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A NOTE ON THE BURDEN OF THE MEXICAN FOREIGN DEBT

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A B S T R A C T

This paper examines the macroeconomic repercussions of the future foreign debt restrictions that Mexico will face. Our view is that credit conditions will be fundamentally modified in the years to come, so that the foreign debt will have to grow at a substaintial lower rate than in the recent part. Given the reduced availability of foreign savings, the relevant question is whether the country will be able to generate enough internal savings to compensate for the fall of foreign savings, and thus produce the necessary flow of investment to sustain an "adequate" rate of growth. We also examine the burden of the interest rates that Mexico is paying on its foreign debt, in terms of additional required savings and/or lower economic growth.

RESUMEN

Este trabajo estudia las repercusiones macroeconómicas de las restricciones futuras en la deuda externa mexicana. Se supone que las condiciones de crédito serán modificadas en los próximos años de tal manera, que la deuda externa tendrá que crecer a tasas menores que las de años recientes. Dada la disponibilidad reducida de ahorro externo, la pregunta que procede es ¿si el país será capaz de generar suficiente ahorro interno para compensar la caída de ahorro externo y generar el flujo necesario de inversión para sostener tasas de crecimiento "adecuadas"?. También examinamos la carga de las tasas de interés que México paga en su deuda externa, en términos de los requisitos adicionales de ahorro interno y/o menor crecimiento económico.

A NOTE ON THE BURDEN OF THE MEXICAN
FOREIGN DEBT

by

Guillermo Ortiz and Jaime Serra-Puche*

1. Introduction.

Like most developing countries, Mexico has been traditionally a net capital importer. As measured by the balance of payments accounts, this implies that foreign capital inflows -which include private and public sector debt, foreign investment and other transfers- have usually exceeded capital outflows. However, Mexico became a large net capital exporter in 1982. The public sector borrowed just under 6 billion dollars (bd) (resulting from a net long term inflow of 7.9 bd and short term amortizations of 1.4 bd) and the private sector contracted an estimated 1.3 bd of fresh debt. On the other hand, interest payments for both public and private debt amounted to 10.8 bd; that is 3.4 bd more than the inflow of net debt. If estimated private capital otuflows are taken into account, it turns out that Mexico exported about 11 bd during that year.

The outlook for 1983 is that net public indebtedness will not increase beyond 3 bd, while the private sector will probably repay some credits Considering the interest payments are estimated around 10.5 bd, capital exports will easily exceed 7 bd in 1983. In only two years Mexico will have

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exported the equivalent of about one quarter of the total outstanding public sector debt. Given the size of the private financial outflows, most of the capital exports occurred in 1982 could be attributed to the financial crisis and the loss of confidence in the government's ability (and/or) willingness to stabilize the economy. Also, the expected results for 1983 could be interpreted as a natural part of the adjustment process to this crisis. In other words, it may be argued that Mexico's current position as a net capital exporter is likely to be a temporary situation, lasting only the required time for the stabilization program to yield the expected results, however, the prospects for the next few years indicate that Mexico will probably continue to be a net capital exporter.

Under the current (IMF-approved) adjustment program for the period 1983-1985, the ceilings contemplated for public sector indebtedness are: 5 bd in 1983 and 3.5 bd in each of the years 1984 and 1985. Interest payments on the public debt alone will reach almost 8 bd in 1983, and under any reasonable assumptions about the behavior of interest rates, these payments are unlikely to decrease in the following years. On the other hand, interest payments of the private sector debt are not easy to estimate, since part of the debt is being repaid at the present time, and accurate estimates of the outstanding amounts are not available. It is difficult to imagine, however, that enough fresh debt will come forward from the private sector to compensate for its debt service payments.

Whether of not, will Mexico's position as a net capital exporter be modified again once the current adjustment program concludes is the main

question. To say the least, the medium term prospects for obtaining enough
fresh credit to compensate for interest payments is very uncertain. Given
the size of Mexico's and other Latin American countries' debt, it is doubt-
ful whether enough funds will be available under current institutional arrange-
ments so as to provide the region with a positive inflow of credit net of
interest payments. It is widely known that many international lending insti-
tutions are eager to reduce their exposure to the region. The recent finan-
cial packages obtained by Mexico, Brazil, and other Latin American countries
were structured only after considerable arm-twisting on the part of IMF and
US financial authorities [1]. This is an entirely new situation for many Latin
American countries who have enjoyed easy access to international capital mar
kets. For Mexico, debt service payments here exceeded the inflow of new cred
its in only 5 out of the past 30 years.

The purpose of this paper is to examine some of the possible macro
economic repercussions of the future debt restrictions that Mexico will face. The
view taken here is that credit conditions will be fundamentally modified in
the years to come, so that the foreign debt will have to grow at a substant-
tially lower rate than in the recent past. Within this scenario, one must
question as to whether the country will be able to regain an adequate level
of economic growth in the medium term. An "adequate" growth rate being that
which would permit the creation of sufficient employment opportunities for
Mexico's growing labor force. Given the reduced availability of foreign sav
ings, the above question is tantamount to asking whether the country will be
able to generate enough internal savings to compensate for the fall of foreign
savings, and thus produce the necessary flow of investment to sustain the re-

[1] See, for example, Kuczynski, Pedro Pablo (1983).

quired growth rates. A related issue is to examine what is the burden of the interest rates that Mexico is paying on its foreign debt, in terms of additional required savings and/or lower economic growth.

An alternative approach is to ask what are the necessary changes in "structural parameters" or key relative prices -such as the capital/output ratio, the real wage or the real exchange rate- needed to promote the resource reallocation and greater efficiency consistent with a certain growth target. All this, for a given level of available external credit.

This paper is organized as follows. Section 2 presents a brief overview of the Mexican foreign debt, emphasizing its behavior during the last few years. Section 3 introduces the concepts of "basic balance" and the "natural" rate of growth of the foreing debt. Then we attempt to explore the above questions utilizing simulations on a simple growth model with savings constraints. Finally, the last section summarizes our main results.

2. The Mexican Public Foreign Debt.

The size of the Mexican public debt -approximately 60 billion dollars at the end of 1982- is rather large as measured by most of the usual standards[1]. In Latin America, the Mexican public sector has consistently been the second largest borrower, after Brazil, since at least 1960. Over time, Mexico's public sector has also increased its participation of total credits granted to the region. In 1960, Mexican public foreign debt represented 16 per cent of the total outstanding Latin American debt, whereas in 1970 the

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[1] The basic reference on the history and analysis of the Mexican debt is Zedillo (1981).

proportion had increased to 18.2 per cent, reaching 26.2 per cent in 1981.

Like in most other Latin American countries, private commercial banks have been an increasing source of foreign debt for Mexico. While in 1973 54.8 per cent of the outstanding debt was owed to private financial institutions, in 1979 this proportion was 77.6 per cent. Also, the origin of the Mexican public foreign debt shows a clear deconcentration away from U.S. banks' credit. In 1977, 46.6 per cent of foreign credit flows came from U.S. banks, while in 1983 only about 35 per cent will be obtained from these banks. Banks from Japan, Canada and France will grant almost 30 per cent of new credit in 1983, up from less than 12 per cent in 1977.

Between 1950 and 1982, public foreign debt grew at consistently larger rates than international nominal interest rates. Table 2.1 shows how in most years the nominal rate of growth of the public sector debt exceeded the nominal rate of interest by several points. This has led the country to very high debt service ratios and to increasing ratios of debt relative to GDP. The public foreign debt service ratio, measured as interest plus capital payments as a proportion of total exports, has shown a consistent upward trend during the period 1954-1979. From 6.4 per cent in 1954, this ratio rose to 77.2 in 1979 (Table 2.2). This relation declined in 1980 to 37.4 per cent, due to a substantial increase in the volume and price of oil exports and to a large decrease of capital payments in that year. On the other hand, the debt/GDP ratio has fluctuated drastically since 1950. The peaks correspond to 1954, 1977, 1982 and 1983 due to the effects of the devaluations of the peso, and to the enormous rise in the stock of debt since 1980. We now comment briefly on this point.

Table 2.1

Nominal Rate of Growth of Public Foreign
Debt and Nominal Interest Rates
(1950-1983)

Year	$\hat{D}^P$ [1]	r	Year	$\hat{D}^P$	r
1950	12.5		1967	12.2	2.8
1951	12.5		1968	7.5	3.4
1952	31.3		1969	9.0	3.5
1953	18.9		1970	7.6	4.3
1954	21.3		1971	6.6	4.2
1955	1.5		1972	2.3	4.4
1956	1.4		1973	23.9	9.2
1957	2.9		1974	34.6	9.7
1958	11.2		1975	38.1	8.9
1959	1.8		1976	32.7	8.0
1960	6.4	1.0	1977	14.3	8.2
1961	6.1	1.1	1978	10.9	10.1
1962	3.1	1.5	1979	12.6	11.7
1963	5.4	1.5	1980	13.6	14.2
1964	10.4	1.4	1981	56.6	16.8
1965	1.3	1.6	1982	11.2	13.2
1966	5.6	2.3	1983 [2]	7.6	12.5

[1] $\hat{D}^P$ refers to the growth rate of public debt and r to Libor from 1972 onwards.

[2] Estimated figures.

Sources: E. Zedillo (1981) and Banco de México, Indicadores
Económicos.

Government expenditure in Mexico has traditionally complemented and stimulated private expenditure. Although, at times, public investment crowded out private investment through the use of available financial resources, there is a positive correlation between government expenditure as a whole and private expenditure.

In recent years, and especially during the oil boom (1978-1981), public expenditures grew at a much faster pace than revenues, resulting in very large fiscal deficits that reached up to 18 per cent of GDP in 1982. These deficits were a result of the ambitious government investment program (especially in the oil industry) and the granting of very large subsidies, coupled with lower non-oil revenues due to increasing tax evasion and -mostly- to lags (behind costs) in the prices of goods and services produced by public sector enterprises. To finance this deficit, and the associated current account imbalances, the government resorted to foreign credit in large amounts. With the prospects of Mexico's increasing oil revenues -especially after the oil shock of 1979-1980- and given the large pool of available financial resources in the international capital markets at the time, international bankers were more than eager to lend to Mexico.

This form of financing the public sector deficit minimized the crowding out of private investment, which grew much faster than gross domestic product during the period. The average real growth rates for public invest-ment, private investment and GDP were 13.9 , 20.4 and 8.4 per cent during the years 1978-1981.

Table 2.2

Public Foreign Debt in Mexico
1954-1982

Year	$\dfrac{\text{Debt Stock}}{\text{GDP}}$	$\dfrac{\text{Debt Service}}{\text{Exports}}$	$\hat{D}_{LR}$ (Long-run)	$\hat{D}_{SR}$ (Short-run)	$\dfrac{D_{SR}}{D\ \text{Total}}$
1954	45.6	6.4			
1955	38.0	7.0	1.5		
1956	33.7	7.7	1.4		
1957	30.2	8.5	2.9		
1958	30.2	12.9	4.1		6.3
1959	28.7	14.9	2.3	- 4.9	5.9
1960	26.9	17.5	5.7	18.3	6.6
1961	26.4	16.3	5.7	11.6	6.9
1962	25.2	21.8	4.1	-10.4	6.0
1963	23.9	18.2	5.7	0.5	5.7
1964	22.3	25.6	10.6	7.6	5.6
1965	20.7	23.4	0.02	22.5	6.7
1966	19.7	28.4	3.2	38.3	8.8
1967	20.2	30.9	7.3	62.1	12.8
1968	19.6	34.8	5.7	19.7	14.2
1969	19.4	30.1	11.3	- 4.7	12.5
1970	18.7	31.1	5.2	25.0	14.5
1971	18.4	27.2	5.3	14.2	15.5
1972	16.6	26.0	7.4	-25.3	11.3
1973	17.0	31.0	20.1	53.6	14.0
1974	17.5	26.1	28.6	71.4	17.9
1975	19.9	32.6	38.2	37.6	17.8
1976	26.2	36.6	33.0	31.4	18.9
1977	32.1	48.2	22.9	-25.8	11.8
1978	28.5	65.8	19.3	-54.6	4.5
1979	23.9	77.2	12.4	16.6	4.7
1980	18.1	37.4	14.1	7.1	4.4
1981	22.1	39.6	30.6	620.0	20.4
1982	35.9	43.5	17.3	-13.9	15.8

Sources: Banco de México, Indicadores Económicos.

Foreign debt was utilized not only to finance public and private
investment projects, but a large amount of foreign credit was also used to
support obviously overvalued exchange rate in 1981 and 1982. This resulted
in a drastic change in the profile of the foreign public debts (see Table 2.2).
After a succesful effort to restructure the debt profile, which reduced the
proportion of short term debt (less than one-year maturity) to total debt from
18.0 per cent in 1976 to 4.4 per cent in 1980, in 1981 the growth of short
term foreign public sector debt was a fantastic 620 per cent. Given the
reluctance of the international banking system to roll over this debt, the
foreign exchange requirements for 1982 were too great to handle. This, of
course, precipitated the "August crisis". We now turn to the analysis of the
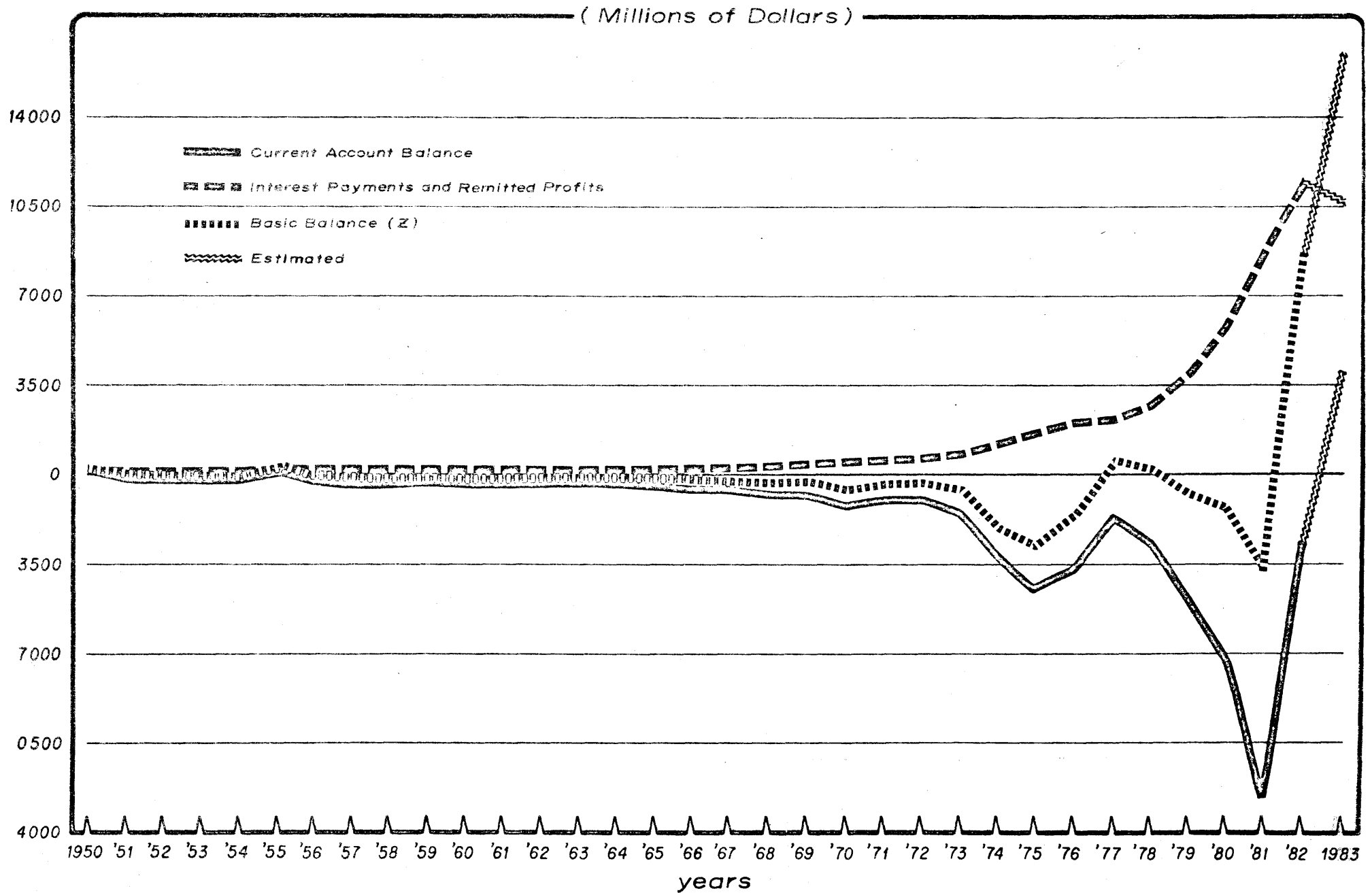economic consequences of servicing this debt.

3. The Basic Balance and the "Natural" Rate of Growth of the External Debt.

Let us define the "basic" balance of payments of an economy as the
current account deficit minus all interest payments, payments for other finan-
cial services, and remitted profits from foreign companies operating in the
country. The evolution of Mexico's basic balance since 1950 is depicted in
Figure 1. As shown in this figure, only in five years during the period
considered (1950, 1955, 1977, and 1982), did the basic balance show a surplus.

In 1950, a surplus was obtained both in the basic balance and in
the current account. This is explained by the effects of the 1948 devaluation
of the peso and the surge of Mexican exports during the Korean War; similarly,
the small surplus in current account obtained in 1955 is a result of the 1954

Figure 1

EVOLUTION OF THE BASIC BALANCE IN MEXICO
(1950 – 1983)
———— (Millions of Dollars) ————

Legend:
- Current Account Balance
- Interest Payments and Remitted Profits
- Basic Balance (Z)
- Estimated

years

devaluation. Mexico has not obtained a current account surplus since then. Only in 1977 and 1978, as a result of the 1976 devaluation of the peso, did the basic balance register a surplus. Again, in 1982, when the peso experienced the largest devaluation in modern history, the basic balance shows a substantial surplus. This resulted from the sharp contraction of economic activity experienced that year and the ensuing reduction in imports.

A surplus in the basic balance of a country has to be generated, so that its foreign debt grows at a lower pace than the interest rate it is paying on this debt. Let us assume, for a moment, an economy which in time t-1 does not have any outstanding debt. By definition, the current account in this period equals the basic balance. The economy's foreign exchange revenues (R_{t-1}) are equal to its expenditures (E_{t-1}): the basic balance is in equilibrium. Let an external shock to the economy create a deficit in the basic balance in period t of the magnitude.

$$E_t - R_t \tag{1}$$

Over the short term, the economy may adjust by incurring additional debt to pay for this deficit:

$$E_t = R_t + D_t \quad , \tag{2}$$

where D_t is the amount of the debt required to cover the deficit. In the next period (t + 1), the economy's balance of payments will be

$$E_{t+1} + (1 + r) D_t = R_{t+1} + D_{t+1} \quad , \tag{3}$$

Thus, the growth of the debt (D) will be given by

$$\hat{D} = \frac{E_{t+1} - R_{t+1}}{D_t} + r \qquad \text{or}$$

$$\hat{D} = \frac{Z}{D_0} + r \quad , \qquad\qquad (4)$$

where Z is the basic balance deficit $(E_{t+1} - R_{t+1})$, D_0 the stock of the debt, and r the nominal interest rate. When the basic balance is in equilibrium (Z = 0), the debt grows at rate r, which we shall call the natural rate of growth of the debt [1]. Clearly, for the rate of growth of the debt to be smaller than the interest rate $(\hat{D} < r)$ a surplus in the basic balance (Z < 0) has to be obtained.

As shown in Figure 1, Mexico has very seldom experienced surpluses in its basic balance. During the last thirty years, foreign debt has grown at a higher rate than the nominal interest rates paid during the period.

Then, the question we ask in the following exercise is whether or not -or under what conditions- will the Mexican economy be able to steadily generate enough basic balance surpluses to ensure that the foreign debt will grow at rates smaller than its natural rate of growth.

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[1] The typical equilibrium solution of growth models in the steady state is that $r = \gamma = \mu$, where γ is the rate of output growth, and μ is the rate of growth of population. This implies that the capital debt ratio and the capital-labor ratio remain constant.

As mentioned earlier, this situation has already been reversed in 1982, and 1983, and it is likely to continue so far the forseable future.

4. Simulations on a Simple Growth Model.

Consider a production function of the following type:

$$Y_t = F(K_t , N_t) , \qquad (5)$$

where Y_t, K_t and N_t denote, respectively, output, capital and labor. Suppose that this function satisfies the usual neoclassical properties; namely, we assume $F(\cdot)$ to be differentiable, concave and homogeneous of first degree in K and N. Output is expressed _net_ of depreciation of the capital stock.

If this economy has surplus labor, firms will face an elastic supply of labor at an institutionally determined real wage. If firms maximize profits, labor will be utilized up to the point where its marginal productivity equals the real wage:

$$W/Q = \omega = \partial F/\partial N_t , \qquad (6)$$

where W is the nominal wage, Q the price level, and ω the real wage.

Capital will also be utilized up to the point where

$$\rho = \partial F/\partial K_t \qquad (7)$$

where ρ is the real return on capital. Note that by assuming an exogenously determined wage, (5) can be expressed as

$$Y_t = \sigma(\omega) K_t \quad , \tag{8}$$

where σ is a parameter that depends on the real wage. Since by definition $F_1, F_2 > 0$, a lower real wage will always increase output and employment for a given stock of capital. Substracting Y_{t-1} from (8) we obtain:

$$Y_t = Y_{t-1} + \sigma(\omega) I_t \quad , \tag{8'}$$

where I_t represents current investment. Ex-post, total investment equals total savings, which can be decomposed:

$$S_t = SI_t \text{ (internal savings)} + SX_t \text{ (external savings)}$$

$$SI_t = SPR_t \text{ (private savings)} + SPU_t \text{ (public sector savings)}.$$

Private savings are treated here as a fixed proportion of current disposable income

$$SPR_t = s(1 - \tau) Y_t \quad , \tag{9}$$

where $0 < \tau, \ s < 1$. Public sector savings are the difference between current income and expenditures. We also included the real growth rate of currency

in the definition of public sector income, since this variable approximates
the seniorage obtained from money issue:

$$SPU_t = \tau Y_t + \hat{H} - G , \qquad (10)$$

where Y is current income, $\hat{H}$ is the real growth of currency and G represents
current expenditures. We define external savings (SX) as the "basic balance"
of the previous section (Z), which is equal to M - X (M = imports of goods and
services and X = exports of goods and services):

$$SX_t = M_t - X_t . \qquad (11)$$

Assuming that foreign debt will grow at a rate less or equal than
its "natural" rate, we obtain the following condition

$$(M_t - X_t) + (1 - \alpha) r D_{t-1} = 0 \qquad (12)$$

or

$$SX_t = -(1 - \alpha) r D_{t-1} , \qquad (11')$$

where $0 \leq \alpha \leq 1$ represents the proportion of interest payments that will be
compensated with fresh debt. That is, when $\alpha = 1$ we assume that new credits
will be sufficient to cover interest payments during that period and when
$\alpha = 0$, no new credit is available. In this last scenario, the economy needs
to generate a surplus on the basic balance to cover interest payments.

Substituting (9), (10), and (11') in (8') we obtain:

$$Y_t \left[1 - \sigma(s(1-\tau)+\tau) \right] = Y_{t-1} - \sigma\left[(1-\alpha)rD_{t-1} + G - \hat{H} \right] \; . \tag{13}$$

Equation (13) was first simulated in the sample period 1970-1981[1].
The parameters s, τ, and σ were computed from historical data. Data on Y, X,
M and G were obtained from the National Accounts. All series (reported in the
appendix to this paper) are in constant 1970 pesos. Data on foreign debt and
interest payments does not directly appear on the National Accounts. We obtained
them from the Balance of Payments data published by Banco de Mexico, and made
then compatible with the rest of the information.

The results of the simulation performed on the sample period are
reported in Table 4.1. It should be noted that the actual values of Y_t are
closely replicated by the model. The largest errors are under 2 per cent,
and the MSE statistic is quite low.

Equation (13) was then simulated for the years 1985-1991 under the
following assumptions: a) Since 1984 is the second year of the current
adjustment program, output was assumed to grow 1 per cent in real terms. This
is the official figure contemplated in the 1984 budget. The expected value
of GDP for 1983 was taken as the base year; b) The average interest rate (r)
paid by Mexico on its outstanding loans was assumed to remain constant at its
present level (approx. 13 per cent) in one set of exercises. Another scenario
contemplates a reduction of 2 percentage points throughout the period; c) Real
current expenditures of the public sector are assumed to remain constant at its

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[1] 1982 was not considered, since it was (we hope) a very atypical year.

Table 4.1

GDP Estimates $(\tilde{Y}_t)$

(billions of 1970 pesos)

-sample period-

Year	Y_t (Observed)	$\tilde{Y}_t$ (Estimated)	$(\tilde{Y}_t - Y_t)$
1971	462.8	463.0	0.2
1972	502.0	499.0	- 3.0
1973	544.3	539.0	- 5.3
1974	577.6	570.0	- 7.6
1975	610.0	600.0	-10.0
1976	635.8	626.0	- 9.8
1977	657.7	650.0	- 7.0
1978	712.0	712.0	0.0
1979	777.2	783.0	5.8
1980	841.8	856.0	14.2
1981	908.7	920.0	11.3

$$\text{Mean square error} = \sqrt{\sum_{i=1}^{T}\left(\frac{\tilde{Y}_i - Y_i}{T}\right)} = 5.16$$

1983 level; d) Total outstanding debt at the end of 1983 (D_0) was assumed to be 84 bd. This was converted into pesos using an average exchange rate of 120 pesos/dollar; e) The structural parameters (s, τ, σ) are assumed to remain at their average sample levels; f) Real money growth (currency) was assumed to grow at a rate of 6 per cent per year[1].

The simulation for 1985-1990 are reported in Table 4.2. Under the assumption that no new loans are forthcoming $(\alpha = 0)$ the average growth rate for the period would be 4.4 per cent if interest rates remain at current levels.

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[1] The data is reported on Table A.1 in the appendix.

Table 4.2

Simulation Result 1985-1990

(billions of 1983 pesos)

	$\alpha = 0$				$\alpha = 1$	
	$r = 13\%$		$r = 11\%$			
	Y_t	$\hat{Y}_t(\%)$	Y_t	$\hat{Y}_t(\%)$	Y_t	$\hat{Y}_t(\%)$
1983	18 260		18 260		18 260	
1984	18 443	(1.0)	18 443	(1.0)	18 443	(1.0)
1985	19 144	3.8	19 181	4.0	19 531	5.9
1986	19 910	4.0	20 005	4.3	20 742	6.2
1987	20 766	4.3	20 946	4.7	22 090	6.5
1988	21 721	4.6	21 951	4.8	23 570	6.7
1989	22 763	4.8	23 093	5.2	25 197	6.9
1990	23 924	5.1	24 363	5.5	26 935	6.9

A fall of 2 percentage points in the average interest rate paid on the debt would increase average growth to 4.8 per cent; that is according to our projection, a 1 per cent fall in international interest rates results in a .20 increase in the long-run Mexican GNP. On the other hand, if the debt grows at its "natural" rate ($\alpha = 1$), the average GDP growth for the period would be 6.5 per cent, close to the historical average of the period 1970-1981 (6.9 per cent). The examples clearly illustrate the costs of servicing the debt and the effects of credit constraints in terms of slower economic growth.

What is the required effort in terms of domestic savings necessary to maintain the above mentioned growth rates of output?. First, it should be noted that current expenditures of the public sector are assumed to remain at their 1983 level in real terms. This restriction is quite severe since these

expenditures have fallen 25 per cent in real terms (with respect to their 1982 level). Maintaining real current expenditures unchanged implies, of course, that any improvement in social services such as health, education., etc... would have to be done at the cost of reducing other expenditures. Private savings, on the other hand, are assumed to remain at their historical levels despite the effort to increase public savings.

Now we turn to examine what is the growth of exports consistent with the output projections reported in Table 4.1. Let us rewrite equation (12) as follows:

$$XP_t + XNP_t = M_t(\theta_t(\omega),Y_t) + (1-\alpha) r D_t \qquad (12')$$

$$M_{t_1} > 0 \quad , \quad M_{t_2} > 0 \quad , \quad \theta_2' > 0 \quad ,$$

where XP_t are petroleum exports, XNP_t are non-oil exports, and imports, M_t, are assumed to be positively related to movements in the real exchange rate θ and the level of domestic output. In turn, the real exchange rate (defined as $\theta = P/P^*E$, where P is the price of the domestic good, P^* the external price level and E the nominal exchange rate) is positively related to the real wage. Differentiating (12') we obtain:

$$dXP_t + dXNP_t = (\eta_\theta^M \eta_\omega^\theta \frac{d\omega_t}{\omega_t} + \eta_Y^M \frac{dY_t}{Y_t}) M_t + (1-\alpha)r \, dD_{t-1} \qquad (14)$$

where η_θ^M = real exchange rate elasticity of imports; η_ω^θ = real wage elasticity of the real exchange rate; and η_Y^M = income elasticity of imports. The relation-

ship between movements in the real wage, changes in income and exports, as shown in equation (14), was also simulated for the sample period, and projected for the years 1985-1990. The simulation was performed assuming: a) Oil exports remain constant in real term throughout the period; b) The real exchange rate elasticity of imports (η_θ^M) was taken from Salas (1982); we utilized the weighted average of his elasticity estimates for capital, intermediate and consumer goods, 1.5; c) The long-run real wage elasticity of the real exchange rate (η_ω^θ) was estimated to be .59 [1].

The simulations of equation (14) are reported in Table 4.3. Different scenarios were considered depending on the value of the income elasticity of imports and of the rate of growth of the real wage. Income elasticities vary from 1 to 3 [2]. The rate of growth of the real wage compensates for recent losses, under one set of scenarios and it remains constant under the other. As before, we also considered a case where no new loans are forthcoming $(\alpha = 0)$ and another can where debt grows at its "natural" rate. The rates of interest are, again, 11 and 13 per cent.

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[1] Let the price of non-tradable goods be determined by unitary costs, $P = aW$, and the price of tradable goods in terms of domestic currency by $P_T = P*E$. Define the price level as $Q = (aW) \exp \beta (P*E) \exp (1-\beta)$, $1 > \beta > 0$. From these definitions we obtain $\theta = (a\omega) \exp (1/1-\beta)$. Taking logarithms, and incorporating this expression into a partial adjustment model we estimated the following equation (the Cochrane-Orcutt procedure was utilized to correct for serial autocorrelation):

$$\ln \theta_t = 4.63 + .39 \ln \omega_{t-1} + .35 \ln \theta_{t-1}$$
$$(-43.9) \quad (3.54) \quad (3.48)$$

$$R^2 = .81 \quad SER = .059 \quad Durbin-h = 1.65$$

Quarterly data on minimum wages and the consumer price index from 1970-1982 were utilized (t-statistics in parenthesis).

[2] There are several available estimates of income elasticities of imports for Mexico. Most estimates vary between   and   . See, for example, Ize and Salas (1984).

Table 4.3

Simulation of Equation (14)
Average Percentage Growth Rate of Real Exports
1985-1990

		$\alpha = 0$				$\alpha = 1$	
		r = 11%		r = 13%			
		XT	XNP	XT	XNP	XT	XNP
$\eta^M_X = 1$	$d\omega/\omega = 0$	1.9	2.6	2.0	2.8	3.1	4.2
	$d\omega/\omega = 3.7$	3.5	4.8	3.3	4.5	4.9	6.0
$\eta^M_X = 2$	$d\omega/\omega = 0$	4.2	5.6	3.9	5.2	5.8	7.7
	$d\omega/\omega = 3.7$	5.4	7.1	5.1	6.8	7.0	9.2
$\eta^M_X = 3$	$d\omega/\omega = 0$	5.9	7.9	5.5	7.4	8.3	10.7
	$d\omega/\omega = 3.7$	7.1	9.3	6.7	8.8	9.3	12.1

The results are quite sensitive to the ratio of the income elasticity of imports. From 1978 to 1981, imports grew at an average annual rate of 43 per cent, while output growth was 8.4 per cent. In contrast, the average drop of imports in 1982 and (the expected for) 1983 is 40 per cent, while the output decline is estimated to be 2.5 per cent on average. These figures indicate extremily high income elasticities, which, of course, are different than estimations from earlier periods. A conservative estimate would place the value of this elasticity around 2 per cent.

Non-oil export growth requirements are also quite sensitive to the behavior of real wages. It is estimated that during 1982 and 1983 the average real minimum wage will have fallen 25 per cent with respect to its 1981 level. Under one set of exercises, we assume that the real wage remains constant in 1984, and then increases 3.7 per cent per year, so that in 1990 it will reach the purchasing power of 1981. Another set of exercises assumes that the real wage remains constant at its 1983 level [1].

Even under the assumption of constant real wages, the non-oil exports required to sustain moderate rates of output growth are quite high, except, perhaps, for the case where the import elasticities of demand equal one. For example, under the assumption that output will grow at an average rate of 4.8 per cent (corresponding to the case $\alpha=0$, $r=11$ per cent) and that the income elasticity of imports has a value of 2, the required growth in non-oil exports is 5.7 per cent. This should be compared with an average export growth of about 5 per cent per year in real terms between 1960 and 1970, a period of favorable world economic conditions and rapidly expanding world trade. During the period 1971-1981, exports grew at an average real rate of 8.1 per cent per year; this high rate, however, was the result of dramatic increases in the volume of oil exports and very favorable terms of trade effects, especially after 1977.

---

[1] Our assumptions about the evolution of real wages and its impact on the real exchange rate are only approximate, since productivity trends were not considered when estimating the real wage elasticity of the real exchange rate. There is evidence that labor productivity declined in the 70's, especially during the later part of the decade, while the minimum real wage remains quite stable between 1978 and 1981. However, we were not able to account for labor productivity in a convincing manner in our empirical estimations.

The Mexican National Development Plan contemplates output growth in the range of 5 to 6 per cent per year after 1984. Real non-oil exports are forcasted to grow at similar rates. Given our assumptions about credit availability, these export rates seem roughly consistent with the rate of growth of GDP. However, the question as to whether world economic conditions and the required efforts in terms of internal savings discussed earlier, will make these growth rates feasible.

The above exercises implie that a considerable effort of sustained public savings and export growth is required to maintain a growth rate that, in the most favorable case, is still lower than the growth rate of the seventies. Although Mexico may be able to service its debt in years to come at the current high interest rates, the cost in terms of slower growth and reduced consumption paths will be very high[1].

Finally, perhaps the most important question that remains to be examined are the implications of our growth scenarios in terms of the generation of employment opportunities for Mexico's growing labor force. The long-run elasticity of employment has been estimated by Rizzo and Solís (1979) to be around 0.45. With a labor force growing above 3 per cent an output growth above 6.6 per cent is required to avoid growing unemployment. In this respect, the prospects are rather pesimistic.

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[1] This point is overlooked by Cline (1983), who in a recent study claims that if industrialized countries grow at 3 per cent per year from 1984-onward, the problem of international debt should prove manageable under current institutional arrangements. These conclusions are derived from balance of payments projections which do not explicitly account for the costs in terms of slower growth and reduced living standards for the population.

5. Final Remarks.

The burden of the Mexican foreign debt will have a negative impact on the potential growth of the economy in the near future. The service of the foreign debt introduces balance of payments constraints that, even under relatively favorable estimates of domestic savings, results in rather low rates of output.

The nominal rate of growth of the foreign debt in recent years was larger than the nominal interest rate of the loans. The need to finance large domestic and foreign sector deficits has led the country to an extremely high debt service ratio in the late seventies and early eighties. During the last years the profile of the debt (short-run vs. long-run) change very dramatically; between 1980 and 1981, the share of short-run debt to total debt went from 4.4 to 20.4 per cent. This change, coupled with associated interest rates above their historical tendency, resulted in large foreign exchange requirements that the country could not satisfy. As a result, the foreign debt was rescheduled ensuring that no capital payments will be made until 1985.

The "natural" rate of growth of the nominal debt -the nominal interest rate- has gone up to unsustainable levels in the last four years. Even after the foreign debt was restructured, the interest payments alone impose large foreign exchange constraints on the economy. When additional restrictions on the growth of the debt are introduced ($\alpha < 1$), the economy has to go through strong adjustments to generate a large enough surplus (-Z) to cover the interest payments.

Under the optimistic assumption that the foreign debt will keep
growing at a rate equal to the nominal interest rate ($\alpha = 1$), the maximum rate
of growth of output does not even reach 7 per cent in real terms, which is
substantially lower than the rates of growth of the last six years. In this
case, the debt-GDP ratio increases constantly. When the growth of the debt is
further constrained ($\alpha = 0$), the debt-GDP ratio decreases, but the associated
output growth is too low to keep up with the growth of the labor force.

There is a clear trade-off between the rate of interest and the
rate of growth of output. The persistent unorthodox economic policy of the
United States, characterized by large a public deficit, does not show a very
bright perspective for the future of the interest rates. The burden of the
debt will not be substantitally reduced in the near future, and thus the rates
of growth of the Mexican economy can not be expected to recover their historical
tendency, unless there are drastic changes in the current institutional
arrangements.

Constraints in the rate of growth of the foreign debt are also
closely related to the behavior of exports. Under reasonable assumptions about
the value of import elasticities, the required rates of growth of exports are
quite high. Non-oil exports, for non-optimistic scenarios of the oil market,
are expected to grow faster than their historical tendency, prior to the
petrolization of the balance of payments in Mexico. The associated structural
changes in real wages and output growth, within the country, might be affordable.
The demand for these non-oil exports are out of the control of Mexican policy
makers and thus the perspectives are not very bright, as long as the strength

of the recovery of the American economy is shadowed by its large fiscal deficits.

The foreign debt in Mexico has reached levels that, even under optimistic scenarios, impose foreign exchange requirements that can be met by the economy only if substantial costs are incurred. Mexico can not have low rates of output growth for a sustained period of time while retaining political stability. Non-oil exports might be able to grow at high rates, but it will be very difficult to sustain them. Only if the interest rates are substantially reduced and/or institutional arrangements suffer a drastic change, will Mexico be able to realistically service its debt in the long run.

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APPENDIX
DATA SOURCES

Item	Source
Structural Parameters (σ, τ, s)	Sistema de Cuentas Nacionales de México, SPP and Dirección General de Informática y Evaluación Hacendaria.
Export Import Data (X, M)	Sistema de Cuentas Nacionales de México, SPP.
Gross Domestic Product and Government Expenditure Data (Y, G)	Sistema de Cuentas Nacionales de México, SPP
Foreign Debt and Interest Payments Data $(r^X D_{t-1})$	Indicadores Económicos Banco de México
Money Issue Data $(\hat{H})$	Indicadores Económicos Banco de México

Table A.1

Simulation Data
(billions of 1970 pesos)

	G_t	X_t	r^*D_{t-1}	$\hat{H}_t - \hat{H}_{t-1}$	Y_t
1970	32.2	34.4	5.5	1.9	444.3
1971	35.7	35.8	5.6	1.6	462.8
1972	40.4	41.7	5.5	4.4	502.0
1973	44.5	47.4	6.4	5.8	544.3
1974	47.3	47.4	7.7	5.5	577.6
1975	54.0	43.2	10.2	5.3	610.0
1976	57.4	50.4	11.1	12.8	635.8
1977	56.8	57.8	11.6	3.1	657.7
1978	62.4	64.5	15.8	8.0	712.0
1979	68.4	72.3	20.0	8.8	777.2
1980	74.9	76.7	25.8	8.9	841.8
1981	82.5	81.5	35.7	13.5	908.7
1982	86.5	83.7	47.2	21.8	907.3

Sources: Sistema de Cuentas Nacionales de México, SPP. For $\hat{H}_t$, the source is Indicadores Económicos Banco de México.

Table A.2

Historical Parameters

	σ	τ	s
1970		.1897	.1058
1971	.2141	.1839	.1093
1972	.3968	.1872	.1020
1973	.3759	.2016	.0952
1974	.2740	.2107	.0951
1975	.2445	.2315	.0835
1976	.1928	.2376	.0909
1977	.1742	.2416	.1088
1978	.3774	.2549	.0957
1979	.3817	.2622	.1045
1980	.3268	.2776	.1231
1981	.2941	.2771	.1021

Source: Sistema de Cuentas Nacionales de México,
SPP. and Dirección General de Informáti-
ca y Evaluación Hacendaria.

Table A.3

Simulation Data

(billion pesos of 1983)

Variables

	G	$\hat{H}_t - \hat{H}_{t-1}$	$D(\alpha=1)$
1984	2 838	243	10 080
1985	2 838	259	10 080
1986	2 838	276	10 080
1987	2 838	295	10 080
1988	2 838	314	10 080
1989	2 838	335	10 080
1990	2 838	357	10 080
1991	2 838	381	10 080

Parameters

σ	τ	s
.2738	.2627	.1014

Table A.4

EVOLUTION OF THE BASIC BALANCE IN MEXICO

(1950-1982)

(Millions of Dollars)

Y E A R	Current Account Balance	Interest Payments and Remitted Profits from Direct Foreign Investment	Basic Balance Deficit (z)
1950	163.1	55.9	-218.9
1951	-203.3	58.1	145.2
1952	-213.1	68.9	144.2
1953	-204.4	81.1	123.3
1954	-227.5	65.2	162.3
1955	1.7	80.7	- 82.4
1956	-183.1	98.7	84.4
1957	-359.9	88.0	271.9
1958	-385.5	95.1	290.4
1959	-232.1	116.3	115.8
1960	-419.7	139.6	280.1
1961	-343.7	135.4	208.3
1962	-249.6	149.8	99.8
1963	-226.1	169.9	56.2
1964	-444.7	204.7	240.0
1965	-442.9	216.0	226.9
1966	-477.8	259.1	218.7
1967	-603.0	306.6	296.4
1968	-775.4	372.1	403.3
1969	-708.4	441.2	267.2
1970	-1187.9	546.1	641.8
1971	- 928.9	571.3	357.6
1972	-1005.7	625.6	380.1
1973	-1528.8	815.1	712.9
1974	-3226.0	1163.6	2062.4
1975	-4442.6	1646.1	2796.5
1976	-3683.3	2070.4	1612.9
1977	-1596.4	2163.0	-566.6
1978	-2693.0	2786.0	- 93.0
1979	-4870.5	4066.1	804.4
1980	-7223.3	5920.7	1303.3
1981	-12544.3	8933.9	3610.4
1982	-2684.5	11404.0	-8720.4

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