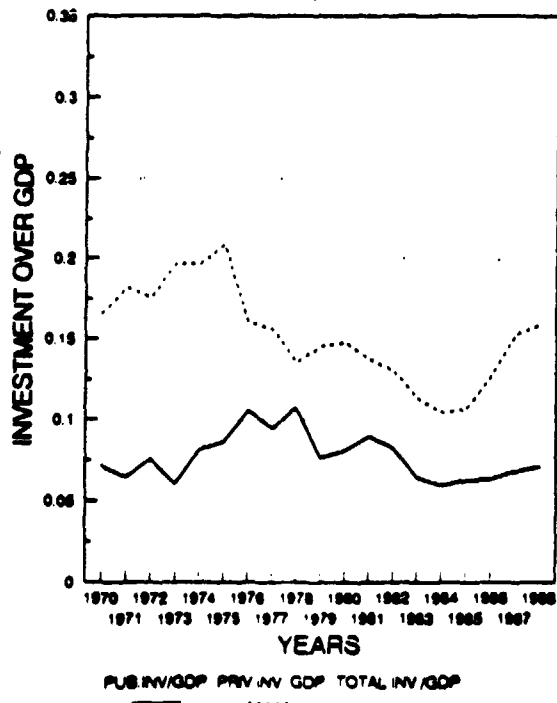


TABLE 5

PUBLIC AND PRIVATE INVESTMENT AND MACROECONOMIC INDICATORS			
VARIABLE	ANNUAL AVERAGES(%)		ARGENTINA
	1978-81	1982-84	1985-88
TOTAL INVESTMENT (% OF GDP)	22.03	16.30	13.08
PUBLIC INVESTMENT (% OF GDP)	10.18	8.40	6.50
PRIVATE INVESTMENT (% OF GDP)	11.85	7.90	6.58
REAL GDP GROWTH (%)	-0.29	-0.04	0.20
INFLATION (GDP DEFLATOR)	128.85	396.35	319.60
CURRENT ACC BALANCE (% OF GDP)	-3.32	-3.70	-3.01
FOREIGN DEBT (% OF GDP)	45.41	70.01	69.77
REAL EXCH. RATE (1980 = 100)	124.13	209.98	239.78

SOURCES: Investment: Pfeffermann, G.P. and Maderassy, A. (1989)
Other variables from World Bank Database

PUBLIC AND PRIVATE INVESTMENT AND MACROECONOMIC INDICATORS			
VARIABLE	ANNUAL AVERAGES(%)		BRAZIL
	1978-81	1982-84	1985-88
TOTAL INVESTMENT (% OF GDP)	23.10	18.60	20.43
PUBLIC INVESTMENT (% OF GDP)	8.90	6.93	6.70
PRIVATE INVESTMENT (% OF GDP)	14.20	11.67	13.73
REAL GDP GROWTH (%)	3.66	0.79	4.81
INFLATION (GDP DEFLATOR)	72.97	154.05	317.39
CURRENT ACC BALANCE (% OF GDP)	-4.49	-3.10	-0.83
FOREIGN DEBT (% OF GDP)	28.47	43.51	39.72
REAL EXCH. RATE (1990 = 100)	87.59	89.05	101.91

SOURCES: Investment: Pfeffermann, G.P. and Maderassy, A. (1989)
Other variables from World Bank Database

In the case of Brazil the same downward trend in public investment, starting in the early eighties, is observed. Such reduction in public investment has been (part of) the fiscal response to the reduced external financing as well as to the enlarged burden posed by the internal public debt.

Macroeconomic Stability in East Asia: Korea, Singapore, Thailand

Let us leave Latin America and take a look at some of the "success stories" in East Asia. Let us consider the cases of Korea, Singapore and Thailand. These are high growth economies, outward oriented, with active state intervention in economic affairs and, in contrast with several Latin American experiences, with a remarkable degree of macroeconomic stability.

Korea since the mid-sixties has been a high growth country, strongly oriented toward the expansion of manufacturing exports. Income distribution is relatively egalitarian¹⁴, though at the political level the country has been governed since the sixties until 1987 by authoritarian military regimes.

High investment rates were guided by a series of five-year economic plans where the government intervened actively controlling (among other things) the allocation of credit to firms with an overwhelming focus on exports. The close link between government and business, in turn, created large conglomerates and a high degree of industrial concentration.¹⁵ The trade regime has been far from liberal in Korea, with both tariffs and quantitative restrictions in place, although in the eighties a relaxation of

¹⁴The agrarian reform is credited as an important explanation behind the relatively even income distribution in Korea, see Collins and Park (1989).

¹⁵ See Collins and Park (1989) for a good description of the Korean case.

these barriers has taken place. Exchange rate policy has been oriented to maintain the external competitiveness of Korean exports, though some episodes of real appreciation have taken place (e.g., in the late 1970s). Korea was hit by the debt crisis in the period 1979-82 but recovered quickly afterwards. In contrast with most highly indebted countries¹⁶, Korea has been able to reduce her current account deficits after 1982 while restoring high growth, maintaining low inflation and avoiding fiscal imbalances.

The case of Singapore is rather particular. It is a city-state, with a high growth economy, completely open to foreign trade and with (almost) unrestricted capital mobility operating under a fixed exchange rate regime. Per capita income is comparable to that of low income OECD countries and the distribution of income is considered to be relatively even. Singapore did not suffer a debt crises in the eighties and has been running current account surpluses since the mid 1980s in the context of high growth and very low inflation.

Thailand borrowed in the late seventies and adjusted gradually afterwards taking advantage of a good record of creditworthiness¹⁷. In the eighties, the reduction in the current account deficit took place in a macro environment of sustained growth, while maintaining inflation low and the fiscal budget in check. This is certainly a case of sorting out adverse foreign shocks without going through a macroeconomic crisis and domestic instability.

¹⁶ Chile is perhaps an exception in this respect.

¹⁷ See Corden (1990).

FIGURE 6

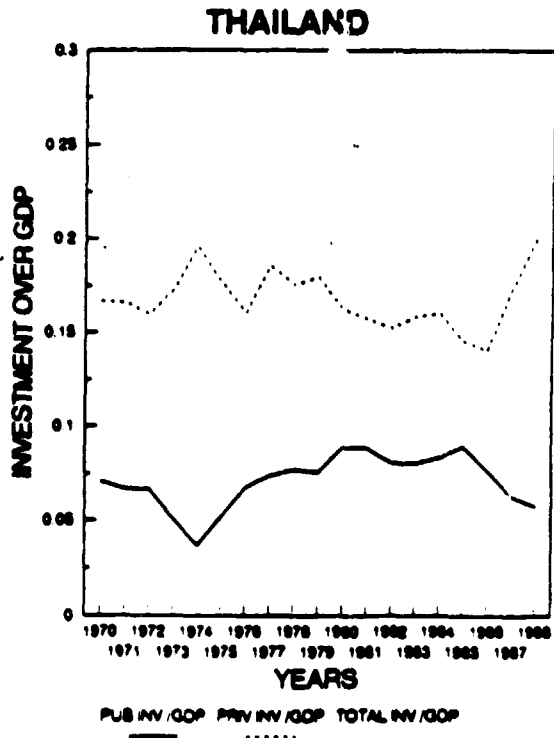
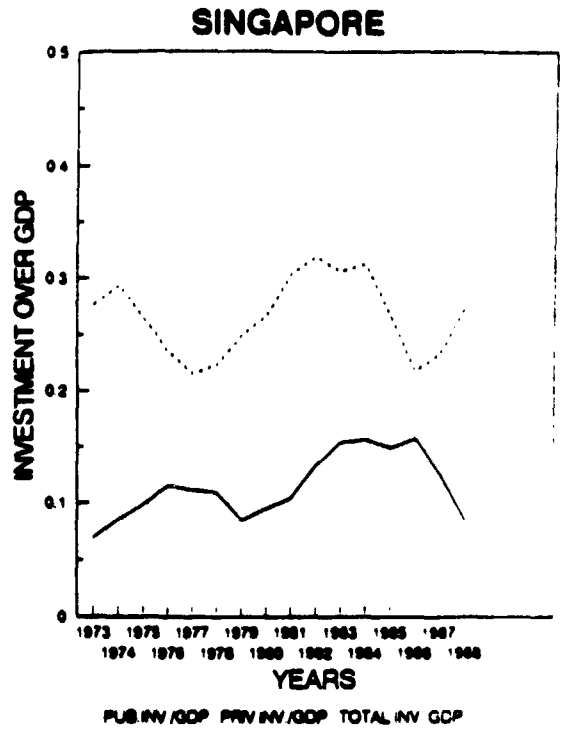
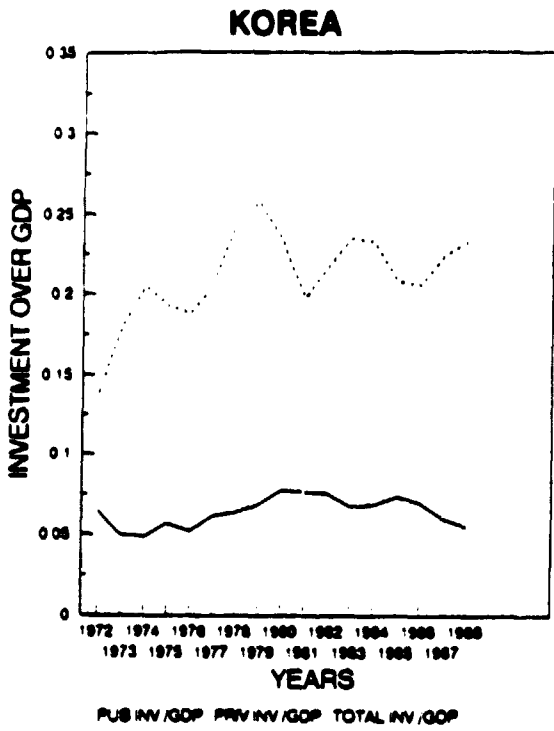


TABLE 6

PUBLIC AND PRIVATE INVESTMENT AND MACROECONOMIC INDICATOR			
VARIABLE	ANNUAL AVERAGES(S)		COPEL
	1978-81	1982-84	1985-88
TOTAL INVESTMENT (% OF GDP)	10.58	29.93	28.25
PUBLIC INVESTMENT (% OF GDP)	7.20	7.10	6.48
PRIVATE INVESTMENT (% OF GDP)	23.38	22.83	21.78
REAL GDP GROWTH (%)	5.49	9.67	10.65
INFLATION (GDP DEFLATOR)	21.34	5.39	5.60
CURRENT ACC BALANCE (% OF GDP)	-5.94	-2.34	4.70
FOREIGN DEBT (% OF GDP)	41.10	48.65	56.84
REAL EXCH. RATE (1980 = 100)	97.70	96.52	115.00

SOURCES: Investment: Pfaffmann, G.P. and Roderick, A. (1989)
Other variables from World Bank Database

PUBLIC AND PRIVATE INVESTMENT AND MACROECONOMIC INDICATORS			
VARIABLE	ANNUAL AVERAGES(S)		SINGAPORE
	1978-81	1982-84	1985-88
TOTAL INVESTMENT (% OF GDP)	36.00	46.20	37.00
PUBLIC INVESTMENT (% OF GDP)	9.90	14.90	13.00
PRIVATE INVESTMENT (% OF GDP)	26.10	31.30	24.00
REAL GDP GROWTH (%)	9.28	7.77	5.21
INFLATION (GDP DEFLATOR)	6.47	2.94	0.32
CURRENT ACC BALANCE (% OF GDP)	-9.37	-4.68	3.14
FOREIGN DEBT (% OF GDP)	0.00	0.00	0.00
REAL EXCH. RATE (1980 = 100)	98.68	89.11	104.82

SOURCES: Investment: Pfaffmann, G.P. and Roderick, A. (1989)
Other variables from World Bank Database

PUBLIC AND PRIVATE INVESTMENT AND MACROECONOMIC INDICATORS			
VARIABLE	ANNUAL AVERAGES(S)		THAILAND
	1978-81	1982-84	1985-88
TOTAL INVESTMENT (% OF GDP)	25.28	24.68	23.70
PUBLIC INVESTMENT (% OF GDP)	8.20	8.20	7.20
PRIVATE INVESTMENT (% OF GDP)	16.98	15.88	16.50
REAL GDP GROWTH (%)	6.63	6.89	6.74
INFLATION (GDP DEFLATOR)	9.91	2.38	3.84
CURRENT ACC BALANCE (% OF GDP)	-6.56	-5.09	-1.70
FOREIGN DEBT (% OF GDP)	25.46	15.21	42.52
REAL EXCH. RATE (1980 = 100)	103.53	95.25	118.50

SOURCES: Investment: Pfaffmann, G.P. and Roderick, A. (1989)
Other variables from World Bank Database

What about investment in these economies? Two main features are worth noting. First, particularly Korea and Singapore are high-investment-high-growth economies. In the period 1978-88, Korea sustained an average a rate of investment near 30% of GDP and grew at an annual average rate of 6.5 percent. Singapore invested, on average, around 40 per cent of GDP over the same period and grew at an average annual rate of 7.5 percent. Investment was not immune to the cycles of economic activity experienced in these economies in the eighties, and some volatility in investment is shown in the data. To make a judgement of the relative efficiency of capital in these countries would require some difficult international comparisons, though the implicit ICOR's do not look particularly low.

Second, the data shows that in these countries private investment is by far more important than public investment as a share of total investment. In Korea around three-fourths of total capital accumulation is private; in Singapore and Thailand the share of private investment in total capital formation is around two-thirds. These provide interesting cases of strong private sectors backed by active, growth-oriented governments.

An Overall Assessment

From the diversity of experiences examined before some conclusions follow.

- There are some clear differences in the level and composition of investment between the Latin American and East Asian countries examined. During the 1980s (and also earlier) investment rates of the order of 30% of GDP and more (40 percent on average in

Singapore) were not unusual in the East Asian countries. The growth record was also remarkable for the 1980s, with annual average rates of growth of the order of 6.5 - 7.5 percent. In terms of composition, private investment is overwhelmingly dominant, representing between 2/3 and 3/4 of total capital accumulation. In Latin America, historically, investment rates have been of the order of 20-25% to support rates of growth of GDP of 5.5-6.0% per year¹⁸. In the 1980s average annual GDP growth decelerated sharply to around 1.5% and investment rates centered in the range of 15-18% of GDP. In general, the share of public investment in capital accumulation is higher in Latin America.

- The analysis suggests that a high degree of macroeconomic stability -- low and predictable inflation, external and internal balance -- is of paramount importance to ensure a strong response of private investment to economic incentives. The East Asian cases examined provide a good example of this. In contrast, in some Latin American countries we find evidence that macroeconomic instability may be largely responsible for the poor performance of private investment.
- The evidence on the effects of structural reforms -- e.g., liberalization, -- on private investment is, so far, still sketchy. Chile experienced a rapid recovery of private investment in the late 1980s as real interest rates receded to "normal" levels, the real

¹⁸The average annual rate of GDP growth for the period 1950-80, was 5.8 % with output measured in adjusted purchasing power terms. GDP per capita in the same period grew at an annual rate of 3 %. These calculations correspond to an average of 19 Latin American countries, see Cardoso and Fishlow, 1989.

exchange rate was kept at highly competitive levels, the economy was free of major micro distortions and aggregate demand was high following a boom in copper prices. Mexico -- which adopted far reaching reforms in the areas of trade liberalization, fiscal reform and privatization in the eighties -- also saw a revival of private investment in spite of still high domestic real interest rates. Bolivia, however, that also liberalized trade, deregulated credit and labor markets and eliminated an hyperinflation in the mid-1980s, has not witnessed an upsurge of private investment.

- A decline in public investment has been observed in several (adjusting and non-adjusting) Latin American economies during in the 1980s. Chile is one exception in this regard, though public investment also declined sharply in the seventies when the structural reforms were adopted. This suggests that public investment may be squeezed in the process of balancing the fiscal and external accounts. Similarly, high domestic real interest rates along with a high level of public debt eventually impose fiscal tightening, which also tends to crowd-out public investment both in adjusting and non-adjusting countries.

3. Macroeconomic Policies and Private Investment: Theory and empirical evidence¹⁹

In this section review the literature on the effects of macroeconomic policies on private investment, that can be useful to understand some of the experiences discussed before. In particular we are concerned with the impact on investment of different tools of monetary, fiscal and exchange rate policy aimed at correcting unsustainable macroeconomic imbalances.

3.1. Demand Management Policies and Investment

(1) Monetary Policy and Private Investment

The restrictive monetary and credit policies usually included in stabilization packages affect investment through two "price" channels. One is the rise in the real cost of bank credit, a major source of investment financing in LDCs. The second is the increase in the opportunity cost of retained earnings -- also an important source of investment financing in most developing countries -- due to higher real interest rates. Both mechanisms raise the user cost of capital and lead to a decline of investment. The empirical relevance of this effect has been confirmed in a number of studies (e.g., de Melo and Tybout (1990), Greene and Villanueva (1990), Solimano (1990)), but others do not find a significant effect of interest rates on investment demand. The reason is that in the repressed financial markets that characterize many LDCs, credit policy affects investment directly, through the stock of credit available to firms with access to preferential interest rates, rather than through the indirect interest rate channel -- although the latter

¹⁹This section draws, partly, from Servén and Solimano (1990).

will also operate for the firms that borrow in the unofficial money market (see Van Wijnbergen (1983a and 1983b)). This direct role of credit availability is found in many empirical studies (e.g., van Wijnbergen (1982), Blejer and Kahn (1984), Lim (1987), Dailami (1990)). Hence, the institutional set-up of the financial markets in developing countries is certainly an important feature determining the impact and transmission mechanisms of monetary and credit policy on investment.

(ii) Fiscal Policy, Public Investment and Private Investment

High fiscal deficits push up interest rates and/or reduce the availability of credit to the private sector, and thus tend to crowd out private investment. Hence, the reduction of the public deficit usually achieved in adjustment packages should allow an expansion of private investment. However, as the experiences of several Latin American countries in the 80's show, fiscal adjustment often takes the form of reduced public investment, some of whose components (especially infrastructure investments such as roads or communications) may be complementary with private investment. As a result, private investment would fall as well. From the policy viewpoint, this would underscore the need to protect public infrastructure expenditures during the adjustment process, in order to facilitate the recovery of investment and growth.

Several empirical studies have attempted to shed light on this issue. The results obtained by Blejer and Kahn (1984) from cross-country data indicate that public investment in infrastructure is complementary with private investment (and other types of public investment are not). More

recently, Greene and Villanueva (1990) have arrived at similar conclusions using a panel of 23 developing countries. Musalem (1989) finds evidence of complementarity between private and public investment in a time-series study of investment in Mexico. However, Balassa (1988) reports cross-section estimates showing that public and private investment are negatively related, with an increase in public investment leading to a decline in private investment. Furthermore he finds a negative correlation between the share of public investment in total investment and the size of incremental output-capital ratios, which indicates a lower efficiency of public investment as opposed to private investment. Khan and Reinhart (1990) reexamine the issue of the differentials in productivity between private and public investment for a sample of 24 developing countries, finding that the marginal productivity of public sector capital is negative, although not significantly so, while that of private investment is significantly positive.

The main drawback of most of these empirical studies is their failure to consider infrastructure investment separately from other types of public investment. While in most cases this may be due to the unavailability of information, such disaggregation would help identify more precisely the relationship between public and private investment.

(iii) Output changes and Investment

Empirical studies of investment behavior show a strong response of investment to changes in output. Investment in LDCs is no exception to this rule, and most econometric studies conclude that output fluctuations are the most important determinant of private investment (see e.g., Blejer and Kahn

(1984), Faini and de Melo (1990), Greene and Villanueva (1990)). To a certain extent, this is a puzzling finding, since a non-negligible part of output fluctuations appear to be transitory (therefore they should not affect investment), and it is costly to install capital (so adjusting to transitory shocks is also costly). Thus, this 'excessive' output-related variability of investment in the cycle remains largely unexplained (see Blanchard's discussion of Shapiro, (1986)).

Whatever the cause for this excessive output sensitivity of investment, the clear implication is that the usual demand-reducing monetary and fiscal policies introduced as part of an adjustment package are likely to have an adverse short-run impact on investment through their negative effect on output growth. This is apparent in the context of the Q approach to investment: as the econometric evidence shows (see Solimano 1989, for the case of Chile) aggregate profitability is highly procyclical -- Tobin's Q increases in upturns and falls in downturns -- so we should expect the market value of capital, and hence investment, to fall in the short run in response to a slowdown in economic activity following restrictive demand policies.

This initial downturn in economic activity often associated with macroeconomic adjustment may also affect investment through its effect on expectations. In fact, a current recession could form the basis for "pessimistic" expectations, that lead investors to postpone investment until the recovery arrives; this, in turn, may prevent the take off of investment (particularly of projects with short gestation lags) and delay the recovery itself, and the economy may get stuck in a low investment equilibrium because of insufficient investment arising from self-fulfilling pessimism. How to

avoid such an outcome is an important consideration in the design of restrictive demand policies that minimize the potentially adverse impact on investment and growth.

3.2. Exchange rate policy and private investment

To reduce the external imbalance, adjustment programs use a combination of expenditure-reducing and expenditure switching policies. The latter typically include a real devaluation; thus in the 80's many LDCs undertook sharp real depreciations as part of the adjustment to the debt crisis. A real depreciation affects investment through several channels:

(1) The profitability of investment - Investment goods can be viewed as a composite commodity produced by combining domestic (i.e., construction or infrastructure) and foreign components (i.e., machinery and equipment). In this setting, a real depreciation of the exchange rate raises the real cost of the imported component and acts like an adverse supply shock in the "production" of investment goods -- with the magnitude of the shock being given by the import content of investment. As argued by Buffie (1986) and Branson (1986), the effect of a real devaluation then is to raise the real cost of new capital goods in terms of domestic goods; ceteris paribus, this effect tends to depress investment in the nontradable activities. However, in the traded goods sector the opposite happens: the real cost of new capital goods falls, and investment rises. The result for aggregate investment is therefore uncertain.

Despite this theoretical ambiguity, most empirical studies conclude that in the short run a real depreciation has an adverse impact on investment

through this cost-of-capital-goods effect (although its long-run effect may be positive). For example, Musalem (1989) finds an adverse investment effect of devaluation in the case of Mexico. Faini and de Melo (1990) arrive at similar results using data for 24 developing countries. Branson (1986) explicitly calculates the impact of a devaluation on Tobin's Q in the home goods sector, concluding that profits fall (and along with them the market value of capital) while the real cost of new capital goods rises following a real depreciation. Using an empirical simultaneous equation model for Chile based on an extended Tobin's Q approach, Solimano (1989) also concludes that a real depreciation reduces investment in the short run. His results show that economy-wide Q falls when the real exchange rate depreciates, as the adverse replacement cost effect dominates the market value effect.

In general, a high dependence on imported capital and intermediate goods and a relatively low share of the traded goods sector in total investment would make the contractionary result hold. This is made explicit by Lizondo and Montiel (1988), who distinguish between investment in the traded and non-traded goods sectors in a model in which capital is sector-specific. They decompose the effect of devaluation on profitability into three elements: a) the impact on the cost of capital; b) the effect on the product wage in both sectors (also examined by Van Wijnbergen (1986) and Risager (1988)); and c) the impact on the cost of imported intermediate inputs. They show that the net effect of a real depreciation is generally ambiguous, since it tends to increase investment in the traded goods sector and reduce it in the home goods sector.

Another channel through which devaluation may affect the profitability of investment is the real interest rate. Consider first the case of an unanticipated devaluation (we discuss below the anticipated devaluation case), and assume that interest rates are determined in domestic assets markets (i.e., in the money market). Devaluation raises the price level through its impact on the cost of imported intermediate inputs and wages under indexation; if monetary policy does not fully accommodate the increase in the price level, real money balances fall, pushing up the real interest rate for a given rate of (expected) inflation. In this way, devaluation depresses the market value of existing capital and exerts an adverse effect on investment. On the other hand, if devaluation was anticipated and if it succeeds in eliminating devaluation expectations, then it may result in an investment expansion, since the required return on capital would tend to fall reflecting the reduction in the anticipated rate of depreciation. Whether this will be so depends on the degree of capital mobility and also on the import content of investment (see below).

(ii) Devaluation, activity levels and investment: Devaluation may also affect investment through its impact on aggregate demand. This may be especially important when firms face sales constraints, so that the degree of capacity utilization or other variable representing demand considerations has a strong systematic effect on investment (as noted above, such effect is often found empirically). If devaluation reduces aggregate demand ex-ante, then ex-post investment is likely to fall. Moreover, if investment has a significant import content, then output expansion is likely to be a necessary (but not

sufficient) condition for investment not to fall ex-post (Serven (1990)).

The literature on contractionary devaluation (Krugman and Taylor (1978), Van Wijnbergen (1986), Edwards (1987), Solimano (1986), Lizondo and Montiel (1989)) emphasizes the slow working of substitution effects arising from devaluation; hence in the short run the impact of a real devaluation on aggregate demand is dominated by its adverse income effects. The latter operate through two main channels: one arises from the likely initial trade imbalance, which results in a real income transfer to the rest of the world (even at given terms of trade); the other, from the negative impact on consumption of real income redistribution from wages to profits. On the supply side, three transmission mechanisms may contribute to output contraction: the increased real cost (in terms of domestic goods) of imported inputs, the rise of working capital costs (due to increased interest rates), and real wage resistance. If the net effect of a currency devaluation is contractionary, i.e., GDP falls, then the slump in economic activity is likely to form the basis for investors to cut investment spending -- unless they clearly perceive the slump to be transitory. However, with sufficiently strong substitution effects (e.g., a large impact of devaluation on net exports) an expansionary outcome will result, and so devaluation may raise real income and stimulate investment spending as the degree of capacity utilization increases. This outcome becomes more likely as time passes and substitution effects gradually come into play (see Solimano, 1986, for an evaluation of such J-curve type effects of devaluation on output in Chile).

(iv) Anticipated depreciation and the timing of investment - The discussion until now has focussed on the effects of devaluation without making any explicit distinction between anticipated and unanticipated devaluation. An anticipated devaluation can also have a substantial impact on the timing of investment. This results from the combination of two opposing effects of devaluation expectations: the effect on interest rates, and the effect on the future cost of capital goods imports (for a detailed exposition, see Serven (1990)).

The effect of an anticipated devaluation on interest rates depends on the degree of capital mobility -- that is, on the costs of portfolio adjustment. In the general case of imperfect capital mobility, the domestic real interest rate is an increasing function of the foreign real interest rate plus the expected rate of depreciation of the real exchange rate (it may also depend on the relative or absolute stocks of financial assets). The perception by the public that a real depreciation is imminent will be reflected in higher real interest rates -- and more so the larger the degree of capital mobility. In this way, devaluation expectations represent a transitory investment disincentive; pending the depreciation, the real interest rate is high and investment is low. Once devaluation has taken place, the transitory investment disincentive is eliminated and investment rises.

The import content of capital goods operates in the opposite direction. When a real depreciation is anticipated, the real cost of imported capital goods is expected to rise; pending the depreciation, capital goods imports are transitorily cheap and hence investment must be transitorily high (the mechanism is entirely similar to an anticipated increase in tariffs on

investment goods). As pointed out by Dornbusch (1986), this represents a transitory investment incentive, that disappears once the depreciation is actually implemented.

Obviously, the net effect on investment depends on the degree of capital mobility relative to the import content of investment. With high capital mobility, the interest rate effect dominates, and devaluation expectations lead to an investment slump that will persist until the depreciation is actually undertaken. With low capital mobility and high import content of investment, an anticipated depreciation may result in a transitory investment boom, and the actual depreciation may give way to a drop in investment. As described in Servén (1990), these conclusions are consistent with the empirical evidence for Chile and Uruguay.

3.3 - Trade liberalization and investment

Trade liberalization is one of the structural reforms that often accompany macroeconomic adjustment measures. In principle, a permanent trade liberalization should reduce investment in the previously protected import-competing sector and encourage investment in the export sector. Hence, its impact on aggregate investment is uncertain, as it depends on the relative capital intensities of the different economic sectors.²⁰ In practice, in many LDCs the protected sector is relatively capital-intensive, and thus trade liberalization could well result in reduced aggregate investment -- which of

²⁰This is empirically confirmed by Lopez (1990), who does not find any significant effect of import and export restrictions on capital accumulation in a sample of 35 developing countries.

course may be consistent with enhanced growth due to the increased efficiency with which investment would be used.

However, when liberalization is perceived as temporary, its results can be very different. In such case, the removal of trade barriers can introduce important distortions in both the intertemporal and the sectoral allocation of investment. The timing effect is similar to the one examined in the previous subsection: if investment goods have a high import content, a temporary liberalization amounts to a transitorily low cost of investment goods, and hence to a temporary investment incentive. This may lead to a transitory investment boom, which, in addition, is likely to be allocated to the 'wrong' sectors: if trade restrictions are expected to be reintroduced shortly, the increased investment will be directed to the protected sector and not to the export industry -- exactly the opposite effect to what the liberalization intended to achieve.

Thus a trade liberalization suspected to be only temporary can have very adverse consequences for investment. As several authors have emphasized (see van Wijnbergen (1985), Rodrik (1989)), this is especially so when investment is irreversible: then there is an incentive to halt investment in all sectors, to avoid the irreversible mistake of investing in what can turn out to be the 'wrong' activity. We explore the issue of irreversibility in more depth in the next section.

4. The incentive structure and investment response: credibility, uncertainty and irreversibility

A key ingredient of most macroeconomic adjustment packages is a change in economic incentives that switches spending towards domestic goods (offsetting the deflationary bias of the usual monetary and fiscal restraint) and raises profitability in the tradable sector. This change in incentives is expected to lead to an outburst of investment in the tradable goods sector, increasing productive capacity and enhancing economic growth -- and thus ensuring the sustainability of the adjustment effort.

In practice, however, the investment response often is unexpectedly weak, and involves long delays (a clear example is the case of Bolivia in the late 80s). This poses major difficulties for the adjustment effort, since in the absence of an investment expansion the short-run deflationary consequences of the expenditure-restraining measures may be magnified, leading to a persistent reduction in growth. In this way, the lack of an adequate investment response in the tradable sector to the change in economic incentives increases the cost of the adjustment in terms of employment and growth; ultimately, it may render the stabilization effort socially unacceptable and thus unsustainable.

Conventional investment theories cannot provide a satisfactory explanation for this slow reaction of investment. To justify the latter, one would have to assume that firms face rapidly increasing adjustment costs to investment -- which does not seem to hold true empirically -- or that investors' expectations adapt very slowly to changes in the economic environment -- but there is no clear rationale for such suboptimal behavior by investors. A more satisfactory explanation can be offered by emphasizing the importance of uncertainty factors in investment decisions.

4.1 Irreversibility, Uncertainty, and Investment

As an emerging literature has emphasized (see Pindyck (1989) for references), the key role of uncertainty in investment decisions follows directly from the irreversible nature of most investment expenditures. These can be viewed as sunk costs, because capital, once installed, is firm- or industry-specific and cannot be put to productive use in a different activity (at least without incurring a substantial cost). The decision to undertake an irreversible investment in an uncertain environment can be viewed as involving the exercising of an option -- the option to wait for new information that might affect the desirability or timing of the investment. Thus, the lost value of this option must be considered as part of the opportunity cost of investment -- an issue which is overlooked in the conventional net present value calculations (which would therefore underestimate the opportunity cost and overpredict investment). As recent studies have shown, this opportunity cost can be substantial, and is also very sensitive to the prevailing degree of uncertainty about the economic conditions that determine the future returns to the investment. As a consequence, changes in uncertainty can have a very strong impact on aggregate investment; from a policy perspective, the stability and predictability of the incentive structure and the macroeconomic policy environment may be as important as the level of the tax incentives or the interest rate. In other words, if uncertainty over the economic environment is high, tax and related incentives may have to be very (or even prohibitively) large to have any significant impact on investment.

It is important to note that this effect of uncertainty is completely independent of investors' risk preferences or of the extent to which their

risks may be diversifiable. Investors may be risk-neutral (as assumed by most of the irreversibility literature) and their risks completely diversifiable; yet investment would continue to depend negatively on the perceived degree of uncertainty. The latter becomes important here simply because the fixed investment decision cannot be 'undone' (at least at zero cost) if future events turn out to be unfavorable. In general, there will be a value to waiting (i.e., an opportunity cost to investing today rather than waiting for information to arrive) whenever the investment is irreversible and its returns evolve stochastically over time.

The relevance of these results for macroeconomic policy, especially in developing countries, cannot be overemphasized. Consider, for example, the problem of relative price volatility. Many developing countries suffer from high and unpredictable inflation, which is usually matched by high relative price variability. The irreversibility approach suggests that this would reduce the effectiveness of relative price changes in stimulating investment. Specifically, a history of frequent relative price swings would make investors extremely cautious in reacting to a policy-induced change in sectoral incentives; substantial time may elapse before investors become convinced that the change is permanent -- and before they are willing to give up their option to postpone investment. Notice also that the implementation of an adjustment program may well increase uncertainty in the short run, as private agents start receiving mixed incentive signals -- some associated with the previous policy rules, some with the stabilization package, and some with the structural reforms aimed at restoring medium term growth. An example along these lines is provided by van Wijnbergen (1985), who shows that a trade

reform which is suspected to be only temporary can in fact lead to a fall in investment -- as economic agents postpone investment in both the home and traded goods sectors in order to receive additional information.

The debt overhang faced by many high-indebted countries creates a similar problem, which has been emphasized by Sachs (1988). It arises from the need to carry out an external transfer to the country's creditors, and represents another source of instability of the macroeconomic environment: in a context of uncertainty, the level of the real exchange rate and/or the demand management policies consistent with the required transfer also become uncertain; the size of the transfer itself is not known with certainty, as it depends on uncontrollable factors such as the future level of world interest rates and the terms of trade. Carrying out the transfer may require future real exchange rate changes, fiscal contraction, or both. Thus investors must face the risk of large swings in relative prices, taxation, or aggregate demand; as we argued above, each of them would lead to reduced investment.

In practice, this effect may be hard to identify, since foreign debt may affect investment adversely through two additional channels (emphasized by Borenstein (1989)). First, the debt overhang, which acts as an anticipated foreign tax on current and future income: since part of the future return on any investment will accrue to the creditors as bigger debt service payments, it discourages capital accumulation and promotes capital flight. Second, the credit rationing effect: a highly indebted country is likely to face credit constraints in international capital markets, which is equivalent to facing higher real interest rates, and this will also discourage investment. Empirical studies have confirmed the adverse impact on investment of the

foreign debt burden (e.g., Faini and de Melo (1990), Greene and Villanueva (1990)), though still more research is needed to identify the specific mechanisms at work.

4.2 The role of credibility

From a policy perspective, a very important source of uncertainty is the imperfect credibility of policy reforms. The latter is related to the public's perceptions about both the internal consistency of the adjustment program and the government's willingness to carry out the program despite its implied social costs. Unless investors view the adjustment program as fully credible in both senses, the possibility of a future policy reversal will become a key determinant of the investment response. As argued by Dornbusch (1988), Rodrik (1990), the policy measures of an adjustment program can easily be reversed -- while investors cannot undo their fixed capital decisions. In such conditions, the value of waiting arises from the losses (the 'irreversible mistake', in Bernanke's (1983) terminology) that investors would incur if policy were in fact reversed in the future. Clearly, the larger the perceived probability of a future policy reversal, the less willing investors will be to undertake fixed investment projects -- or the larger the current return they will require in order to compensate for the possibility of an irreversible mistake. Moreover, such increase in the required return on investment can be substantial even when the perceived probability of reversal is moderately low, as Dornbusch (1989) and Rodrik (1989) have shown. Thus, when investment is irreversible policy uncertainty can have disastrous

consequences for private investment (Rodrik, 1990).²¹

This also implies that any given set of policy measures can have widely different effects on investment depending on the prevailing degree of 'confidence' of the public. In particular, stabilization may entail large social and economic costs if credibility is low -- since the investment response will be insufficient to offset the deflationary bias of the usual fiscal and monetary restraint measures; thus, a persistent recession may develop before investors become confident enough that the adjustment measures will be maintained. This may be particularly relevant in economies with a past history of frequent policy swings or failed stabilization attempts -- two features shared by many highly indebted countries -- in which the private sector has learned to view adjustment programs with considerable skepticism.

Hence setting the right economic incentives is a required precondition for investment and growth, but it does not guarantee that they will in fact take place. Bolivia and Mexico provide examples of a rather slow investment response, while Korea and Singapore are cases of strong private sector response to economic incentives. Obviously, high credibility would help speed up the investment response and reduce the costs of the adjustment. However, the question of how can credibility be affected by government actions remains largely unresolved. Specifically, an important issue here is the choice between gradual and abrupt stabilization. The former would set initially modest objectives, which can be achieved with near certainty, in order to build up the government's reputation. The latter would start with an

²¹This adverse impact of uncertainty on private investment in LDCs has been empirically verified in several recent studies (see Solimano (1989), Faini and de Melo (1990), Lopez (1990)).

overadjustment (e.g., an over-depreciation of the exchange rate) to frontload the incentives to resource reallocation (but also the costs of the adjustment). As argued by Edwards (1988), the choice may largely depend on the specifics of each country; the social distribution of adjustment costs implicit in the program, together with past policy experience, are likely to be important issues here.

It is important to emphasize that policy reversal is an endogenous outcome in this framework, since current private sector decisions affect the opportunity set of future policy actions and ultimately determine the sustainability of the adjustment policy. As an example, consider again the case of a large real depreciation that due to low confidence fails to attract investment to the tradable sector. Its only visible effects will be a deflationary real income cut and an income redistribution from labor to capital, especially in the traded goods sector; however, because the depreciation is not sufficient to compensate for the lack of credibility, the increased profits will be reflected in increased capital flight. Social pressure and balance of payments problems may eventually force policy reversal, thus confirming the initial skepticism of investors.

The alternative situation starts with high confidence, which allows an investment boom and validates the adjustment program. Thus, there are two possible outcomes, and the final result of the adjustment measures is

indeterminate²². This is due to the existence of an externality that creates a wedge between the social and private returns to investment: higher aggregate investment helps sustain the adjustment effort and therefore results in higher returns to investment, a mechanism that will be ignored by the individual investor. If left to its own resources, the economy may get stuck in the 'low investment-adjustment failure' equilibrium²³. Since the 'high investment-adjustment success' equilibrium is clearly better in a meaningful sense, it is crucial to investigate what specific policy measures can lead the economy to this superior outcome.

There is no simple answer to this question. While transitory investment incentives would appear as the most appropriate tool to address the investment externality, in practice they run the risk of destabilizing public finances, which often are a key element in adjustment programs. On the other hand, sufficient external support to the stabilization effort may play an important role by raising investors' confidence in the sustainability of the adjustment, thus giving way to the investment takeoff. In fact, the lack of external resources has been a negative element that probably contributed to weaken the private sector's confidence in some stabilization attempts in highly indebted countries.

²²Observe that in both cases expectations are self-fulfilling, which reflects the existence of multiple rational expectations equilibria. Such result is familiar from the literature on investment under monopolistic competition (Kiyotaki (1988), Shleifer and Vishny (1989)). An example of indeterminacy similar to that in the text, but focussed on the consequences of trade liberalization, is provided by Rodrik (1989).

²³However, when multiple equilibria are present there is no clear rule to determine which of the possible outcomes will in fact prevail. An attempt to shed some light on this issue is made by Krugman (1990).

5. Econometric analysis

In the preceding discussion we have examined from the theoretical viewpoint the effect on private investment of a number of factors. The immediate question is to what extent can these factors contribute to explain the observed performance of investment in LDCs in recent years.

To investigate this issue, in this section we estimate a simple investment equation using pooled cross section-time series data for a group of developing countries. We postulate that real private investment is a function of real output growth, the real exchange rate, real public investment, the foreign debt burden, and the degree of macroeconomic uncertainty/instability:

$$IP/Y = F(\Delta Y, e, IG/Y, D^*/Y, \sigma, (IP/Y)_{-1})$$

where IP is real private investment, Y is real output, e is the real exchange rate, IG is real public investment, D^*/Y is the foreign debt/GDP ratio, and σ represents an appropriate measure of instability. For empirical purposes, we also introduce lagged private investment among the explanatory variables, in order to allow for some dynamics arising from adjustment and/or installation costs. According to our previous discussion, we would expect real output growth to exert a positive effect on the private investment rate; in contrast, an increase in the degree of economic instability or in the burden of foreign debt should reduce investment. On the other hand, the effect of the real exchange rate is uncertain, as discussed before; the same applies to the public investment rate, which can have an expansionary or contractionary

effect on private investment depending on whether public investment is primarily complementary with or substitutive for private investment.²⁴

To estimate this investment equation, we use data for the years 1972-1987 for twelve developing countries so our sample is constituted by 192 observations. The choice of sample period was dictated by data availability; the countries considered are essentially those whose performance was reviewed in section 2.2 above, to which we add Colombia, Kenya, Turkey and Uruguay. Thus the total sample comprises these four countries plus Argentina, Bolivia, Brazil, Chile, Korea, Mexico, Singapore and Thailand, and, as we noted before, represents a mix of positive and negative adjustment experiences.

To measure uncertainty σ , we followed other authors in using the sample variability of some key macroeconomic variables. In particular, we experimented with the variability of the real exchange rate and of real output growth; the corresponding results are reported below.

Because for each country the uncertainty variable σ is time-invariant, the investment equation was estimated using a two-step procedure. First, we compute the estimates of the coefficients on the time-varying variables (i.e., all explanatory variables except σ) using an instrumental variable procedure. In the second stage, we recover the coefficient estimate for the uncertainty variable σ (for details see e.g., Anderson and Hsiao (1982)).

²⁴We should note that our empirical equation does not include the real interest rate among the explanatory variables. Our experiments with alternative measures of the ex-ante real interest rate proved unsuccessful. The usual difficulties in measuring such variable are in our case likely to be compounded by the wide differences in financial market arrangements across the countries in the sample, and also across time periods. Thus, we opted for excluding interest rates from our final specification.

We experimented with different dynamic specifications, allowing for lags in the effects of the explanatory variables. However, the results were in all cases very similar. Table 7 presents the first-stage estimation results for the preferred specification, which was selected on the basis of the overall significance of the estimates.

Table 7
Determinants of Private Investment (1972-87)
(dependent variable: $\log(IP/Y)$)

Variable	Coefficient	T-statistic
Real output growth ^a	3.532	3.853***
Real exchange rate ^b (lagged)	.002	.031
Public investment ^c (lagged)	.058	1.170
Foreign debt/GDP ratio ^d	-.104	-2.633***
Lagged dependent variable	.584	9.845***
R ²	.584	
SEE	.203	
N. obs	180	

Notes: a - First difference of the log of real GDP (source: World Bank).
b - Log of the real exchange rate index (source: World Bank and IFS).
Increase means depreciation.
c - Log of the real public investment/real GDP ratio (source: World Bank).
d - Log of the ratio of foreign debt to GDP in U.S. dollars (source: World Bank).
*** - Coefficient significant at the 5 percent level.

Table 8

The Effect of Uncertainty on Private Investment (1972-87)

(dependent variable: country-specific effect from Table 5.1)^a

Variable	Equation 1	Equation 2	Equation 3
Constant	-7.413*** (-50.566)	-7.592*** (-63.710)	-7.373*** (48.495)
Output growth variability ^b	-.130 (-1.324)	-----	-.134*** (-1.986)
Real exchange rate variability ^b	-----	-.011 (-.755)	-.013 (-.993)

Notes: a - T-statistics in brackets

b - Measured by the coefficient of variation.

*** - Significant at the 5 percent level

As in most empirical studies, we find that real output growth has a strong positive impact on private investment. In contrast, the effect of the real exchange rate is very small and insignificant, even after allowing for a one-year lag; this is in accordance with our theoretical discussion in which we identified several channels through which the real exchange rate affects investment in opposite directions.

Public investment has a positive effect on private investment after a one-year lag, suggesting that complementarity relationships between both investment categories dominate in our sample. However, the effect is only moderately (i.e., at the 25 percent level) significant.

As expected, the foreign debt burden has a strong negative effect on the private investment ratio. As we discussed above, this result may reflect a combination of the increased macroeconomic uncertainty arising from the need to carry out an increased resource transfer, or also from credit rationing effects in world capital markets.

Finally, we also find substantial inertia in private investment, as indicated by the large and highly significant coefficient of the lagged dependent variable.

Using the results in Table 7, we can estimate the impact of uncertainty and instability on the private investment ratio. Our two proposed measures of instability are the variability of the real exchange rate, and the variability of real output growth; in both cases, variability is measured by the coefficient of variation of the corresponding variable. The empirical results for three alternative specifications (using real exchange rate variability, output variability, or both, as the relevant uncertainty measure) appear in

Table 8.

Because the sample for the second-stage regression is very small (only 12 observations), the results should be viewed only as suggestive. Nevertheless, as Table 8 shows, we do find that in all cases the uncertainty measures have a negative effect on private investment; thus, countries with higher real exchange rate instability and/or higher growth variability tend to have lower private investment ratios -- although only the output variability effect is statistically significant at conventional levels.

6. Conclusions and Policy Implications

One of the most troublesome features of the experience with macroeconomic adjustment in LDCs in the eighties has been the adverse impact on investment. In most cases, the adjustment measures have not been rewarded by a vigorous response of private investment, and this creates the risk of a persistent growth slump and an eventual failure of the adjustment effort.

The cross-country comparison carried out between several Latin America and East Asia countries suggest the following results regarding the performance of investment:

- There are some clear differences in the level and composition of investment between the Latin American and East Asian countries examined. During the 1980s (and also earlier) investment rates of the order of 30% of GDP and more (40 percent on average in Singapore) were not unusual in the East Asian countries to support growth rates of GDP of the order of 6.5 - 7.5 percent. In terms

of composition, private investment is overwhelmingly dominant, representing between 2/3 and 3/4 of total capital accumulation. In Latin America, in the 1980s average annual GDP growth decelerated sharply to around 1.5% and investment rates centered in the range of 15-18% of GDP (historically, in Latin America, investment rates have been of the order of 20-25% to sustain rates of growth of GDP of 5.5-6.0% per annum). In addition, on average, the share of public investment in capital accumulation is higher in Latin America.

- The analysis suggests that a high degree of macroeconomic stability -- low and predictable inflation, external and internal balance -- are of paramount importance to ensure a strong response of private investment to economic incentives. The East Asian cases examined provide a good example of this assertion. In contrast, in several Latin American countries macroeconomic instability may be largely responsible for the poor performance of private investment.
- The evidence on the effects of structural reforms -- e.g., liberalization, -- on private investment is, so far, still sketchy. Chile experienced a rapid recovery of private investment in the late 1980s as real interest rates receded to "normal" levels, the real exchange rate was kept at highly competitive levels, the economy was free of major micro distortions and

aggregate demand was high following a boom in copper prices. Mexico -- which adopted far reaching reforms in the areas of trade liberalization, fiscal reform and privatization in the eighties -- also saw a revival of private investment in spite of still high domestic real interest rates. Bolivia, however, that also liberalized trade, deregulated credit and labor markets and eliminated an hyperinflation in the mid-1980s, has not witnessed an upsurge of private investment.

- A decline in public investment has been observed in several (adjusting and non-adjusting) Latin American economies during in the 1980s. Chile is one exception in this regard, though public investment also declined sharply in the seventies when the structural reforms were adopted. This suggests that public investment may be squeezed in the process of balancing the fiscal and external accounts. Similarly, high domestic real interest rates along with a high level of public debt eventually impose fiscal tightening, which also tends to crowd-out public investment both in adjusting and non-adjusting countries.

On the other hand, we can summarize our econometric results as follows:

- Real output growth has a strong positive impact on private investment. In contrast, the effect of the real exchange rate is small and statistically insignificant in our sample, even after allowing for a one-year lag.

- Public investment has a positive effect on private investment after a one-year lag, suggesting that complementarity relationships between both investment categories dominate in our sample. However, the effect is only moderately (i.e., at the 25 percent level) significant.
- The foreign debt burden has a strong negative effect on the private investment ratio. This result may reflect a combination of the increased macroeconomic uncertainty arising from the need to carry out an increased resource transfer, or also from credit rationing effects in world capital markets.
- Our two proposed measures of instability (the variability of the real exchange rate, and the variability of real output growth, in both cases, measured by the coefficient of variation) have a negative effect on private investment; thus, countries with higher real exchange rate instability and/or higher growth variability tend to have lower private investment ratios -- although only the output variability effect is statistically significant at conventional levels.

What can we conclude for the design of growth-enhancing adjustment programs? First, macroeconomic stability and policy credibility are key ingredients for the achievement of a strong investment response. In a context

of high macroeconomic uncertainty, the reaction of investment to incentive changes is likely to be very limited. The same will happen if the policy measures are perceived as inconsistent or suspected to be only temporary. In such circumstances, investors will prefer to wait and see before committing resources to irreversible fixed investment.

Second, this has important implications for the sequencing of adjustment measures. In particular, macroeconomic stability is a prerequisite for the success of many types of reforms. For example, trade liberalization measures undertaken in a context of large macroeconomic imbalances are likely to be viewed as purely transitory, and thus can have very adverse consequences on the intertemporal and intersectoral allocation of investment.

Third, even well-designed, consistent adjustment programs may have to overcome, at least in the early stages, the consequences of lack of credibility. The availability of sufficient external resources can play an important role here, by raising the private sector's confidence in the viability of the adjustment effort, thus contributing to facilitate the recovery of private investment.

Fourth, even if the policy changes are perceived as permanent, the lack of adequate infrastructure may pose a significant obstacle to the recovery of private investment. The implementation of well-targeted public investments in infrastructure projects that complement private investment can play an important role to stimulate the private sector's response to the adjustment measures.

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