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Notes and explanation of symbols

The following symbols are used in tables in the *Review:*
Three dots (...) indicate that data are not available or are not separately reported.
A dash (—) indicates that the amount is nil or negligible.
A blank space in a table means that the item in question is not applicable.
A minus sign (-) indicates a deficit or decrease, unless otherwise specified.
A point (.) is used to indicate decimals.
A slash (/) indicates a crop year or fiscal year, e.g., 1970/1971.
Use of a hyphen (-) between years, e.g., 1971-1973, indicates reference to the complete number of calendar years involved, including the beginning and end years.
Reference to "tons" mean metric tons, and to "dollars", United States dollars, unless otherwise stated.
Unless otherwise stated, references to annual rates of growth or variation signify compound annual rates.
Individual figures and percentages in tables do not necessarily add up to corresponding totals, because of rounding.

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CONTENTS

Saving and investment under external and fiscal constraints

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In this article the author examines recent trends in the coefficient of domestic saving —or the unconsumed portion of the product— in the region. He shows how it has stagnated in relation to the saving prevalent before the external debt crisis, despite the sharp decline in per capita consumption. In other words, consumption and the product have fallen in a parallel fashion. Thus austerity has been useless in raising the coefficient of saving, which would have kept the turnaround produced by the net transfer of resources abroad —which must be financed with domestic saving— from in turn resulting in a total loss of available financing for investment.

The stagnation of the saving coefficient is a consequence of the fall in investment demand, caused by crisis-induced macroeconomic imbalances. An aggregate model is constructed which illustrates the constraints that operate in three basic imbalances or gaps: the saving-investment balance, the fiscal budget and the balance of payments. The author then shows how the fiscal and external gaps can act as dominant constraints, by reducing the investment rate to below what would be feasible with potential capacity for saving. Finally, some policy conclusions are drawn that highlight the different impacts of the various instruments available —exchange-rate, monetary and fiscal— depending on which gap or gaps are more restrictive.

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Introduction*

The magnitude of the negative impact of the external debt crisis on the Latin American economy is already reaching alarming proportions. Per capita gross domestic product dropped more than six percentage points between 1981 and 1988. Given the prevailing trends, the average inhabitant of the region will be worse off by the end of this decade than at the beginning.

Moreover, there are indications that economic problems have tended to worsen. There is no relief in sight from the burden of the external debt, despite efforts to pay interest and principal. In fact, in 1988 the external debt/gross domestic product ratio for Latin America as a whole reached 55%, in comparison with an annual average of 56% in the period 1982-1987 (ECLAC, 1988b).

For its part, the rate of investment —key to future growth— continued to decline in most Latin American countries. In a sample of six countries, the investment coefficient in 1985-1987 was lower than before the crisis, and also lower than the 1982-1984 rate, with the exception of Chile and Brazil (table 1).

Lastly, inflation has risen steadily since 1986 for the region as a whole, reaching an all-time high of close to 500 points in 1988. Such an imbalance is partly due to the serious fiscal problems faced by most Latin American countries.

In this context, it is absolutely essential to formulate a policy package capable of reversing the situation, in order to recover production and investment levels. To this end, research must be done on the relationships between the external debt burden and fiscal constraints, inflationary pressures and the decline in the investment rate.

The cessation of capital flows to the region and the rise in international interest rates from 1982 onwards produced a turnaround in the net financial transfer of resources from abroad (net

Table 1

LATIN AMERICA (SIX COUNTRIES) TOTAL
GROSS DOMESTIC INVESTMENT
AS A PERCENTAGE OF GROSS
DOMESTIC PRODUCT

(1980 dollars)

Country	Periods[a]		
	1975-1981	1982-1984	1985-1987
Argentina	21.1	14.1	11.5
Brazil	23.3	16.1	16.9
Chile	16.2	10.4	13.7
Ecuador	25.0	19.0	16.8
Mexico	24.3	18.6	16.7
Peru	24.6	22.6	19.7

Source: ECLAC, Statistics and Quantitative Analysis Division,
National Accounts Section.
[a] Simple arithmetic mean for the years indicated.

Table 2

LATIN AMERICA (SIX COUNTRIES) TOTAL
GROSS DOMESTIC SAVING AS A
PERCENTAGE OF GROSS
DOMESTIC PRODUCT

(1980 dollars)

Country	Periods[a]		
	1975-1981	1982-1985	1985-1987
Argentina	23.2	22.5	20.5
Brazil	19.4	20.1	21.6
Chile	14.4	16.6	24.9
Ecuador	27.4	25.7	27.9
Mexico	24.3	28.0	27.2
Peru	24.5	25.5	22.0

Source: ECLAC, Statistics and Quantitative Analysis Division,
National Accounts Section.
[a] Simple arithmetic mean for the years indicated.

capital inflow minus interest payments). This transfer (on average, 2.6% of GDP in the period 1973-1981) reached almost -4% in the period 1982-1987. Since the coefficient of investment is approximately equal to the coefficient of saving plus the quotient of the net financial transfer of resources, this upset dealt a hard blow to investment financing.

Recovering the coefficient of investment presupposes decreasing the net flow of resources abroad or increasing the coefficient of domestic saving. The first alternative necessarily involves trying to renegotiate the external debt and bring about lower international interest rates. This article deals with the second alternative, recovering the coefficient of domestic saving.

In most of the countries in the sample —once again Chile is different— the coefficient of domestic saving, or the unconsumed part of the product, remains practically at a standstill in relation to the level before the outbreak of the crisis (table 2). Brazil and Mexico are having some success at raising it, but by a lower proportion than the loss they have sustained in the transfer of resources. It is certainly paradoxical that the coefficient of saving remains static while average Latin American per capita consumption in 1988 was around 7% less than in 1980. Furthermore, no one can say that there has been a lack of austerity since the crisis. The drop

in real wages, the rise in unemployment rates, the deterioration of State aid to the neediest groups are, among others, eloquent indicators of how much adjustment there has been. However, efforts at austerity have not led to an increase in saving; that is to say, the crisis has meant a parallel decline in the product and in per capita consumption, with the consequent adverse effect on living conditions, but without an increase in the coefficient of saving. Thus the turnaround in the transfer of external resources has equalled the decline in the coefficient of investment, while the fall in consumption has not led to higher levels of domestic saving, to mitigate the decline in net external financing.

The question then is how to moderate consumption and increase the product, pushing saving up, instead of lowering the product and consumption —a formula that brings saving to a halt and penalizes investment (given the turnaround in the transfer of resources). In the search for an expansionary policy for promoting saving, it is essential to introduce the distinction between *ex ante* saving and *ex post* saving. If we try to moderate consumption in order to absorb, without detriment to investment, the turnaround in the transfer of resources, the result will be an expansion of *ex ante* saving. However, if the adjustment effort leads to a decline in investment, *ex post* saving may remain

unchanged —in other words, the austerity will be useless. On the other hand, if the initial moderation of consumption is accompanied by a stable level of investment, *ex post* saving will rise.

Adjustment policies, then, condition investment decisions by action or omission. Empirical evidence shows that in the desire to promote domestic adjustment through austerity, measures to promote saving often end up depressing it by inhibiting investment. For that reason, in this article, we add two channels of interaction between the external financing crisis and the investment possibilities. The turnaround in the transfer of resources affects investment behaviour not only by decreasing available saving (domestic saving plus the transfer of resources) but also by influencing the balance of payments and the fiscal budget.

The effect of the external crisis on the balance of payments is direct. The decrease in the net external flow of capital and the increase in interest payments on the debt erode the availability of foreign currency. The consequent shortage restricts the capacity to import finished consumer goods, intermediate inputs for production and capital goods for investment. Then, to avoid declines in production and investment, foreign currency must be saved by consuming fewer imports, and imported intermediate inputs and capital goods must be replaced by domestic products. However, given the inflexibility of the domestic structure of production in substituting for imported goods and the impossibility of discriminating in the reduction of consumption —so that only imported consumer goods or domestically produced exportables are affected— adjustments in consumption depress effective demand, production and investment.[1] Thus part of the increase in *ex ante* saving produced by the drop in consumption is frustrated by the decline in investment, and *ex post* saving adjusts to a lower level as production and investment fall.

The effect of the external financing crisis on the public budget has also been negative. The

cutoff of the flow of capital has limited the public sector's capacity for indebtedness abroad, while the rise in the international interest rate has increased the burden of servicing the external public debt. In many countries in the region, governments have guaranteed part of the external private debt; at times the corresponding private-sector domestic debt has been liquidated, and in other cases, the State has subsidized private debtors and the domestic financial system, in order to prevent it from collapsing. All of this has put pressure on public finances. At the same time, the recessive adjustment has deteriorated fiscal income because of the lower level of domestic activity and consequent reduction in tax receipts, and because of the drop in imports and resultant decline in customs duties. Finally, the effort to adjust external accounts has brought on real devaluations of the national currency, provoking an increase in the deficit in real terms in countries whose public sectors lacked foreign currency.

By recurring to domestic borrowing and issuing more currency, the authorities initially tried to prevent the worsening fiscal position from slowing down government consumption

Table 3

LATIN AMERICA (SIX COUNTRIES) GROSS FIXED PUBLIC INVESTMENT AS A PERCENTAGE OF GROSS DOMESTIC PRODUCT

(1980 dollars)

Country	Periods[a]		
	1975-1981	1982-1984	1985-1987
Argentina	[b]	...	...
Brazil	...	...	...
Chile[c]	5.5[d]	5.1	9.2
Ecuador	6.2	4.9	5.0
Mexico	9.6	7.6	5.8
Peru	5.6	6.4	4.3

Source: ECLAC, Statistics and Quantitative Analysis Division, National Accounts Section.
[a] Simple arithmetic mean for the years indicated.
[b] Official unavailable figures.
[c] Unofficial estimates (Larrañaga, 1989).
[d] For 1978-1981.

[1] A scarcity of foreign currency has repercussions on investment through recessive adjustments, required by the disequilibrium of the balance of payments, instability due to fluctuations in external financing, and an interest rate kept high by the authorities to avoid capital flight.

and investment At the saturation point of domestic borrowing, and faced with an inflationary spiral,[2] governments were obliged to reduce their current expenditures and investment.[3] This decline in fiscal investment depressed private investment, limiting *ex post* saving (table 3).

In short, the external debt crisis has placed direct and indirect constraints on investment capacity. Applying austerity policies to consumption (promoting *ex ante* saving) will be inefficient and recessive to the extent that these policies do not influence the investment factors which are also affected by the crisis, namely, the

process of generating foreign currency and the fiscal budget for public investment.

In this article, we build a macroeconomic model that shows the above interrelationships. It tries to show that the formation of *ex post* saving, or saving effectively materialized, differs according to whether the balance of payments and the fiscal budget act as restrictive variables or not. The presence of two possible gaps, external and fiscal, means that there are four potential situations, according to whether each one, both, or neither exerts a restrictive pressure. In each case, the most suitable policies for promoting domestic saving are indicated.

I

The model

To deal with the external debt crisis, Latin American economies have been forced to put into effect economic policies that have moved them away from full employment. Unemployment and idle installed capacity suggest the adoption of a Keynesian analytical model, according to which the product is determined by the effective demand side.

Thus we assume that the economy produces a generic good in quantity "Y", which is offered at price "p"; the effective product is determined by the quantity demanded of the product at price p, $D(p)=Y$.

The domestic product is offered on both the internal and external markets. In the latter, the domestic good faces a negatively sloped demand[4] at the relative price between the domestic good and a generic good produced abroad at price p*. Since both prices —p and p*— are denominated in different currencies, the number of units of

the local currency per unit of foreign currency being e, the relative price between them is ep*/p, which we will call the real rate of exchange (TR).

For the sake of simplicity, we set p*=1 as the unit value of the exchange rate of the model, making TR=e/p. We will describe below the equations that regulate the different components of effective demand.

1. *The public sector*

Government consumption is considered exogenous or, to be more exact, as one of the instruments of fiscal policy.
Thus,

$$(1) \qquad CG = \overline{CG},$$

where CG represents government consumption in units of the domestic good.

Tax receipts originate, on the one hand, in direct taxes on residents' income, and on the other hand, in indirect taxes on both the domestic good and the imported good.

$$(2) \qquad T = t\,Y + B\,TR\,M,$$

where t is the average tax rate (direct and indirect) per unit of the domestic good produced,

[2]Furthermore, inflationary adjustment deteriorates tax receipts (Tanzi, Blejer and Teijeiro, 1987).

[3]Table 3 shows that the trends in public investment, total investment and domestic saving differ in Chile from those in the rest of the region. For an analysis of the Chilean case, see Eyzaguirre (1989).

[4]The offer of the domestic product is infinitely elastic, so that if its external demand were also, the level of the product would remain undetermined.

while B represents the combined rate of average customs duties and indirect taxes paid on the imports (M). These latter are measured in units of the imported good.

$$(3) \quad YDG = T - DPENC - TR\ DPEFC \\ - r\ BGP - TR\ r^*\ BGX$$

We call the difference between tax receipts and a group of financial entries that will be spelled out below disposable government income (DGY). The deficit of public enterprises in national currency and foreign currency is represented by DPENC and DPEFC, respectively (if there were a surplus, the sign before the entry would be changed).[5] Bonds issued by the government and sold to the general public (BGP) pay a fixed nominal interest. Assuming that the public keeps the real volume of these bonds at least constant, the servicing of the government's domestic debt is given by r BGP, where r is the real interest rate. Lastly, BGX represents public-debt securities issued in foreign currency at the international interest rate, ri.

Disposable government income (DGY) equals the volume of government expenditure capable of being financed without having to resort to increasing the volume of the real domestic public debt, the monetary base or the external indebtedness of the public sector.

Let us now introduce the concept of fiscal constraints. We will speak of dominant fiscal constraints if the government cannot acquire more real domestic debt,[6] if it is inadmissable or impossible to increase inflation tax receipts and if its capacity to increase external indebtedness is exogenously determined.[7]

The public-sector deficit is given by:

$$(4) \quad PSD = DBGP + DBGX\ TR + \pi\ m,$$

where DBGP is the increase in the real volume of public-sector domestic indebtedness, DGBX is the increase in public sector external indebtedness in units of foreign currency,[8]

π is the rate of inflation,

m is the real money supply,[9]

πm is the real receipts of inflation tax.[10]

Thus the dominant fiscal constraints are the equivalent of DBGP=0, DBGX=F and $\pi m=k$, where F is the net exogenous flow of capital from abroad and k a constant.

Finally, government investment is given by:

$$(5) \quad GI = \overline{GI} = DGY - CG + PSD$$

if the fiscal constraints are not dominant (NDFC).[11]

Note that if the government can finance PSD, public investment is a policy variable ($\overline{GI}$) determined on the basis of medium-term considerations; in this case the adjustment variable is PSD. On the contrary, if fiscal constraints are dominant (DFC), the PSD is fixed and the variable that is adjusted is government investment.

$$(6) \quad GI = DGY - CG + k + TR\ F$$

if fiscal constraints are dominant.

2. The private sector

Private sector consumption, measured in units of the domestic good, is given by:

$$(7) \quad CP = C_0 + C_1\ (Y - t\ Y + r\ BGP \\ - TR\ BPX\ r^* - \pi m) - C_2\ TR - C_3\ r,$$

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[5]The formulation assumes that public enterprises do not issue their own debt securities.

[6]We adopted an extreme presupposition to make the model simpler. Assuming that, within a certain range, the government can acquire more domestic debt if it offers a higher interest rate. However, this range will probably be narrow if the public's perception is that the government cannot possibly service its debt in the future. In this latter case, the government would be incapable of financing its deficit by issuing domestic debt.

[7]This is the situation that in practice has been in effect since the crisis of 1982.

[8]Note that, given $p^* = 1$, units of foreign currency is the equivalent of units of the foreign good.

[9]For the sake of simplicity, we assume that the real demand for money m is constant. The other possibility would be to introduce a demand function for money that would relate the demand to income and the interest rate. Such a formulation would make it possible to include changes in seigniorage.

[10]In this formulation we take the case of the economic authority who avoids financing the public debt through a money issue that accelerates the rise in prices. Thus inflation is not caused by excess demand, but is merely inertial, and the government collects the consequent inflation tax.

[11]Note that the option is to model public investment as an adjustment variable and government consumption as a policy variable. The purpose is to show that government consumption is relatively less flexible.

where BPX represents private-sector external indebtedness in units of foreign currency.

The term in parentheses approximates the disposable income of the private sector. The real exchange rate exerts a negative influence on private consumption, under the implicit assumption that the real exchange rate correlates inversely with real wages and that workers' propensity to consume is higher than that of capitalists. Finally, the real interest rate is postulated to be a variable that negatively affects private-sector consumption, by acting as a relative price between present and future consumption.[12]

In turn, private-sector investment is explained as a function of the product, government investment and the real interest rate.

$$(8) \qquad PI = I_0 + I_1 Y + I_2 GI - I_3 r$$

Implicit in this formulation is that public investment is complementary to private investment.[13] Thus a larger public investment (for example, in infrastructure) improves the profitability of private projects and pushes up private investment. For its part, the real interest rate approximates the cost of capital.

3. The external sector

The equations that describe foreign trade correspond to the behaviour of imports and exports, as well as to the movement of international reserves.

$$(9) \qquad M = M_0 + M_1 Y + M_2 (PI + GI) \\ - M_3 (1 + B) TR$$

It is assumed that the number of units of the foreign good demanded by the residents is positively correlated with the product and with total investment. On the other hand, a relative price rise between the foreign good and the domestic good {(1+B) TR} will discourage demand for the imported good.

$$(10) \qquad X = X_0 + X_1 TR$$

The number of units of the domestic good sold abroad (X) is determined by the external demand for the domestic product. The cheaper the domestic good compared to the foreign good, that is, the higher the real exchange rate, the greater the demand. By construction, in this model an improvement in the terms of trade is approximated by a rise in X_0, for a given real exchange rate.[14]

$$(11) \qquad \Delta R = F - r^* (BGX + BPX) \\ + (X/TR) - M$$

Finally, the result of the balance of payments, expressed in units of foreign currency, is given by the difference between the net transfer of resources from abroad {F − ri (BGX + BPX)} and the result of the trade balance {(X/TR) − M}. We speak of the dominant external constraints (DEC) if the economic authority, faced with an unsustainable loss of international reserves, imposes an equilibrium on the balance of payments, $\Delta R = 0$.

4. The closures of the model

The existence of two possible fiscal régimes (dominant and non-dominant fiscal constraints) and of two possible situations of foreign trade (dominant and non-dominant external constraints) comprise four conceivable closures for the model.

a) Both sets of non-dominant constraints (case I)

In this case, the economy in question has a financially solvent public sector, with the capacity to face its current expenditures and invest-

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[12]Consumption could have been modeled on the basis of wealth, approximating it by (disposable income/r). The practical impossibility of lending and borrowing at the r rate, without constraints of time and quantity, makes it recommendable to model income and the interest rate as separate arguments. It should be noted, on the other hand, that, all else being equal, private saving is directly linked to the interest rate. However, on the general equilibrium level, the correlation between saving and the interest rate may be inverse, as we will see further on.

[13]Note that the complementarity of public investment and private investment takes on a technical character in (8), in the sense that private investment requires public investment to provide infrastructure, services, etc. The so-called "crowding-out effect", by virtue of which public investment would displace private investment by competing for financing, comes from the indirect impact via interest rates. This is also included in the model.

[14]In more rigorous terms, it is a question of a positive displacement of foreign demand for the domestic good.

ment costs, either through current income or through the sale of public debt. Its external position is also solid and financing the balance of payments presents no problems.

The model is closed with the equation for determining the product on the side of effective demand.

$$(12) \quad Y = CP + CG + PI + GI + X - TR\ M$$

Given the above, equations (3), (4), (6) and (11) are inactive, i.e., they do not contribute to determining the endogenous variables. The domestic interest rate is defined by the monetary policy, while the tax rate, government consumption and investment respond to fiscal policy. The exchange rate, finally, is also a policy variable.

Reducing the model to its basics, case I could be described by four equations:

$$Y - PI - CP + TR\ M = CG + GI + X_0 + X_1\ TR$$

$$I_1\ Y - PI = -I_0 + I_3\ r - I_2\ GI$$

$$C_1\ (1 - t)Y - CP = -C_0 + C_1\ \pi m + TR$$
$$(C_1\ r^* \ BPX + C_2) + r\ (C_3 - C_1\ BGP)$$

$$M_1\ Y + M_2\ PI - M = -M_2\ GI - M_0 +$$
$$M_3(1 + B)\ TR$$

b) *Dominant fiscal constraints and favourable external conditions* (case II)

In this case, the critical macroeconomic variable is the domestic transfer of resources from the private to the public sector, i.e., the inability of the State to finance its plans for current expenditure and investment. This economy will typically face problems in financing the public deficit, but it may well have favourable external accounts.[15]

In this situation, changes in available public-sector financing (motivated, for example, if BGX > 0, by a rise in the international cost of credit or by a decline in the refinancing of outstanding interest) will require that an adjustment be made in the amounts of public investment. Given the complementary nature of public and private investment, an adjustment of the former will affect the amount of the latter and, *ex post facto*, the economy's level of aggregate domestic saving.

[15]This was clearly the case of Brazil in 1988.

The model that describes case II can be seen in the following five equations:

$$Y - GI - PI - CP + TR\ M = CG + X_0 + X_1\ TR$$

$$t\ Y - GI + B\ TR\ M = DPENC + CG - k$$
$$+ TR(DPEFC + r^* \ BGX - F) + r\ BGP$$

$$I_1\ Y + I_2\ GI - PI = -I_0 + I_3\ r$$

$$C_1\ (1 - t) - CP = -C_0 + C_1\ k$$
$$+ TR\ (C_1\ r^* \ BPX + C_2) + r\ (C_3 - C_1\ BGP)$$

$$M_1\ Y + M_2\ GI + M_2\ PI - M = -M_0$$
$$+ M_3\ (1 + B)TR$$

c) *Dominant external constraints and favourable fiscal conditions* (case III)

This case symbolizes the problem of an economy that faces serious problems in financing its balance of payments but not its fiscal accounts. Here the problem is one of an external, not domestic, transfer of resources. The government can finance its plans for consumption and investment, either directly through taxation or by selling domestic debt (bonds or money). However, the overall economy is confronted with an imbalance in international payments, and neither the public nor the private sector can sell abroad the amount of bonds needed to finance this imbalance.

We make the dominant external gap operational by means of $\Delta R = 0$. The subsystem (9)-(11) indicates that, given a certain level of investment, the level of product is determined by the external imbalance; or, more precisely, there is a level of maximum domestic product compatible with the external accounts. When that level of production is less than full-employment production, we speak of a dominant external gap.

There is no guarantee, however, that the level of product that satisfies equation (12) is the same as the level implicit in the subsystem (9)-(11). This is an important point; if effective demand (equation (12)) determines a level of production higher than the one compatible with the external gap, the economy will begin to lose international reserves. The economic authorities will then be forced to contract effective demand; to do so they could reduce public expenditures, modify the exchange rate and/or regulate the real interest rate through the monetary policy. However, since government consumption and

investment are usually variables, with little flexibility and determined by considerations other than that of regulating effective demand, we will assume that the adjustment will be made through the monetary policy.[16] In other words, in conditions of a dominant external gap, the monetary policy will adjust the interest rate to make effective demand compatible with the external constraints.[17]

In case III, since we are assuming the existence of favourable fiscal conditions, equation (5) once again replaces equations (3) and (6), while equation (11) is also activated. Unlike the previous cases, the interest rate becomes an endogenous variable. The case can be described by the following five equations:

$$Y - PI - CP + TR\ M = CG + GI + X_0 + X_1\ TR$$

$$I_1\ Y - PI - I_3\ r = - I_0 - I_2\ GI$$

$$C_1\ (1 - t)Y - CP - (C_3 - C_1\ BGP)\ r = - C_0 + C_1\ \pi\ m + TR\ (C_1\ r^*\ BPX + C_2)$$

$$M_1\ Y + M_2\ PI - M = - M_2\ GI - M_0 + M_3(1 + B)TR$$

$$TR\ M = TR\ \{F - r^*\ (BGX + BPX)\} + X_0 + X_1\ TR$$

d) *Dominant fiscal and external constraints* (case IV)

Let us examine the last case, which is the most complicated situation. The economy faces problems of financing the public sector and the balance of payments, i.e., it suffers from problems of both domestic and external transfers. As we pointed out above, it is not a question of mere academic speculation; rather, since external shocks —such as the 1982 crisis— may affect both equilibria, this is currently the most common economic-policy problem in many countries of the region.

[16]The adjustment can also be made through the exchange rate. However, that entails modifying the real rate of exchange, which presupposes changing real wages (at least in the short term); and, on the other hand, the effect of the real exchange rate on demand is less precise (Krugman and Taylor, 1978).

[17]If reserves are being lost, the monetary policy can raise the interest rate to reduce effective demand. However, the contrary is not necessarily true. If external conditions were favourable, the interest rate could not fall below the minimum level necessary to avoid capital flight. When the real exchange rate is fixed, that minimum level is approximately equal to the international interest rate, less external inflation, plus the country risk.

The model that synthesizes case IV once again activates equations (3) and (6) instead of (5). The external constraints (equation (11)) remain operative and, for that very reason, the interest rate is an endogenous variable. The case can be described by the following six basic equations:

$$Y - GI - PI + TR\ M = CG + X_0 + X_1\ TR$$

$$I\ Y - GI + B\ TR\ M - r\ BGP = DPENC + CG - k + TR(DPEFC + r^*\ BGX - F)$$

$$I_1\ Y + I_2\ GI - PI - I_3\ r = - I_0$$

$$C_1\ (1 - t)Y - CP - (C_3 - C_1\ BGP)\ r = - C_0 + C_1\ k + TR\ (C_1\ r^*\ BPX + C_2)$$

$$M_1\ Y + M_2\ GI + M_2\ PI - M = - M_0 + M_3(1 + B)TR$$

$$TR\ M = TR\ \{F - r^*\ (BGX + BPX)\} + X_0 + X_1\ TR$$

5. *The factors that determine saving*

Having laid out the model in its separate phases, we can now explicate the underlying theory regarding the determination of the domestic interest rate in the economy. When we introduced the model, we spoke of idle installed capacity and of determining the product through effective demand. With respect to the process of saving and investment, this is equivalent to introducing the fundamental distinction between *ex ante* saving and *ex post* saving, i.e., to considering saving as a derivative amount basically resulting from effectively implemented investment programmes.

The national accounts establish that,

(13) $DS = Y - CG - CP,$

where DS is domestic saving, measured in units of the domestic good.

Using (12) we have

(14) $DS = PI + GI + X - TR\ M$

And if external constraints are dominant,

(15) $DS = PI + GI - TR\ \{F - ri\ (BGX + BPX)\}$

What is fundamental here is the direction of the causality: it goes from investment to saving and not vice versa. The level of investment, both public and private, is an endogenous variable,

whose value is the result of all the variables that operate in the model. Furthermore, the factors that determine investment —and by extension, saving— vary, depending on whether the fiscal and external constraints are operative or not. We thus arrive at the main argument of this article, namely that the economy's aggregate saving, and therefore, the policy measures to affect it, are determined by the prevailing fiscal and external macroeconomic constraints.

The above analysis is valid wherever the external debt crisis in the Latin American countries has generated macroeconomic situations characterized by high unemployment, huge fiscal deficits —with consequent inflationary pressures— and disequilibria in the balance of payments. For a different economic situation, for example, one in which there is an abundant flow of voluntary credit and full employment, the above model would have to be reformulated.

II

The results

The economy's level of domestic saving and investment, as we saw above, depends on the system of dominant gaps. In this section, we study the effect produced by a range of policies and shocks in exogenous variables on the reduced function of domestic saving and total investment.

We are particularly interested in isolating the effect of some selected variables. First, we will investigate the impact of monetary policy through changes in the real interest rate.[18] We should stress that we can do so only if the external constraints are not dominant, because when they are, monetary policy becomes endogenous.

We will then analyse the impact of a group of fiscal policy variables, namely, government consumption, the tax rate[19] and the deficit (surplus), in both national and foreign currency, of public enterprises.

Finally, we will examine the effect of the changes originating in the external sector of the economy. Changes in the real rate of exchange belong in this category.[20] We also consider

changes in the terms of trade (estimated through changes in X_0), in the international interest rate and in the flow of capital from abroad.

To establish the impact of various policies and shocks on the exogenous variables, we will calculate the slopes of saving and investment with respect to the elements in question.[21] However, given the structure of the model, the signs of the different elements of the slopes cannot be determined *a priori*; to further understand the effects we need make some assumptions about the basic data and the elasticities of the structural model.[22]

1. *Basic assumptions about variables and parameters*

In formulating these assumptions, we have attempted to keep some variables free —particularly the debt levels of the various agents, the deficit of public enterprises and the flow of capital— for the purpose of achieving general results.[23] The "free" variables were

[18]This effect, although in the framework of another kind of model, has received a good deal of attention in the literature. Studies on this question are found in Fry (1980), Giovannini (1983), Blinder (1975) and Boskin (1978).

[19]For the purposes of this model, a change in the degree of tax evasion has similar repercussions.

[20]The effect of real devaluations on the product has been widely studied. Classical references on the subject, in the context of developing countries, are Cooper (1971), Diamand (1978) and Krugman and Taylor (1978). The impact of devaluations on saving derives in part from repercussions on the product.

[21]The analytical solution of the endogenous variables in the four cases described presented enormous difficulties of algebraic resolution. We were able to overcome these obstacles thanks to the recently developed, computer programme "Maple", which was capable of handling the equations. Even so, the algebraic structure of the gradient of saving is, in the four cases, very extensive. It is set out in detail in Eyzaguirre (1989).

[22]Since we do not have an econometric estimate of the model at this stage.

[23]We could have also assigned values to each of the variables and parameters and simulated the model. However, this alternative is generally valid only as an example.

selected precisely to make more flexible the fac-
tors that are most essential in differentiating
among macroeconomic structures, namely, the
levels of domestic and external debt and the
foreign currency position of the public-sector
flow.

The basic assumptions are as follows:

i) Ratios to the product: exports (0.25),
imports (0.20), public investment (0.1), private
investment (0.05), government consumption
(0.2) and private consumption (0.6).

ii) Elasticities: all the product elasticities
(imports, private investment and private con-
sumption) are equal to unity. The price elastici-
ties of imports and exports are both set at 0.5
(thus ensuring that they will remain within the
limits of the Marshall-Lerner condition).

The elasticities of private investment and
consumption, in relation to the real interest rate,
are fixed at 0.5 and 0.05. The effect of the real
exchange rate on private consumption, in terms
of elasticity, is set at 0.12.

iii) Tax rate, 20%; taxes on imports, 30%;
inflation tax, equal to 3% of the product.

Two exercises are performed on the basis of
these data. The first is to find the sign of the
influence of the various factors that determine
saving and investment, allowing the free varia-
bles to fluctuate within reasonable ranges.[24]
Expressed in percentage points of GDP, these
are as follows:

BGX   : between 10 and 80
BPX   : between 0 and 40
BGP   : between 0 and 60
DPENC : between 0 and 6
DPEFC : between -10 and 0
F   : between 2 and 8

A run of the free variables yields an interval
for each element of the saving and investment
slopes. The effect of the different variables will
be considered positive if the interval does not
represent negative values, and vice versa. If the

possible interval contains both negative and pos-
itive values, the corresponding variable will be
considered to have an ambiguous effect.

The second exercise consists of choosing a
value within each interval, in order to calculate
the elasticities of saving and investment in rela-
tion to each of their determinant factors. For this
purpose, the average value of the above-
mentioned intervals was adopted in each case.

2. The impact of the interest rate

Before analysing the effect of the real interest
rate on saving and investment, we might do well
to note the way in which the rate is determined,
according to this model. The monetary authori-
ties, by buying and selling Central Bank bonds
that pay a certain real interest,[25] regulate the
interest rate of the economy. When there are
external constraints, the interest rate is fixed at a
level that makes overall demand compatible
with these constraints. In other words, if the
Central Bank begins to lose international
reserves, it can "brake" the speed of domestic
activity by raising interest rates and vice versa.

When the external constraints are non-
dominant, the interest rate ceases to be an endo-
genous variable and can be freely changed by the
economic authorities. This happens in case I, in
which both constraints are non-dominant, and
in case II, in which the economy faces a fiscal
problem.[26]

Given the parameters assumed above, the
impact of a rise in the interest rate on invest-
ment is negative in case I (the model without
constraints). With fiscal constraints (case II), the
impact is even more negative, since in addition
to the direct impact of the higher interest rate on
private investment, there is also a reduction of
public investment, owing to the increased
burden of servicing the domestic public debt.

Table 4

ELASTICITIES OF DOMESTIC SAVING (S) AND INVESTMENT (I)

Variable	System	Case I (NDFC-NDEC)	Case II (DFC-NDEC)	Case III (NDFC-DEC)	Case IV (DFC-DEC)
Interest rate	S	-0.13	-0.46	a	a
	I	-0.36	-1.20	a	a

a In these cases the interest rate is endogenous.

The effect of the rise in the interest rate on saving is also negative in both cases, since the impact is greater when there are fiscal constraints. The drop in saving is due to the fact that the decline in investment leads to a bigger reduction in the product than in consumption.

It may be concluded, then, that it is possible to increase saving by lowering the rate of interest; the efficiency of the measure will depend on how favourable external conditions are, and on the amount of idle capacity. Table 4 presents the elasticities obtained in each case.

3. The impact of fiscal-policy variables on the level of domestic saving and investment

a) Government consumption

In the model with no constraints, the impact of government consumption on the economy's level of investment is positive. The reason is found in the traditional Keynesian argument concerning the multiplier effect of fiscal policy on the product and the consequent increase in investment induced by expanded demand. However, with external constraints (case III), the so-called "crowding-out effect" is found. This is a partial encroachment of public expenditure on investment. The increase in effective demand derived from higher government consumption encourages imports, and consequently the balance of payments deteriorates; the economic authorities are then obliged to intervene by raising the interest rate, which discourages private investment. If the economy also has fiscal problems (case IV), the displacement effect is even greater, in so far as government consumption is expanded at the expense of public investment. Finally, the negative impact of government con-

sumption reaches its highest value when there are only fiscal constraints (case II). With fiscal constraints, public consumption completely overrides public investment, and the lower level of public investment discourages private investment, generally resulting in a contraction of effective demand and a fall in the product. Nevertheless, in this case the recessive component can be avoided by lowering the interest rate.

The above can be better explained with the aid of a diagram (figure 1). In the space (y,r), the equilibrium of the goods market (BB) has a negative curve, due to the negative effect of a rise in the interest rate on private consumption and investment. The external equilibrium (XX) is inelastic, in so far as the balance of payments is not directly affected by the domestic interest rate (throughout the model we have assumed that the external flow of capital F is an exogenous variable). Finally, the fiscal equilibrium (FF) shows a positive curve, in so far as the rise in the interest rate increases the burden of servicing the domestic public debt and an expansion of the product increases tax receipts.

Figure 1

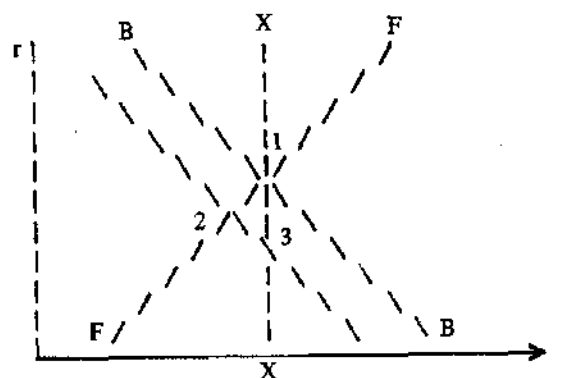THE EFFECTS OF EXPANDED GOVERNMENT CONSUMPTION

Table 5

ELASTICITIES OF DOMESTIC SAVING (S) AND INVESTMENT (I)

Variable	System	Case I (NDFC-NDEC)	Case II (DFC-NDEC)	Case III (NDFC-DEC)	Case IV (DFC-DEC)
Government consumption	S	-0.18	-0.94	-0.43	-0.51
	I	0.11	-1.84	-0.57	-0.67
Taxes	S	0.09	0.46	0.24	0.35
	I	-0.05	1.51	0.32	0.47
Deficit of public enterprises in national currency	S	.	-0.19	.	a
	I	.	-0.48	.	a
Deficit of public enterprises in foreign currency	S	.	-0.31	.	a
	I	.	-0.80	.	a

a The effect is ambiguous.

In the presence of fiscal constraints, since expanded government consumption completely replaces public investment and depresses private investment, the equilibrium BB moves down. In case II, the economy remains at point 2; and in case IV —the case in which the level of total investment is highest— the economy is at point 3.

The effect of expanded government consumption on domestic saving is also generally negative.[27] The reasoning is very similar to that concerning investment. For cases III and IV, the effect on saving is the same as the effect on investment. With external constraints, since the change in government consumption cannot affect the trade balance —which is determined by the net transfer of resources from abroad— saving and investment move together.[28] In case I, the economy without constraints, the increase in government consumption promotes domestic saving, through the multiplier effect. Finally, in case II, the negative impact of government consumption on domestic saving is at its greatest, given the recessive effect commented on above.

Table 5 shows the positive or negative effect of government consumption on investment and saving in the different cases, as well as estimates of the elasticities involved.[29]

b) *The impact of taxes*

The effect that a change in the tax rate (and/or the degree of tax evasion) has on investment and saving also shows important differences according to the dominant system of gaps.

In the model without constraints, an increased tax burden will contract investment. The increase in taxes reduces disposable personal income and private consumption, thereby depressing the product and investment. However, if the external gap is dominant (case III), the reduced consumption generates favourable external conditions, allowing for a reduction of the interest rate and an increase in investment. If there are also fiscal constraints (case IV), the positive effect on investment is even greater in so far as the higher fiscal receipts make it possible to expand public investment and encourage private investment. If there are only fiscal constraints, the impact is highest, since the recovery of public and private investment allows for an

[27]The type of relationship established in this model between public saving and private saving is generally contradictory to the equivalency hypothesis of Ricardo (Barro, 1974).

[28]National accounts show that investment is equal to saving plus the amount of the trade balance.

[29]Note that the value of the elasticities is influenced by the assumptions about some of the parameters of the structural model.

Table 6

ELASTICITIES OF DOMESTIC SAVING (S) AND INVESTMENT (I)

Variable	System	Case I (NDFC-NDEC)	Case II (DFC-NDEC)	Case III (NDFC-DEC)	Case IV (DFC-DEC)
External	S	0.51	0.82	0.94	0.99
demand	I	0.07	0.83	1.25	1.33
Real	S	0.44	0.43	a	0.24
exchange rate	I	a	a	a	a
External flow	S	·	0.31	0.23	0.28
of capital	I	·	0.80	0.65	0.70
External	S	·	-0.30	-0.69	-0.30
interest rate	I	·	-0.80	-0.90	-0.87

aThe effect is ambiguous.

expansion of both aggregate demand and the product, which in turn induces further investment.

The behaviour of saving in relation to taxation differs slightly from that of investment. In the model without constraints domestic saving, unlike investment, expands in reaction to an increased tax burden. This is due to the fact that consumption is reduced more than the product; the trade balance improves, since investment decreases; and domestic saving rises, resulting in a more favourable balance of payments. In all the other cases, the effect of higher taxes on saving is positive and the impact even greater. The elasticity of saving in relation to taxes is particularly sensitive to the tightness of the fiscal budget (table 5).

c) *The deficit of public enterprises*

Variations in the results of public-sector enterprises have little influence on saving and investment if the State has a margin of indebtedness or a favourable fiscal situation. However, when fiscal constraints exist, an improvement in the public-enterprise balance makes it possible to recover public investment and hence private investment and saving (this latter item rises in case II, since when public investment first recovers, the product grows more than consumption).

If external constraints also exist (case IV), the impact on saving and investment is ambiguous. The increase of public investment, which would allow for improving the financial situa-

tion of the State enterprises, exerts pressure on aggregate demand and the balance of payments. With external constraints, the economic authorities have to slow down the rate of activity by raising interest rates.

4. *The impact of the external sector*

a) *Increase in external demand*

In the framework of this model, an increase in external demand for the domestic product (and/or an improvement in the terms of trade) has a positive effect on the formation of saving and the level of investment in all the cases. But the magnitude of the impact grows the more the economy is constrained.

Let us first look at the effect on investment. In the model without constraints, a growth in exports leads to an expansion of the product and investment, through the multiplier effect. With fiscal constraints and an increase in exports and the product, there is an expansion in tax revenues and thus in public and private investment. In turn, the inflow of foreign currency increases, making possible a financed expansion of domestic demand when external constraints are dominant.

The effect on domestic saving is similar. In the model with no constraints, the product grows more than consumption, causing saving to rise and the trade balance to improve. Saving expands in all the other cases and the elasticity reaches its highest value in case IV (table 6).

b) *Exchange policy*

The effects of a real currency devaluation on the formation of saving and the level of investment are generally ambiguous. Devaluations trigger a variety of effects, whose relative importance varies according to the prevailing dominant gaps.

A real devaluation encourages exports while inhibiting the demand for imports, and makes each unit of the imported good more expensive in real terms. The net impact of the previous changes on the trade balance is studied in the so-called Marshall-Lerner condition. On the other hand, a real devaluation has an impact on real wages and on private external debt servicing, resulting in lower private consumption.

In choosing the parameters, the sum of the price elasticities of exports and imports was posited to be equal to one; nevertheless, as the export coefficient is greater than the import coefficient, the net impact of the real devaluation on the trade balance is slightly positive. Since the devaluation contracts private consumption in the model without constraints, the total impact on aggregate demand is ambiguous. Also in case I, the effect on saving is positive, in so far as private consumption declines.

Another effect is added when there are fiscal constraints: the devaluation affects the fiscal budget, favourably or unfavourably, according to the sign of the fiscal position in foreign currency (F − r* BGX − DPEFC). Countries with a high external fiscal debt and low direct public income in foreign currency (i.e., DPEFC slightly negative or close to zero) will be unfavourably affected, and vice versa. For this reason, the impact of the devaluation on the product and on investment remains ambiguous. The effect on saving is positive, while private consumption decreases.

If external constraints are present, the product grows if they are weakened by the devaluation. This depends on the Marshall-Lerner condition, which was assumed to be zero in this case; therefore, the effect on investment remains ambiguous, as in case IV.

In short, the devaluation will tend to favour investment in so far as the price elasticity of imports and exports is greater, and to favour government income in foreign currency to the extent that private indebtedness abroad is lower and the propensity of capitalists to consume is more on a par with that of workers. These last two factors have an inverse effect on saving.

c) *The net flow of capital and the interest rate*

The effect of these two variables —which together with the volume of domestic debt determine the net transfer of external resources (NTER)— is very important if the economy is faced with some type of constraint. An increase in the net flow of capital and/or a reduction in the international cost of credit —which is equivalent to an increase in NTER— makes it possible to relax external and fiscal constraints simultaneously. Saving rises in all the cases with constraints (II, III, IV), and so does investment.

The increase in NTER makes it possible to recover fiscal and private investment in cases II and IV; in case III, where there are only external constraints, the initial favourable situation of foreign currency allows for a more expansionary economic policy. If this leads to lower interest rates, private investment recovers as a consequence of both the lower cost of credit and the expansion of domestic demand.

The corresponding elasticities are given in table 6. We should point out that in the economy without constraints (case I), the impact of NTER is nil in the context of this model. This is because it is assumed that economic policy regulates the changes in NTER via the volume of international reserves (and monetary effects are nullified, since there is no change in r). It is possible —and this in fact happened in Latin America towards the end of the 1970s— for the effect of a rise in NTER to be negative for saving in case I, if the new resources are allocated to finance plans for private or government consumption. In this situation, external financing replaces domestic saving.

III

Conclusions

The empirical evidence on recent trends in consumption, domestic and external saving and the rate of investment in Latin American countries raises some basic questions about the causes of these trends. The spectacular fall in external financing brought on by the debt crisis has dealt a hard blow to available investment funds; per capita consumption, in turn, has also plummeted during the adjustment process. However, the reduction in consumption has not led to a greater availability of domestic saving, which would have prevented the decline in external financing from being adjusted, as it was, through an equivalent deterioration in the investment rate. On the contrary, consumption and the per capita product declined in parallel fashion, the rate of domestic saving remained unchanged and investment dropped by the same amount as net external financing or the financial transfer of resources. This is what we have called useless austerity.

The basic assumption on which we have based this article is that the reduction of external financing has given rise to severe constraints in the foreign currency budget (external gap) and public-sector budget (fiscal gap), besides undermining the capacity for saving. This seems to have produced a change in the nature of macroeconomic functioning. We have particularly highlighted the way in which such gaps contract investment and thereby frustrate efforts to increase private saving. The reasoning adopts a clearly Keynesian approach: the scarcity of investment produces a recessive adjustment, and the potential excess of saving disappears as income drops.

It is certainly paradoxical that a crisis provoked by a decline in saving (in this case, external saving) should lead to a situation characterized by an excess of saving. This needs to be explained. The reduction or cessation of external financing produces a contraction of public saving, and ultimately, of public investment, an effect that may be likened to a lack of saving. Nevertheless, in the private sector, the decline in public investment and the recession brought on by the adjustment to the external gap discourage investment. Here is where the potential additional saving dries up.

The analysis of macroeconomic functioning under the different systems of gaps —external, fiscal, both or none— helps in identifying the policies capable of increasing investment and domestic saving. The analysis also studies the impact of changes in variables beyond the control of economic policy on saving and investment.

An increase in government consumption and/or tax relief tend to be expansionary in an economy without serious budgetary constraints, be they fiscal or from the balance of payments. Both policies favour investment, although tax relief discourages domestic saving somewhat (see the elasticities in table 2). However, with fiscal and/or external constraints, government consumption crowds out investment and discourages the formation of saving, while taxation encourages saving and investment.[30] If there are external constraints, and the level of the product therefore remains subordinate to the equilibrium of the balance of payments, fiscal austerity makes it possible to recover investment; if fiscal constraints exist, the substitution is indirect. This is the case of useful austerity.

The effect of a rise in the interest rate tends to be negative for the formation of saving and the level of investment, even in the case of an *ex ante* reduction in consumption. The adverse impact of the real interest rate is much stronger where there are fiscal constraints.

The effect of the exchange policy also depends on the kinds of gaps present. Without fiscal and external constraints, the impact of a devaluation will depend on the price elasticities of exports and imports and on the level of private external debt, as well as on the effect of that devaluation on real wages, and of this latter on

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[30] Taxation is generic in this model. Obviously, a breakdown of taxes would make it possible to draw more precise conclusions; it cannot be supposed, for example, that taxes on profits have the same effect as indirect taxes.

private consumption. However, with fiscal constraints, the devaluation will also have repercussions on public investment, in the sense that it will depend on the foreign currency flow position of the public sector. This last effect will tend to be positive the higher the direct income of the State in foreign currency (when export activities are in the hands of the State) and the lower the effective servicing (r* x BGX − F) of the public debt. External constraints slightly change the conditions for an expansionary devaluation of the model without constraints; what is important in this last-mentioned case is the effect on the trade balance, in national currency, while in the case of fiscal constraints, what is key is the impact on the trade balance in foreign currency, which is more restrictive.

A positive shock in external demand is in all cases favourable to saving and investment, but its impact is much greater when there are constraints on the economy. Such a shock improves the balance of payments and the fiscal budget, the impact on the latter being greater if the shock takes place in exports controlled by the State.

Finally, external financing appears clearly complementary to domestic saving and investment when the economy suffers constraints. Consequently, the present emphasis on improving the net transfer of resources points in the right direction. We should emphasize that the effect of external financing on saving and investment is not clear —it can even be negative— if the economy is free of constraints.

In short, since the external debt crisis has resulted in external and fiscal problems in most of the countries of the region, we can draw some relatively general policy conclusions. First, limiting the negative transfer abroad of resources clearly favours the recovery of domestic saving and investment. Second, moderating government consumption and raising taxes —by increasing tax rates or improving collection methods in order to minimize evasion— are unavoidable policies for recovering growth in the future. Otherwise, fiscal investment will make the adjustment, while discouraging private investment in the process. Finally, exchange policy must be handled with enormous caution, attending to the specificities of each case. If the State carries out significant share of export activities and its effective payments for external indebtedness do not produce a deficit in the public budget in foreign currency, a real devaluation —on the assumption that exports and imports fulfill the appropriate elasticities— will point in the right direction. Otherwise, a devaluation by itself could be counterproductive.

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