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Capital Mobility and Policy Effectiveness
in a Solvency Crisis.
The Mexican Economy in the 1980s

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Introduction

The debt crisis affecting a number of developing countries since 1982 has been extensively analysed in terms of the negative transfer of resources which it involves, the reinforced conditionality on domestic policy by international financial institutions, and its internal consequences on social and economic performance. In contrast, other important aspects of the current situation have remained relatively unexplored. First, the fact that, in some of the highly indebted countries at least, the debt crisis is perceived by lenders as a solvency crisis which affects the government in its relations not only with international banks but also with the domestic private sector. The counterpart of this solvency crisis in terms of capital inflows and outflows has been a sharp reduction in the ability of governments to both attract foreign capital and retain domestic savings. This feature has in turn led to a worsening of trade-offs between the different macroeconomic objectives with a corresponding loss of effectiveness in government's macroeconomic policies.

This paper attempts to partially fill these gaps. Section 1 discusses briefly the international and national conditions which determined the large expansion of foreign public debt in many developing countries during the 1970's, as well as the role of foreign debt in the operation and effectiveness of macroeconomic policies over that period. The remaining sections concentrate then on the conditions prevailing after the debt crisis. Section 2 introduces the assumption of a solvency crisis into a standard macroeconomic model, through the notion of a kinked demand curve in the market for government debt, and section 3 discusses the resulting loss of effectiveness of macroeconomic policies as expressed in a worsening of trade-offs between internal and external balance under a fixed exchange rate regime as well as between external and 'distributive balance' in a regime of flexible exchange rates. An appendix provides a formal analysis of the main conclusions. Throughout the paper the

mexican experience is examined and used to exemplify the main points. This experience, which is in fact the major motivation of the paper, illustrates in a particularly radical way the abrupt changes brought about by the debt crisis as well as the interactions between the foreign debt crisis, the government's solvency problems and the private capital flight (1).

1. Asset markets and capital mobility before and after the debt crisis

The large expansion of international bank loans to Latin american and other developing countries is a well documented feature of the evolution of the world economy during the 1970's. In the mexican experience, its dimensions took a rather extreme form. Foreign debt, of the order of 8 billion dollars (or about 20% of GDP) in the early 1970's, had increased already to over 20 billion by the mid seventies (see table 1). Following a short-lived financial crisis and economic recession in 1976-77, the oil bonanza from 1978 to 1981 turned Mexico into a preferred customer of international banks, and foreign loans were conceded in amounts and conditions which were notably more favourable than for the rest of developing countries. Thus, while international bank loans to developing countries as a whole increased by 76% from 1978 to 1981, in the case of Mexico - already a very large debtor by 1978- they rose by 146% (cf. Frieden, 1984). These loans were channelled mainly to the public sector, which absorbed around 80% of total foreign indebtedness, but the availability of credit extended also to the domestic private sector (2). By the end of 1981, public foreign debt had risen to 61.9 and private debt to 22 billion dollars.

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(1) For a broader analysis and background on the mexican economy in the 1970's and 1980's see Lustig and Ros (1987) and Ros (1987).

(2) The boom in domestic demand and private investment triggered a rapid growth of overall private indebtedness. In large private firms, the debt-capital ratio rose from 90% in 1978 to 120% in 1981, while the share of dollar denominated liabilities in total debt increased from 30% to 63% over the same period (cf. Lopez, 1985).

Table 1. The mexican economy. Basic indicators 1970-1987

	1970-75	1976-77	1978-81	1982-87
Annual growth rates (%)				
G.D.P.	6.5	3.8	8.4	-0.2
Average real wages	4.6	3.1	3.5	-7.8
Inflation (consumer prices)	12.2	23.3	21.1	80.8
Foreign debt (end of period, billion dollars)				
Public	14.6	22.9	61.9	71.5
Private	5.5	6.1	22.0	14.5
Total	20.1	29.0	83.9	86.0

Sources: Banco de Mexico, Informe Annual. 1987.; SPP, Sistema de Cuentas Nacionales (1970-78, 1979-81, 1981-3, 1984); Economia Aplicada SC, Cuentas de los sectores institucionales (1985).

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The surge in foreign borrowing resulted from a combination of international and national circumstances. Externally, the recycling of OPEC funds into the international banking system, together with economic recession in industrial countries, created conditions of excess liquidity which awakened the interest of international banks for lending to fast growing developing economies. Internally, many of these countries faced, to varying degrees and for widely different reasons, structural trade imbalances and weak public finances (3). Its correction through domestic reforms involved no easy options, while its importance could be minimised given the large room for

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(3) In oil exporting Mexico, for example, a declining agricultural trade surplus and a persistent trade deficit were the main sources of external imbalance. In contrast, the oil import bill was a major factor in the expansion of foreign debt in Brazil.

manoeuvre enjoyed by macroeconomic policies under the virtually
unconstrained availability of credit prevailing in external financial
markets.

Thus, in the international conditions of the 1970's, foreign debt
played a critical role in making possible an international and
domestic macroeconomic framework within which the major objectives of
macroeconomic policy could be broadly and simultaneously achieved.
Just as under the standard assumptions of perfect capital mobility,
the absence of foreign credit constraints implied that there was
always a mix of monetary and fiscal policies which was able to
reconcile a high level of domestic economic activity with equilibrium
in the overall balance of payments. Moreover, the broad access to
foreign borrowing gave fiscal and exchange rate policies the
necessary room for manoeuvre to simultaneously maintain domestic
social conflicts and the price level within manageable limits. The
results were a prolonged period of fast economic growth, rising real
wages and incomes, overall external balance and a rate of inflation
which, by present standards, remained at relatively low and stable
levels (see table 1).

The operation of macroeconomic policies over this period can be
illustrated by an analysis of the flow of funds between the public,
private and external sectors. These are shown in table 2, which
corrects the public and private financial surpluses (or deficits) for
the effects of inflation on nominal flows (4). Before 1981, flow of
funds showed typically the following pattern: the public sector
deficit (of the order of 4-6 % of GDP) had as its counterpart a
current account deficit in the balance of payments, equal to about
two thirds of the public sector deficit, and a private sector

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(4) Thus, in principle, each sector real financial surplus
(deficit) refers to the change in the sector's real financial assets
(liabilities). In this definition, the inflation adjustment involves
correcting for the inflationary component of nominal interest flows
as well as any real capital losses (gains) on monetary assets
(liabilities). The data in table 2 is not, however, adjusted for the
effects of external inflation on the real value of assets denominated
in foreign currency.

Table 2. <u>The flow of funds identity, 1978-1987</u>

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
1.Public sector financial deficit	4.3	5.2	6.1	9.8	6.0	1.8	0.1	1.2	3.5	-1.9
2.Current account deficit	2.9	3.6	3.9	6.4	2.1	-3.6	-2.2	-0.9	0.8	-2.7
3.Private sector financial surplus	1.9	1.9	-0.2	3.6	4.4	4.8	1.2	0.0	0.3	-3.9
3.1.Net acquisition of public debt (1)	2.5	3.3	2.1	2.2	0.6	-0.9	-0.9	-3.0	0.2	-6.3
3.2.Net acquisition of foreign assets	-0.6	-1.4	-2.3	1.4	3.8	5.7	2.1	3.0	0.1	2.4
4.Public sector borrowing abroad (2)	2.3	2.2	1.6	7.8	5.9	2.1	-0.2	2.1	0.9	-0.3
5.Statistical discrepancy (1-2-3)	-0.5	-0.3	2.4	-0.2	-0.5	0.6	1.1	2.1	2.4	4.7

Notes:

    (1) residual obtained as (3) - (3.2)

    (2) net of change in international reserves

Source: Banco de México, Informe Annual, 1987

financial surplus, corresponding to the remainder of the public
sector deficit. The private sector surplus comprised in turn a
financial deficit with the external sector (due mainly to borrowing
by private firms from foreign banks) and a financial surplus with the
public sector which more than compensated for the former, and which
financed between half and two thirds of the public sector financial
deficit. The remaining part was then obtained through the
government's borrowing abroad in amounts which were sufficient to
simultaneously finance the current account deficit in the balance of
payments as well as the desired increase in international reserves

   Through monetary management in order to alter the composition of
the private sector financial surplus (in terms of domestic and
foreign assets) or by directly changing the amount of public debt
sold to the foreign sector, fiscal policy enjoyed from a sufficiently
large degree of freedom in order to simultaneously achieve internal
and external balance without putting in danger the stability of the
exchange rate. In sum, the policy making process operated effectively
with three objectives - internal, external and distributive balance -
and three main policy instruments, fiscal policy, monetary/ exchange
rate policy, and foreign debt management.

   The process led however to a growing financial fragility and
became unsustainable when favourable external conditions began to
change in 1981-82. Foreign real interest rates which had been rising
since 1980 reached a peak of around 9% in 1981-82, while oil prices
started falling at a time when oil export revenues represented around
70% of total merchandise exports. In 1981, the expansion of the
public sector financial deficit was accompanied by a larger current
account deficit and a significant increase in the private sector
financial surplus. But now, rapidly deteriorating exchange rate
expectations stimulated a massive capital flight, of the order of 20
billion dollars from the beginning of 1981 to mid 1982, and the net
acquisition of foreign assets by the private sector turned from
negative to a large positive figure (see table 2). Temporarily, the
government compensated the effects of capital flight on the balance
of payments through a massive increase in external borrowing, but

very rapidly foreign loans became increasingly rationed. After two exchange rate crisis and dramatic devaluations of the mexican peso in february and august 1982, the mexican government suspended payments on its foreign debt signalling the beginning of the international debt crisis (5).

After the 1982 debt crisis foreign lending to the mexican public sector shrank to negligible proportions (mainly explained by involuntary bank lending under IMF adjustment programmes). At the same time, the proportion of the private sector financial surplus invested abroad, in contrast to the period previous to 1981, has remained high and has actually increased over the recession from 1983 onwards, even if the large adjustments in the real exchange rate have substantially reduced the dollar value of the financial savings that are flowing out of the country. In fact, from 1983 onwards, the change in the real value of the private sector holding of mexican public debt has actually been negative, and thus the whole of the private sector net real savings has been invested abroad. This flight away from government debt by both the domestic and foreign private sector has annihilated the previous room for manoeuvre of fiscal policy and has led to a drastic change in the government's fiscal stance. The present surplus in the public sector financial accounts is to a large extent the counterpart of the fiscal and external constraints imposed by the debt crisis as well as by a major alteration in the asset composition of the private sector net financial savings.

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(5) The debt crisis was made worse and more abrupt by the initial beliefs, on the part of both international lenders and the mexican government, that the increase in foreign interest rates was a temporary phenomenon while a high oil price in real terms would remain a lasting feature of the world economy. This initial stage, which explains the massive and continued expansion of debt over 1981 and part of 1982, was followed by a less optimistic outlook and the full realization of its implications.

2. Capital mobility under a solvency crisis

The changes after the 1982 debt crisis can be interpreted and analysed in terms of a sharp modification in the nature and extent of international capital mobility. In order to proceed along these lines, let us consider a model with three financial assets – money, government bonds and foreign assets – with only the last two being substitutes in the portfolio of both domestic and foreign private sectors. For a given level of foreign interest rates and private wealth, the relation between the stock of government debt (internal and external) and the interest rate on government bonds will in general have the shape shown in figure 1.

Figure 1
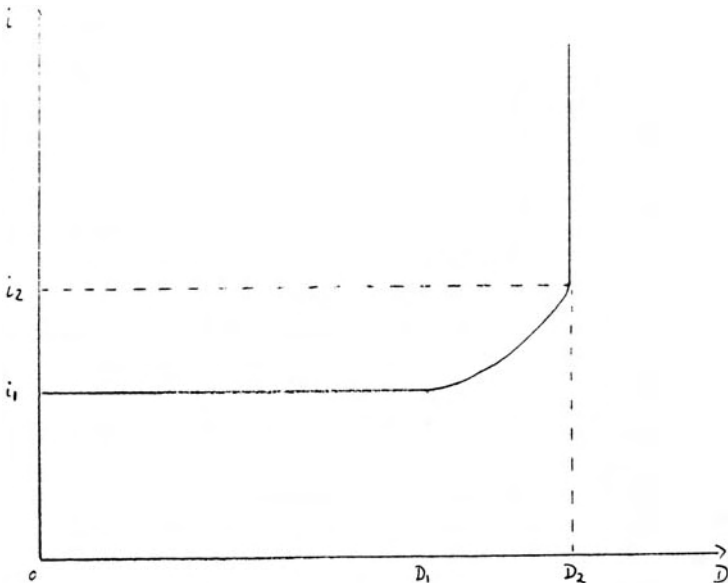
The interest rate i_1 is the minimum interest rate at which
government bonds will be held by the private sector. By analogy with
Keynes' liquidity trap, this is the interest rate on government bonds
at which foreign assets and public debt become perfect substitutes.
Thus, in the absence of capital controls, i_1 must be equal to the
foreign interest rate (corrected for expected exchange rate
devaluation) plus a 'normal' risk premium. D_1 is then the maximum
amount of government debt that can be sold at the minimum interest
rate. Below this level of government debt, the Mundell-Fleming
assumption of perfect, and perfectly symmetrical, capital mobility
holds: foreign and domestic financial assets are perfect substitutes
and the government faces a perfectly elastic demand for its debt.

Above D_1, additional sales of government debt can only be
effected at the cost of an increasing risk premium, and the demand
for government bonds becomes thus increasingly inelastic. There is,
however, a maximum limit to the process of increasing risk premium
and bond sales, for when the stock of government debt has reached a
level which, in the perception of lenders, endangers the government's
solvency itself, higher interest rates would only add to the
deterioration of lenders expectations. This 'fiscal trap' is
represented in figure 1 by the maximum level of government debt D_2
and the interest rate i_2 at which the demand for government bonds
becomes perfectly inelastic. This is the Mundell-Fleming assumption
on its head: there is no interest rate at which the government can
sell additional amounts of its debt, and capital inflows are
perfectly inelastic to increases in domestic interest rates.

The margin between i_2 and the minimum interest rate i_1 is
thus the maximum risk premium (over and above normal) which lenders
are willing to accept for holding public debt instead of foreign
assets, and is in turn determined by the lenders state of confidence
and perceptions of government solvency as well as by the level of
foreign interest rates. If confidence is eroded and/or the foreign
interest rate increases, the maximum risk premium shrinks and in the
limit disappears. The relation between the stock of government debt

and domestic interest rates takes then the form of a kinked curve, as in figure 2, with the kink corresponding to the minimum interest rate and the stock of government bonds demanded at that rate.

Figure 2
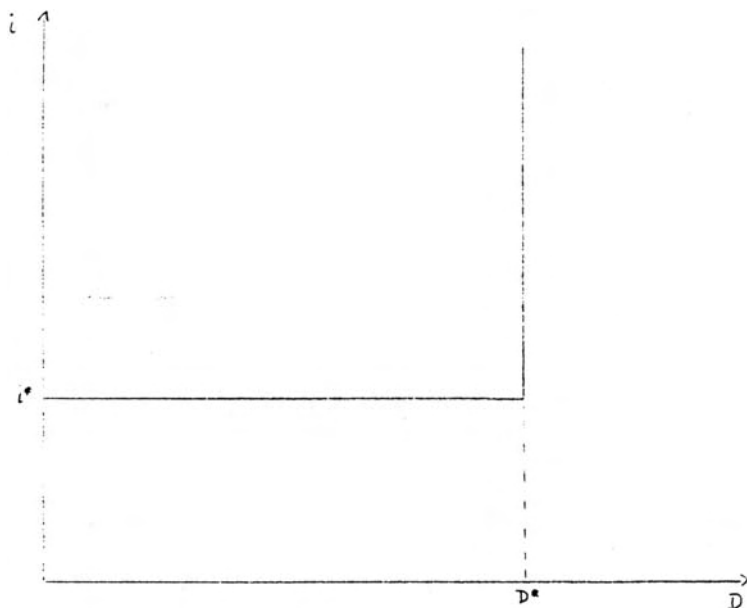
A kinked demand curve for government debt carries with it the implication of asymmetrical capital mobility in the market for foreign financial assets. For domestic interest rates higher than i*, capital inflows are fully inelastic since the stock of debt D* is the maximum amount of public debt that the foreign and domestic private sectors are willing to hold at any rate of interest. However, D* is not a minimum: at interest rates equal or lower than i*, the 'liquidity trap' phenomenon still holds and capital outflows become fully elastic since the perceived return on foreign assets is greater than the return on holding public debt.

The analysis of the mexican experience in the first section of the paper can now be rephrased within the present framework. In the early 1970's, starting from relatively low levels of external debt, the mexican economy operated well below its 'indebtedness potential' (D_2 in figure 1, and even below D_1). In the mid 1970's, the discovery of abundant oil reserves and the subsequent massive inflow of oil export revenues enlarged still more the access of the mexican public sector to international credit. The financial markets for public debt and foreign assets operated over this period in conditions which approached the assumption of perfect international mobility. The accumulation of foreign debt became eventually unsustainable as a result of two abrupt changes. First, the increase in foreign interest rates imposed an additional burden on debt service, the balance of payments and already weak public finances, and reduced the 'maximum risk premium' that lenders were willing to accept for holding government debt. Second, the 'state of confidence' was rudely shaken by the sharp reversal in the expected long term trend of real oil prices from 1981 onwards. The result of these two changes was the 1982 debt crisis and the complete reversal of the conditions that had prevailed in international capital markets. Over this period, depending on the state of public sector accounts and devaluation expectations, the narrow limits between the two 'traps' have even been reversed at times giving rise to an exchange rate crisis followed by a period of normalization of exchange rate expectations. An episode featuring this phenomenon took place in mid 1985, when the domestic private sector increased its stock of foreign assets by depleting its holdings of government debt (see table 2).

3. Capital mobility and policy effectiveness

In a world of perfect capital mobility and fixed exchange rates the policy conclusions of the Mundell-Fleming model apply. Fiscal policy is fully effective in the achievement of internal balance while monetary policy is a powerful instrument for influencing the balance of payments. The relative effectiveness of the two

instruments is reversed in a regime of flexible exchange rates, but in both cases there is always a mix of fiscal and monetary policy which can simultaneously achieve internal and external balance.

Asymmetrical capital mobility has several consequences on the operation of macroeconomic policies. First, it increases the constraints on fiscal policy. Fiscal expansion financed through an increase in government bonds sold either to the domestic or the foreign private sector is not an available policy option, given the presence of credit rationing in the market for government debt. Even if the government relaxes these constraints through the regulation of local banks, the effectiveness of a fiscal expansion financed by increased sales of government bonds to the domestic banking sector stands in sharp contrast with the operation of fiscal policy under conditions of perfect capital mobility. In the latter, under a fixed exchange rate regime, fiscal expansion leaves the domestic interest rate unchanged while, at the same time, improving both the level of economic activity and the overall balance of payments (through increased capital inflows). In the present case, as shown formally in the appendix, the inelasticity of external capital inflows implies that there are no capital movements to keep in check the upward pressure on domestic interest rates exerted by the expanding stock of domestic government bonds. As a consequence, the former positive effects of fiscal expansion on the balance of international reserves are not warranted while, at the same time, its effects on aggregate output are now offset by rising interest rates and its negative consequences on private expenditures. Fiscal policy becomes thus largely ineffective.

Monetary policy under a fixed exchange rate, is also largely ineffective in terms of its effects on economic activity. Just as in the model of perfect capital mobility, the main consequences of a monetary expansion are capital outflows and a deterioration of the balance of international reserves. The high interest elasticity of capital outflows dampens the effects of monetary expansion on domestic interest rates and, thus, on private expenditures and economic activity. The main difference with respect to the standard

model of perfect capital mobility is that the present case introduces
an asymmetry into the operation of monetary policy itself. The
effectiveness of a restrictive monetary policy in improving the
overall balance of payments is largely lost. Indeed, the inelasticity
of capital inflows to increases in domestic interest rates implies
that an improvement in the balance of external reserves can at best
be only achieved at the cost of increases in domestic interest rates
and reductions in the level of economic activity.

In sum, credit rationing in the market for government debt and
asymmetrical capital mobility exacerbate the role of fiscal and
balance of payments constraints as a result of the increased
inelasticity of capital inflows and the demand for government debt
with respect to increases in domestic interest rates. The resulting
erosion in the effectiveness of monetary policy in the achievement of
external balance and that of fiscal policy with respect to internal
balance, implies that there will hardly be any mix of monetary and
fiscal policy which, under a regime of fixed exchange rates, is able
to achieve both objectives simultaneously. A policy mix which is
effective in rising the level the level of aggregate demand and
output, such as a combined monetary and fiscal expansion, will only
do so at the cost of sacrificing external balance and viceversa.

Flexible exchange rates, external and distributive balance

The loss of policy effectiveness, which in the context of a fixed
exchange rate regime takes the form of a worsening of the trade off
between internal and external balance, takes a different expression
in a regime of flexible exchange rates. Just as in the standard model
of perfect capital mobility, the ability of monetary policy to
reconcile external and internal balance is restored by the mere fact
that exchange rate flexibility affects both of them in the same
direction. However, in affecting domestic output and the trade
balance, exchange rate movements have distributional consequences, in
particular by altering real wages in relation to labor productivity,
which in turn will lead to changes in the domestic inflation rate,

under realistic assumptions on price and wage formation. Thus, while monetary policy operating through a devaluation can affect the internal and external performance of the economy, it will do so at the cost of exacerbating internal 'distributive unbalances' whose most apparent expression is a deteriorating inflation performance.

This trade off is obscured, or more precisely absent, in the Mundell-Fleming analysis of macroeconomic policies simply because this is a model with two rather than three policy objectives, where the absence of distributional constraints implicity assumes that exchange rate movements have no costs. It is nevertheless the case that under perfect capital mobility and flexible exchange rates, there is always a mix of fiscal and monetary policy which is able to achieve internal and external balance at any exchange rate and, thus, to overcome distributional constraints. This degree of freedom no longer exists when capital inflows are inelastic with respect to increases in domestic interest rates since there is no way then to avoid the consequences of an expansion in domestic output over the balance of payments, under fixed exchange rates, or on the exchange rate, under a regime of flexible exchange rates. The counterpart of policy ineffectiveness that was examined in the case of a fixed exchange rate, is thus a worsening of the trade off between internal/external balance and 'distributive balance'.

In the recent experience of the mexican economy, this trade off is expressed in figure 3 as one between the ncn oil trade balance and the rate of inflation and in figure 4 as one between the real exchange rate and real wages. Since 1982, Mexico's balance of payments has been subject to successive shocks, the major ones being the rise in foreign interest rate and the drying up of new international loans in 1981-82, and the oil price collapse of early 1986 when oil prices fell from above US$20 per barrel to around US$11 per barrel, and drastically cut foreign exchange earnings and fiscal revenues obtained from the government's oil corporation. The loss of oil revenues over 1986 was of the order of 7 billion US dollars, or about 6-7% of GDP, at 1986 prices.
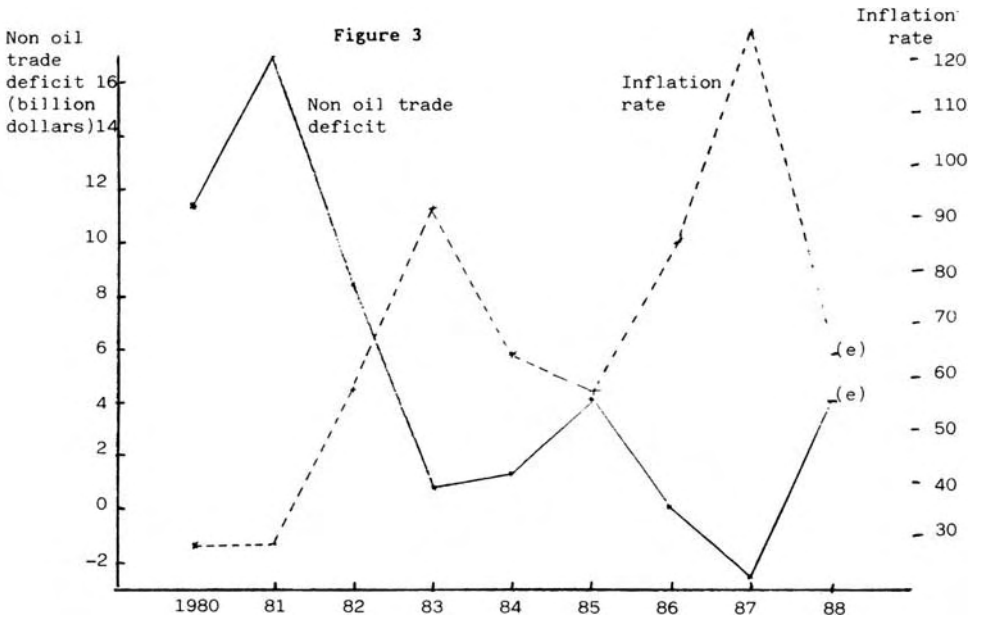
Figure 3
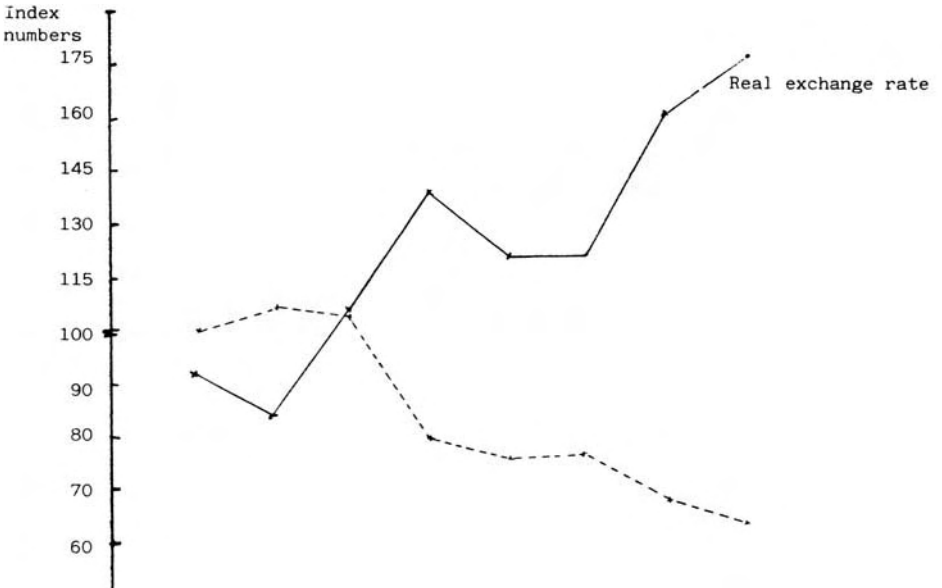
Figure 4

Data for figures 3 and 4

	Non oil trade trade (billion US$)	Inflation rate (annual average) (%)	Real exchange rate (1970=100)	Real average wages (1980=100)
1980	11.5	24.8	93.5	100
1981	17.5	25.9	83.6	106.0
1982	8.3	59.5	105.7	103.1
1983	0.8	93.8	138.2	79.0
1984	1,4	66.3	118.5	75.4
1985	4.1	57.6	118.2	76.2
1986	0.0	86.2	162.5	68.7
1987	-2.5	125.3	177.4	65.3
1988	4.0 (e)	65 (e)	-	-

(e) = estimated

Sources: Banco de Mexico, Informe Anual and Indicadors Económicos, several issues SPP, Sistema de Cuentas Nacionales, several issues.

In the absence of compensatory capital inflows, restoring external balance involved in both cases a major adjustment in the non oil trade balance which was in turn achieved through drastic devaluations and fiscal contraction. More precisely, the short term policy response to the 1982 debt crisis and the 1986 oil price collapse combined three main policy measures: 1) major fiscal adjustments, which came about from sharp reductions in public investment and in the real wages and salaries of public sector employees, as well as from an upward adjustment of public sector relative prices and indirect taxes (net of subsidies); 2) massive devaluations of the peso-dollar exchange rate, of the order in real terms of 70% in 1982-83 and 50% in 1986-87 (with a moderate real appreciation in the interim years); and 3) a very restrictive 'wage policy stance' which, especially over 1983, involved a sharp alteration of wage indexation rules by setting minimum wage adjustments well below the rate of past inflation.

Fiscal contraction and devaluation succeeded in sharply reducing the non oil trade deficit and restoring external balance, but at the cost of severely disruptive effects on the internal distribution of income and inflation. Real average wages fell by almost 30 % over 1982-84 and by an additional 14 % in 1986-87. By 1987 they were almost 40 % below their 1981 level, while inflation had accelerated sharply from a 25 % annual rate in 1980-81 to over 120% in 1987.

The same policy dilemmas have been faced over 1988 when a different approach to counter inflation policy was followed. Since late 1987 an agreement was reached between the government, labor unions and business confederations on a comprehensive attack on inflation involving a deindexation programme, comprising a freeze of the exchange rate, wages and prices as its central element, together with a tight fiscal and monetary policy as well as an accelerated pace of import liberalisation measures. The programme has been successful in bringing inflation down - to a level below 1 % per month in september 1988 - but at the cost of a very rapid deterioration of the trade balance which by the end of 1988 appeared to be unsustainable, with the non oil trade balance in the third

quarter recording a deficit of the order of 5 billion dollars on
annualised figures. The real exchange rate appreciation which
contributed to the reduction of the inflation rate, together with the
massive import liberalisation, are at the roots of the import boom
which led to the sharp deterioration of the balance of payments.

4. Conclusions

In this paper, the debt crisis has been seen as a solvency crisis
which affects governments in their relations with foreign as well as
local lenders. From this perspective, present troubles appear to be
determined as much by the abrupt end of voluntary lending from
international banks as by the increased propensity to save abroad on
the part of the domestic private sector; more precisely, by what both
of these phenomena reflect, a flight away from government debt.

Both the origins and consequences of the debt crisis need to be
looked at from this perspective. Our analysis suggested, for example,
that present problems originated not only in the excessive lending
and borrowing up to 1981-82 but also in the impact of rising
international interest rates on the state of confidence (or the
maximum risk premium which lenders were willing to accept for holding
government debt). This influence is additional to the consequences of
high interest rates on the debt service burden and on balance of
payments constraints. It suggests that debt relief, through a
reduction in either interest rates or principal, would contribute to
the resolution of the crisis not only by reducing debt service -
which although important would not restore by itself the
effectiveness of macroeconomic policies - but also by relaxing the
credit rationg conditions prevailing at present in the market for
government debt.

A second aspect of the current situation is that as long as
present conditions in financial markets continue to prevail there is
little scope for overcoming the crisis through macroeconomic policies.

The policy problem, as suggested by our analysis, is one of too few
policy instruments, and its solution will depend on the effectiveness
of other less conventional economic policies (industrial, trade or
financial). However, policy reforms which can moderate the trade offs
between the different macroeconomic objectives and enlarge the room
for manoeuvre of government policies are not necessarily perceived as
such by international and domestic lenders, in which case they can
lead simultaneously to a further deterioration of the state of
confidence. In fact, we have argued elsewhere (Ros, 1987) that some
aspects of present policy conditionality by international financial
institutions (i.e., the conditions established by creditors on
debtors in exchange for restoring confidence) are an example of how
access to international capital markets can improve temporarily when
policies are adopted which end up worsening the trade offs between
macroeconomic objectives. It is this paradox which makes present
policy dilemmas particularly intractable, and which explains why the
resolution of the debt crisis has become an extremely long and
painful process.

Appendix. The effectiveness of fiscal and monetary policies under
alternative assumptions on capital mobility

In this appendix we introduce the assumption of asymmetrical
capital mobility into a standard macroeconomic model, examine its
implications for the effectiveness of fiscal and monetary policies,
and compare them with the conventional policy conclusions in the case
of perfect capital mobility. We consider a small open economy for
which the foreign levels of income, prices and interest rates may be
taken as exogenously given, and distinguish five institutional
sectors: the private sector, the government, the Central bank,
commercial banks, and the foreign sector. No price changes are
considered and, thus, there is no need to distinguish between nominal
and real magnitudes. For simplicity, we also abstract from interest
payments on all financial liabilities. We shall limit our analysis to
the case of fixed exchange rate regime and thus to the trade offs
between internal and external balance.

In a simple form, the model contains the following structural
equations and budget constraints:

(1) $Y = PE + \bar{G} + NX$
(2) $PE = a_0 + a_1 \cdot (Y-T) - a_2 \cdot i$
(3) $T = t.Y$
(4) $NX = m_0 + m_1 \cdot Y + m_2 \cdot e$
(5) $D = d_0 + d_1 \cdot (Y-T)$
(6) $H = h.D$
(7) $FA = f_0 + f_1 \cdot i_f - f_2 \cdot i$

Budget constraints

(8) Private sector: $Y-T = PE + D + FA - L$
(9) Government: $G-T = \bar{B}_c + B_b + B_f$
(10) Commercial banks: $D = H + B_b + L$
(11) Central Bank: $H = R + \bar{B}_c$
(12) Foreign sector: $R = NX + B_f - FA$

Where:

Y = national income

PE = private expenditures

G = government expenditures (exogenous)

T = tax revenues

NX = trade balance

i = domestic interest rate (on government bonds and bank loans)

i_f = foreign interest rate (exogenous)

e = exchange rate (exogenous)

D = change in bank deposits

FA = change in foreign financial assets

L = change in domestic bank loans

H = change in monetary base (banks cash reserves)

B_c = change in central bank credit to the government (exogenous)

B_b = sales of government bonds to the local commercial banks

B_f = sales of government bonds to the foreign sector

R = change in international reserves

So far, the model comprises 12 unknowns (Y, PE, NX, T, D, FA, L, H, i, B_b, B_f and R) and 11 independent equations since only 4 of the five budget constraints are independent from the national income identity (equation 1). Depending on the assumptions on capital mobility, the model can be closed in two alternative ways. Under perfect capital mobility, the model is completed by:

(13a) $B_f = \hat{B}_f$

and the condition;

(14a) $f_2 \rightarrow \infty$, which implies $i = i_f$

Where $\hat{B}_f$ is the desired amount of government bond sales to the foreign sector decided by domestic macroeconomic management. The perfect elasticity of capital inflows and outflows implies the equality between domestic and foreign interest rates since then domestic and foreign liabilities are regarded as perfect substitutes.

Under asymmetrical capital mobility, the model is completed as follows:

(13b) $B_f = \tilde{B}_f$, where $\bar{B}_f < \hat{B}_f$ and cannot be decided by macroeconomic policy.

and the condition:

(14b) $i > i_f$, with $f_2 \to \infty$ when $i < i^*$
and $f_2 \to 0$ when $i > i^*$.

Condition (14b) expresses asymmetrical capital mobility in an different form than the analysis presented in section 2 of the paper. Here the perfect inelasticity of capital inflows to increases in domestic interest rates does not imply a perfect inelasticity of the demand for government bonds. The present analysis refers rather to the case discussed in section 3 in which the government is able to expand its sales of public debt to the domestic banking sector, although with no consequences on the capital account of the balance of payments.

Fiscal policy

The analysis of fiscal policy under perfect capital mobility replicates the properties of the Mundell-Fleming model. Fiscal policy is fully effective (see table 1). Consider, for example, the effects of an increase in government expenditures at given levels of Central bank credit and government bond sales to the foreign sector. The fiscal expansion has a positive effect on the level of economic activity given by the open economy multiplier. Interest rates, determined by foreign interest rates, remain unchanged and, thus, far from being crowded out by government expenditures, private expenditures are stimulated by the expansion of income. The trade balance deteriorates as a result of overall economic expansion, but the overall balance of payments improves as a consequence of capital inflows which more than compensate for the deterioration of the trade balance.

The full process can be described as follows. The increase in
government expenditures is only partially financed through increased
tax receipts resulting from the higher level of income; given the
assumptions on Central bank credit and government's borrowing abroad,
the rest of the increased government deficit is financed through bond
sales to the domestic banking sector. The supply of bank loans to the
corporate sector is thereby reduced which, together with the
increased investment expenditures, puts an upward pressure on the
loan rate. The latter is arrested, however, by a substitution of
domestic loans by foreign loa_.: (or by a reduction in private
holdings of foreign assets) which, given the assumption of a
perfectly elastic supply of foreign loans, allows to meet the
increased demand for loans at an unchanged interest rate. The process
may also be seen from the perspective of the Central bank balance
sheet: in the new equilibrium, the higher level of income determines
an increased demand for 'high powered' money which, at unchanged
levels of domestic interest rates and Central bank credit, requires
an improved balance of international reserves (6).

Consider now an expansion of government expenditures accompanied
by increased sales of government bonds to the domestic banking sector
in the case of asymmetrical capital mobility (see table 1). Given the
interest inelasticity of capital inflows, there are no capital
movements now to keep in check the upward pressure on domestic
interest rates exerted by the expanding stock of domestic government
bonds. Large increases in domestic interest rates are now unable to
attract capital inflows, implying that the former positive effects of

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(6) The overall effects are similar if the fiscal expansion had
been accompanied by an increase in bond sales abroad with unchanged
levels of Central bank credit and bond sales to the domestic banking
sector. In this case, the balance of international reserves improves
because of foreign lending to the government rather than to the
corporate sector. The main difference with respect to the previous
case is that, depending on the parameters of the model, the process
of economic expansion may be accompanied by private capital inflows
or outflows. For example, if bank deposits expand rapidly relatively
to the demand for bank loans, the expansionary fiscal policy will be
accompanied by a private capital outflow.

fiscal expansion on the balance of international reserves are not warranted. At the same time, the effects on aggregate output are now hindered by the increasing interest rates and its negative consequences on the level of private investments. Fiscal policy becomes thus largely ineffective.

Table 1. Multiplier effects of fiscal expansion (d /dG) under perfect and asymmetrical capital mobility.

	Perfect capital mobility	Asymmetrical capital mobility
Y	$1/A_1$	0
PE	a_1/A_1	-1
i	0	$1/a_2$
NX	m_1/A_1	0
FA	$(m_1-s.h)/A_1$	0
R	$s.h/A_1$	0

$A_1 = 1 - a_1 \cdot (1-t) - m_1$
$s = (1-a_1) \cdot (1-t)$

Monetary policy

Both under perfect and asymmetrical capital mobility, monetary expansion is fully ineffective in its consequences on private expenditures and economic activity (see table 2 where we assume, in the case of asymmetrical capital mobility that the economy is

operating initially at the kink of the demand curve for foreign
assets). Consider an expansion of Central bank credit in the form of
an acquisition of government bonds. The immediate result is an
increase in cash reserves in the commercial banking system which
expands the supply of bank loans and exerts a downward pressure on
the loan rate. The latter is kept in check, however, by an increased
acquisition of foreign assets and an expansion of the demand for
domestic loans. The end result is a deterioration of the capital
account in the balance of payments and of the balance of
international reserves which offsets the original expansion of the
monetary base and compensates for the effects on domestic interest
rates of the original acquisition of government bonds by the Central
bank. Since the latter is unable to affect interest rates (and thus
the level of investment and income), the process continues until the
re-establishment of the stock of high powered money at its original
level, implying that the deterioration in the balance of
international reserves is exactly equal to the original increase in
Central bank credit (see table 2). Thus, monetary expansion has no
effect on the level of output, investment or the trade balance. Its
consequences are limited to a deterioration of the overall balance of
payments through a capital outflow (or a reduction of capital
inflows). In the end, all that happens is a substitution of
government bonds for foreign exchange in the portfolio of the Central
bank.

In the case of perfect capital mobility, the ineffectiveness of
monetary policy is, however, only relative to the level of domestic
economic activity, or to the objective of internal balance. Monetary
policy remains crucial in this model for the achievement of external
balance, or an appropriate level of international reserves. Its
effectiveness in this respect is best seen when we consider a
restrictive monetary policy: then, following a reasoning analogous to
the one presented above, monetary contraction leads to an improvement
of the overall balance of payments without any costs in terms of
investment and domestic output. Given the properties of fiscal
policy, these features imply that in, a regime of fixed exchange
rates and perfect capital mobility, there is always a mix of fiscal

and monetary policy which is able to achieve both internal and external balance. Even if the model is unrealistic in several aspects (for example, in abstracting from inflation and its emphasis on the overall balance of payments rather than its composition), it makes the point that a perfect and perfectly symmetrical capital mobility considerably relaxes the constraints on macroeconomic policies.

Table 2. Multiplier effects of monetary expansion (d /dB$_c$) and contraction (d /d-B$_c$) under perfect and asymmetrical capital mobility.

	Monetary expansion(1)	Monetary contraction	
		Perfect mobility	Asymmetrical mobility
Y	0	0	$-1/(A_1-A_2)$
PE	0	0	$-(A_1+a_1)/(A_1-A_2)$
i	0	0	$A_1/a_2 \cdot (A_1-A_2)$
NX	0	0	$-m_1/(A_1-A_2)$
FA	1	-1	0
R	-1	1	$-m_1/(A_1-A_2)$

(1) perfect and asymmetrical capital mobility

$$A_1 = 1 - a_1 \cdot (1-t) - m_1$$
$$A_2 = (1-h) \cdot s + t - a_1$$

    In contrast, asymmetrical capital mobility introduces an
asymmetry into the operation of monetary policy itself. The
effectiveness of a restrictive monetary policy in improving the
overall balance of payments has now been largely lost given that, as
a result of the inelasticity of capital inflows to increases in
domestic interest rates, monetary contraction has no consequences on
the capital account . Any improvement in the balance of international
reserves can only be achieved through changes in the trade balance
and thus at the cost of reductions in the level of economic activity
determined by the rise in domestic interest rates. In sum, under a
regime of fixed exchange rates, asymmetrical capital mobility erodes
the effectiveness of monetary policy in the achievement of external
balance objectives and that of fiscal policy with respect to internal
balance, implying that there will hardly be any mix of monetary and
fiscal policy which is able to achieve both objectives simultaneously.

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