ISSN 0265-8003

THE DEBT CRISIS: A POST MORTEM

Daniel Cohen

Discussion Paper No. 692
August 1992

Centre for Economic Policy Research
25-28 Old Burlington Street
London W1X 1LB
Tel: (44 71) 734 9110

CEPR Discussion Paper No. 692

August 1992

ABSTRACT

The Debt Crisis: A Post Mortem*

In the first part of the paper I calculate the returns on developing countries' debt obtained by their (private and public) creditors (when taking account of the transfers already generated and of the liquidative value of the debt) and show that they are satisfactory. I then evaluate the conflict of interest between private and public creditors and assess the role of the Brady Plan as a vehicle to achieving a 'grand settlement' of the debt crisis. I argue that they are not as satisfactory. In the second part of the paper I show that the group of reschedulers did suffer from lower growth in the 1980s, but I also show that their rate of capital accumulation did not accelerate in the years before the debt crisis. I evaluate the extent to which sovereign risk, rather than low returns, explains the failure of foreign finance to accelerate capital accumulation in the large debtor countries.

JEL classification: F21
Keywords: LDC debt, Brady Plan, capital accumulation

Daniel Cohen
CEPREMAP
142 rue de Chevaleret
75013 Paris
FRANCE
Tel: (33 1) 4077 8459

Submitted 29 May 1992

*This paper was prepared for the NBER Macroeconomics Annual, 1992. I am most indebted to Stan Fischer for his numerous comments and to Jean-François Nivet for his outstanding research assistance. The paper was started while I was a consultant at the Debt and International Finance Division of the World Bank. I am most grateful to its members for their advice and comments. This work does not necessarily represent the views of the World Bank.

NON-TECHNICAL SUMMARY

There was not really a debt crisis in the 1980s. No country overtly chose to repudiate its debt (those, like Brazil, who thought about doing it, reversed their decision) and no creditor really decided to 'wage a war' against bad debtors. Instead, the crisis has drifted from one decision to reschedule to the next, with no obvious 'final settlement' in sight. This feature, however, does not make the 1980s unique. As Eichengreen and Portes have shown, the 1980s share with the 1930s the same protracted nature, and the same failed attempts to find a resolution. As I show in the paper it also shares with the 1930s an important feature: despite arrears and rescheduling, the creditors did manage to recover an important part of their claims. Taking as a liquidative value the secondary market price of the debt, I show that all major debtors (except for Brazil) delivered a market return to the commercial banks.

Of about $1,220 billion of total debt, $950 billion may be characterized as 'at some risk', and about 65% of this $950 billion is held by just 20 countries. The paper first focuses on this (narrow) sub-group which includes Algeria, Argentina, Brazil, Chile, Colombia, Cote d'Ivoire, Ecuador, Egypt, Hungary, Indonesia, Mexico, Morocco, Nigeria, Pakistan, Peru, Phillipines, Poland, Sudan, Turkey, Venezuela and Zaire. Debt ratios in these countries rose dramatically between 1980 and 1982, as a result of the interest rate shock along the acute recession in the OECD. In order to offset what they saw (or perhaps pretended to see)as a temporary phenomenon, these (already quite indebted) countries allowed their debt to skyrocket to levels that were to become unsustainable in the 1980s environment.

In order to obtain summary measures of the level of resources transferred from debtors to creditors, we calculate the present value (discounted by the Libor rate) of the payments transferred (in net terms) from debtors to creditors. These payments are *minus* the transfers reported in the World Debt Table. If the interest rate on the debt were exactly equal to Libor, this quantity would exactly measure the *reduction* in debt (in present value terms) from the payments. Discrepancies arise because of measurement problems and because a spread over Libor was charged to the debtors.

We present for each country a key indicator that reveals best the extent to which the debt was actually serviced: the ratio of the present value of net payments to the initial level of debt, which measures the share of the initial debt which has been repaid (in net terms) over the years 1982–89.

We define three groups of countries on the basis of this ratio: countries that transferred *in the aggregate* a significant amount of resources to their creditors; countries that neither reduced nor increased (in present value terms) their total

exposure; and finally, the group of countries that continued to absorb new resources.

An extraordinary feature is how well the commercial banks have done. In 11 out of 20 cases, they managed to recover more than 40% of their initial exposure in only 7 years. Even in the third group, the banks managed to recapture in three out of five countries more than 35% of their claims.

We also see that the six countries in the first group repaid a significant amount (more than 30%) of their total outstanding debt. They did not use the debt borrowed from one creditor to help pay the debt due to another one.

In the second group the countries which essentially stayed at financial autarky – Chile, Ecuador, Hungary, Indonesia and Morocco – serviced a large part of their commercial debt using the IFIs money to repay their commercial creditors. Except Morocco, all these countries, along with Turkey, were perceived as good risks and their secondary market price showed a small discount.

Even in the 1930s, governments eventually found a way to a negotiated settlement. It is true that the war speeded up settlements as the governments of the key creditor countries (the UK and the US) attempted to make or preserve alliances with the debtor countries; but more fundamentally it was the build-up of arrears that motivated private creditors to seek an agreement.

Today the build-up of arrears has certainly begun and the Brady Plan, by breaking the link between the accumulation of interest arrears and the IMF agreement, has made this easier. In 1985, arrears were less than $10 billion, but they soared in 1990 to about $50 billion. At the same time, the Brady Plan has certainly revealed a shift of government priorities in the US.

Does this make the Brady deal the vehicle of a possible 'grand settlement'? The answer to this question is not straightforward, since the Brady deal (in contrast to the deals signed in the 1940s) involves debtors' borrowing from International Financial Institutions (IFIs) such as the World Bank or the IMF, to finance their debt reduction programmes with private creditors. Assuming the neutrality of commercial banks, the deal is bound to create conflicts between debtor countries and the IFIs. I argue that it would have been more appropriate to give the debtor countries three or five years to accumulate reserves with which they could have repurchased their debt – at a price agreed upon *ex ante*. Debt repurchases played an important role in the solution of the debt crisis of the 1930s. Secondary markets (or at least secondary market pricing) have now become, once again, the core of many proposals to end the debt crisis (and indeed this is already a key part of the Brady Plan). We review briefly their potential role as it has been set forth in the recent literature on the subject as well as the criticism of this role in the academic literature by Bulow and Rogoff and by Dooley.

Bulow and Rogoff argue that if a country (or an institution acting on its behalf) repurchases a small fraction of its debt the reduction of the market value of the debt is strictly and (perhaps much) lower than the market price of the debt. Even if the country were repurchasing a fraction of its debt one dollar after the other, repeatedly taking creditors by 'surprise' (i.e. if they never expected that the next dollar would be repurchased, but they always knew – at each point in time – what the exact stock of debt was), it would still be 'over-repaying' its debt.

Bulow and Rogoff (1991) concluded that this wedge between the cost of a debt buy-back and its effect on the market value of the debt makes it unlikely to turn buy-backs into a profitable investment. Does this reasoning apply to the debt crisis of the 1930s and lead us to interpret the large buy-backs, which were then performed, as an unprofitable investment? Not necessarily. As Cohen and Verdier pointed out a buy-back can be effective if it is done *secretly*. If – say – Morgan repurchases Brazil's debt – held by Citicorp – on Brazil's behalf without revealing for whom the purchase is made, there are no limits to the extent of the repurchases which can be made by Morgan at the given price. It is only when Brazil's actions are discovered that the price rises since only in that case does the reduction of its outstanding external debt raise the price of the debt. In the 1930s, the Latin American buy-backs were only revealed *after* they were completed.

Yet for the open buy-backs such as those the Brady deal encourages, it is obviously crucial to ensure that the price at which the buy-back is undertaken is appropriate. This involves comprehensive *ex ante* agreement with the creditors, so that none of them can free-ride on the others. This is exactly what the Brady deal has done. In a process called 'novation', it was agreed that all the previous debt had to be exchanged against one of the three options available. In order to evaluate empirically how the Brady deal has worked, the paper analyses how the distinction between average and marginal price can be reconstructed empirically. Building on Bulow and Rogoff's key distinction between average and marginal price, I show empirically that countries would not need substantial resources to repurchase, say half the debt of a typical middle-income debtor, provided that the price appropriately reflected the marginal value to write down the debt.

If a settlement of the debt crisis is actually reached, it is unlikely to be motivated by considerations of efficiency. Rather, it is likely to reflect a change in the bargaining power of the parties concerned. The question is nevertheless important; how much additional growth should we expect an easing of the debt burden to deliver? How much of the slow-down in growth in the 1980s can be assigned to debt? We set up a 'quasi-accounting' framework which builds on the 'augmented' Solow model analysed in MRW, in which production depends on physical capital, human capital, real labour and an exogenous productivity term. One can use this framework to express the growth in output as a function of

exogenous productivity change and the difference between output and its steady-state value. The steady-state value in turn can be expressed as a function of investment in physical and human capital. This equation is consistent with a model of endogenous growth in which the growth of human capital can be unbounded, but can also be interpreted as a 'quasi-accounting' framework. The paper relies on the latter interpretation to decompose the origin of the growth slowdown in the 1980s. Estimates of this equation suggest that, out of an extraordinary reduction of 4.9%, about half of the growth slow-down of the large debtors is a world-wide phenomenon, 0.8% is due to a reduction in their terms of trade, 0.5% reflects lower investment and 'only' 0.9% can be defined as an 'unexplained' productivity slow-down perhaps caused by the debt crisis. Although this may appear small, it is well above the real cost of writing down the debt by – say – one-half, as suggested earlier in the paper.

More broadly, one should look beyond the specific pattern of growth of the 1980s and investigate the lessons of the past two decades for evaluating the scope of foreign finance in terms of enhancing the growth prospects of poor countries. Are sovereign and default risk the prime reasons why developing countries do not benefit much from the behaviour of world financial markets, or is it low returns to capital accumulation in poor countries that explains why they could not take advantage of the world financial markets to grow faster? I assess these questions – very broadly – in the last part of the paper.

GENERAL INTRODUCTION

"Crisis", in greek, means "decision". From that ethymologic view, the debt crisis of the 1980's was not really one. No country overtly choosed to repudiate its debt (those, like Brazil, which went towards doing it, came back on their decision) and no creditor really decided to wage a "war" against bad debtors. Instead, the crisis has been lingering from one rescheduling to the next, with no obvious "final settlement" in sight. This feature, however, does not make the 1980s very specific. As the comprehensive work by Eichengreen and Portes (1989, 1990) (henceforth EP) have shown, the 80s share with the 30s the same protracted nature, the same failed attempts to find a resolution . As I will show in section A below, it also shares with the 30s an important feature: despite arrears and reschedulings the creditors did manage to recover an important part of their claims.(I will attempt to explain why in section A.3.) Taking as a liquidative value the secondary market price of the debt I will show that all major debtors (but Brazil) delivered a market return to the commercial banks. EP found the same feature for the UK bonds in the 30s.

Yet, eventually, the 30s did find their way, a decade later, to a negotiated settlement. A specific event, it is true, the war, speeded up

---

This paper was prepared for the NBER macroeconomic annuals, 1992. I am most indebted to Stan Fischer for his numerous comments and to Jean-François Nivet for his outstanding research assistance. The paper was started while I was a consultant at the Debt and International Finance Division of the World Bank. I am most grateful to its members for their advices and comments. This work does not necessarily represent the views of the World Bank.

settlements as the governments of the key creditors countries (the UK and the US) attempted to find or to preserve alliances with the debtor countries. But more fundamentally, the building up of arrears is what decided private creditors to seek an agreement. To which extent can we expect a similar unfolding of the debt crisis of the 1980s? Should we expect the 1990s to bring the final settlements that the 1940s have brought?

Since the 1990s are apparently speeding up disarmement rather than war, one should not expect the process to repeat itself term for term... Yet the building up of arrears has certainly started and the Brady speech in disconnecting the accumulation of interest arrears from the signature of an IMF agreement has made each of them easier. In 1985, arrears were less than $10 billion, they soared in 1990 to about $ 50 billion (see World Debt Tables, 1991). In the same time, the Brady deal also certainly pointed out to a shift of priorities in the goals of the US government. (The French and the British governments having started, for their part , a competition of their own on who will offer the most favorable terms to the low income debtors.) Will the 1990s be the decade of the grand settlement and -as Eichengreen and Lindert (1989) have, ironically, suggested- will it be the decade that will open the way to a new wave of debt accumulation ?

How far off a settlement do we stand and what lessons of the debt crisis should we draw before the next debt build up starts: these are the two questions that I will attempt to adress in this paper.

a) Towards a grand settlement?

In 1943, Brazil offered its creditors two ways out. One option offered no reduction of principal but an interest rate cut from 6.5 to 3.4 per cent; another option offered a cash payment of about 10% of the face value and a principal and an interest cut on the rest.(See Cardoso and Dornbusch ,1989.) In July 23, 1989, Mexico and its creditors agreed on a debt relief plan offering the banks three options : 1) Reduce the face value of the debt by 35 % ; 2) reduce the interest rate to 6.25% ; 3) keep the face value and the interest rates unchanged but lend an additional 25 % of the face value in the next three years. Eventually,

(on February 4, 1990), 46.9% of the creditors have chosen the par bond, 40.2 percent the discount bond an 13.1 percent have chosen the third option. The parallel between the two deals is striking. Already, Venezuela, the Philippines, Costa-Rica, and Uruguay signed a debt reduction agreement with their creditors. Nigeria is about to, and Argentina and Brazil are also expected to sign one sooner or later.

Does that make the Brady deal the vehicle of a forthcoming "grand settlement"? It takes a long detour to answer this question since the Brady deal (in contrast to the deals that were signed in the 40s) amounts to having the debtor borrow to the International Financial Institutions (IFIs) such as the World Bank or the IMF in order to finance their debt reduction program with the private creditors. Assuming that the commercial banks stay neutral, the deal is bound to create later conflicts between the country and the IFIs. I will argue that it would have been more appropriate to give the debtor countries, say, 3 or 5 years, to accumulate reserves with which they could have repurchased their debt - at a price *agreed upon ex ante*. As I will show empirically (building on Bulow and Rogoff's key distintion between average and marginal price), it does not take much ressources to repurchase, say, *half* the debt of a typical middle income debtor -provided that the price appropriately reflects the *marginal* value to write down the debt.

b) Lessons for the future

If a settlement of the debt crisis actually happens, it is unlikely to be on the ground that this will help to deliver a more efficient outcome. Rather, it is likely to reflect a change in the bargaining power of the parties involved. Yet, the question is clearly important. How much additional growth should we expect an easing of the debt burden to deliver? For one thing, how much of the slowdown of growth in the 1980s can be assigned to debt ? I make (in the first part of section B) an attempt to adress this question empirically. I will show that -out of an extraordinary reduction of 4.9 %- about half of the growth slowdown of the large debtors is a world wide phenomenom, 0.8 percentage point is due to the fall of their terms of trade, 0.5 percentage point is due to a lower investment and "only" 0.9 percentage point is accounted as an "unexplained" productivity slowdown that the debt crisis may have

caused. Albeit this number may appear to be small, I will nevertheless make the point that it is of an order of magnitude which is well above the real cost to write down the debt by -say- half, as I suggested above.

Yet, more broadly, one wants to go beyond the specific pattern of growth of the 1980s and investigate what are the lessons of the past two decades for evaluating the scope of foreign finance to enhance the prospect of growth of a poor country. Should we think that sovereign risk and the risk of default are the prime reasons why the world financial markets do not appear to help very much the developing countries, or should we think instead that it is the low returns to capital accumulation in the poor countries which explain why they could not take advantage of the world financial markets to grow faster (as argued in Lucas, 1990) ? These are the questions that -very broadly- I will adress in the last part of the paper.

SECTION A : PAYING AND CANCELLING THE DEBT

I - HOW MUCH DID THE LARGE DEBTORS PAY IN THE 1980s ?

One of the key (perhaps surprising) results that is obtained from the analysis of the 1930s is that the returns on the foreign bonds were often positive and -in a few cases- not far off the market return. In this section, I will first analyze the returns so far obtained by the creditors in the eighties.

1 - A sub-sample of 20 countries

Of about $ 1 220 billion of total debt $ 950 billion may be characterized as of "at some risk", and about 65% of these $ 950 billion are held by just 20 countries. It is on this (narrow) sub-group that I will first focus the analysis. (I turn to the average debtors later). The 20 countries are Algeria, Argentina, Brazil, Chile, Colombia, Cote d'Ivoire, Colombia, Ecuador, Egypt, Hungary, Indonesia, Mexico, Morocco, Nigeria, ,Pakistan, Peru, Phillipines, Poland, Sudan, Turkey, Venezuela, Zaire. (We also wanted to include Yugoslavia and Poland but we had data problems with these countries.) Table 1 below shows the 1980 and 1982 debt-to-export and debt-to-GDP ratios.

TABLE 1

	Debt-to-export			Debt-to-GDP			Total debt	Secondary market price
	1980	1982	1989	1980	1982	1989	1989	1989
Algeria	130.6	119.2	248.8	47.1	40.4	57.6	26.1	0.76
Argentina	242.4	447.3	537.0	48.4	83.8	129.7	64.7	0.18
Brazil	304.8	395.4	301.6	30.6	36.1	24.1	11.3	0.28
Mexico	259.2	311.5	262.9	30.3	52.5	51.2	95.6	0.41
Nigeria	32.2	100.4	390.1	9.0	14.1	119.3	32.8	0.27
Venezuela	131.9	159.8	211.5	42.1	41.4	79.9	33.1	0.40
Colombia	117.1	204.3	220.8	20.9	26.9	45.8	16.9	0.63
Chile	192.5	335.9	187.7	45.2	76.7	78.3	18.2	0.61
Ecuador	201.6	281.3	392.3	53.8	66.9	112.9	11.3	0.16
Hungary	95.9		158.7	44.8	45.4	75.8	20.6	0.99
Indonesia	94.2	123.6	210.6	28.0	29.2	59.8	53.1	
Morocco	223.8	326.9	328.6	53.1	84.0	95.9	20.9	0.45
Philippines	212.5	297.7	226.4	49.5	62.5	65.7	28.9	0.49
Turkey	332.9	195.8	189.8	34.3	38.2	53.8	41.6	0.93
Zaire	202.2	296.2	370.1	33.5	35.7	96.6	8.8	0.19
Ivory Coast	180.7	276.5	463.9	58.8	111.4	182.2	15.4	0.06
Egypt	208.4	277.8	355.3	95.0	120.9	159.0	48.8	0.39
Pakistan	196.9	215.0	242.6	42.5	38.3	46.9	18.5	
Peru	207.7	294.0	432.2	51.0	49.7	70.8	19.9	0.05
Sudan	499.3	699.3	1051.2	65.7	101.4	82.9	13.0	0.015

It is extraordinary to note the formidable jump of these debt ratios in only two years. This jump is the result of the interest-rate shock along

the acute recession in the OECD. In order to offset, what they viewed (or perhaps pretended to view) as a temporary phenomenon, these (already quite indebted) countries skyrocketted their debt to levels that were to become unsustainable in the economic environment of the 1980s.

2 - How much did they pay ?

In order to get summary measures of the amount of ressources which have been transferred by the debtor to the creditors, call P_t the payments which have been transferred (in net terms) by the *debtors* to the creditors. These payments are *minus* the transfers reported in the World Debt Table (see Appendix 3 for an introduction to these data and for a discussion of their critique by Lindert, 1989). We have calculated:

$$(1) \quad V_0 = \sum_{t=1}^{T} \frac{P_t}{\prod_{s=1}^{t} (1+i_s)}$$

In which $t = 0$ is 1982, T is 1989 and i_s is the Libor at time s. It is the present value of all transfers which have been made by the debtors to their creditors. *If* the interest on the debt was exactly equal to Libor, one would have :

$$(2) \quad D_0 - \frac{D_t}{\prod_{s=1}^{t} (1+i_s)} = V_0$$

and V_0 would exactly measure the *reduction* of the debt (in present value terms) which the payments P_t would have brought. The discrepancies arise because of measurement problems (which are adressed in our working paper) and because a spread over Libor was charged to the debtors.

We first present for each country a key indicator that reveals best the extent to which the debt was actually serviced. It is the ratio

TABLE 2 - PERCENTAGE OF 1982 LONG TERM DEBT PAID IN 1983-1989 (present value calculations)

GROUP A

	Total Debt	Commercial Debt
Algeria	0.31	0.46
Argentina	0.40	0.62
Brazil	0.38	0.29
Mexico	0.62	0.48
Nigeria	0.30	0.91
Venezuela	0.75	0.77

GROUP B

	Total Debt	Commercial Debt
Colombia	0.015	0.19
Chile	0.18	0.35
Ecuador	0.12	0.56
Hungary	0.06	0.54
Indonesia	-0.025	0.28
Morocco	0.009	0.52
Phillipines	0.17	0.66
Turkey	0.09	0.24
Zaire	-0.03	0.25

GROUP C

	Total Debt	Commercial Debt
Ivory Coast	-0.06	0.40
Egypt	-0.14	0.35
Pakistan	-0.09	0.56
Peru	-0.16	0.30
Sudan	-0.16	0.06

V_0/D_0 which measures the share of the initial debt which has been *repaid* (in net terms) over the years 1982-1989. The results are in table

2 . We distinguish three groups of countries. The group A of countries which transferred, *in the aggregate*, a significant amount of ressources to their creditors; the group B which essentially stayed at financial autarky and neither reduced nor increased (in present value terms) their total exposure ; finally the group of countries which kept draining in new ressources.

An extraordinary feature is how well the commercial banks have done. In 11 out of 20 cases, they managed to recover more than 40 % of their initial exposure in only 7 years. Even in group C, they managed to recapture in 3, out of 5 countries, more than 35% of their claims.

We also see that the 6 countries in group A repaid a significant amount (more than 30%) of their total outstanding debt. In these cases, it is not the debt borrowed from one creditor which helped pay the debt due to another one.

Group B contains a sub-sample of countries which essentially stayed at financial autarky. In that group, Chile, Ecuador, Hungary, Indonesia and Morocco serviced a large part of their commercial debt using the IFIs money to repay their commercial creditors. Except Morocco, all these countries, along with Turkey, were perceived as good risks and their secondary market price showed a small discount.

Let us focus for the moment on the countries in Group A, for which a substantial amount of net repayments have been made. In order to get a more comprehensive assessment of the return on debt, let us also take account of the liquidating value of the debt in 1989, such as measured by the secondary market price at the end of 1989 (which was a low point on the market). One gets the following table :

TABLE 3 - DEBT REPAID IN 1983-1989 WHEN TAKING ACCOUNT OF LIQUIDATION VALUE (1989 prices) AS A FRACTION OF 1982 DEBT

	TOTAL DEBT	COMMERCIAL DEBT
Algeria	1.13	0.98
Argentina	0.82	1.02
Brazil	0.47	0.51
Mexico	0.79	0.78
Nigeria	1.37	1.13
Venezuela	1.15	1.24

With such a liquidating value , one now sees that all countries in group A, but Brazil, would have essentially repaid all their debt- if it had been liquidated at 1989 prices. The same conclusion would have been reached with the five "good risk" countries in group B.

Let us now analyze the sub-group of *all* middle income severely indebted countries such as defined by the World Debt Tables (1990). (They consist of : Argentina, Bolivia, Brazil, Chile, Congo, Costa Rica, Cote d'Ivoire, Ecuador, Egypt, Hunduras, Hungary, Mexico, Morrocco, Nicaragua, Peru, Philippines, Poland, Senegal, Uruguay and Venezuela). One gets the results which are shown in table 4 below. In average, one sees that the creditors -as a whole- would have recaptured 58% of their claims if the debt had been liquidated at its 1989 value.

TABLE 4 - DEBT REPAID IN 1983-1989 AS A FRACTION OF 1982 DEBT BY THE SEVERELY INDEBTED MIDDLE INCOME COUNTRIES

	Present value of net transfers (PVNT)	PVNT +1989 liquidation value
Aggregate Debt	0.27	0.58
Debt due to Commercial Banks	0.45	0.77

By the end of 1989 the group of middle income debtors was then, so to speak, 40% off solvency. On the other hand, from the end of 1980 to the end of 1982, the debt of this sub-group jumped by 41%. This shows that the 1980 level of indebtedness would have been just right! (In 1981 and 1982 alone the severely indebted middle income countries borrowed in net terms an extra $ 81 billion of long-term debt -out of a 1980 level of $ 212 billion- 67 % of which was used to meet the rising interest bill). On the other hand, low income debtors did not generate positive transfers, but their aggregate debt is "only" 25% of the total.

3 - Why did they pay ?

Every year, the group of severely indebted middle income countries transferred to its creditors about 3% of its GDP (i.e. about 14% of their exports). This number gives an indirect measure of the losses which the debtors have feared they would suffered otherwise. What is the nature of these losses. To what extent are they likely to shift over time? Here again, the 1930s offer an interesting reference. There was, at the time, no clear evidence of major trade sanctions against defaulting debtor countries. In the same time, trade *credits* were as much an issue of concern for the debtor countries as they have been to-day. At the time, however, *banks* were in the (profitable) business of offering trade credit (while bondholders, a separate group, were attempting to recapture their claims) :*"On several occasions, the representative of the bankers reaffirmed that they were unable to associate themselves with any attempt of the Council (of the Bondholders) to oppose export credit to a defaulting country"* (EP (1989). For their part, the indebted countries made everyting they could to continue their service of their commercial debts. This is a key point to which we shall return below.

Reputation on the other hand was *not*, it seems, a prime motive for sustaining debt service (cf Bulow and Rogoff, 1989, for a theoretical explanation.) *All* Latin American countries -whether they serviced their debt, as Argentina faithfully did, or not- lost their access to foreign finance in the thirties. No reward was granted to the good debtor. Actually, as Eichengreen and Portes have shown in another paper (EP,1989)), those countries which defaulted early on appear to have

experienced a larger growth than the others. After the war, albeit the issue is less unambiguous, it does not seem either that the good debtors enjoyed significantly better terms of credit than the others (see Jorgensen and Sachs, 1989,Morton and Lindert,1989, and the dissenting view of Ozler, 1990).

Let us stick, here, to the idea that the fear of losing trade *credits* lines (and not trade opportunities) is the main reason why the debtors are willing to avoid outright default. In order to get an empirical view on this issue let us first briefly set up a benchmark out of which the dependency of the service of the debt on the cost of debt repudiation can be spelled out.

Let us assume that a country produces an output Q_t (the numeraire) which it (partially) consumes domestically and otherwise sells abroad.

Call X_t the volume of exports and $C_2(t)$ the domestic consumption of the numeraire ; one can write :

$$Q_t = X_t + C_2(t)$$

In exchange for its exports, the country can purchase at a price p_t some imported goods and can repay an amount R_t of its debt.

Call $C_1(t)$ the (domestic) consumption of the imported good. One can write :

$$X_t = p_t\, C_1(t) + R_t \ .$$

Putting together the two previous identities, one can write :

$$p_t\, C_1(t) + C_2(t) = Q_t - R_t \ .$$

We shall refer to financial autarky (or simply "autarky") as the case when $R_t = 0$.

Let us assume that the utility of the country at any time t can be measured through an additively separable utility function :

$$V_t = \sum_{s=t}^{\infty} \beta^{(s-t)} u(C_s) \qquad \text{with } u(C) = \frac{C^{\gamma}}{\gamma}$$

in which $C = C_1^{\alpha} C_2^{1-\alpha}$ is a Cobb Douglas function of the volume C_1 of the imported good and C_2 of the domestic good. Up to a multiplicative constant $(\alpha^{\alpha}(1-\alpha)^{1-\alpha})$ which we ignore in the sequel,, one can then write that the optimal choice of C_t (when R_t is taken as given) is $C_t = p_t^{-\alpha}(Q_t - R_t)$. For simplicity, we shall assume that the terms of trade of the country are a constant $p_t=1$, so that $C_t = Q_t - R_t$ simply measures the "aggregate" consumption that the country has access to when it repays R_t to its creditors.

Assume now that the country, if it were to default, would have to pay up-front (rather than at credit) a fraction $x \leq 1$ of the imports it already purchased. At the time t when it defaults, let us consequently assume that the country must pay $x\alpha Q_t$ to its trade partners in order to avoid trade disruption. This lump-sum up front payments is to be interpreted as a way to clear out unpaid trade credits (proportional to the amounts of imports $C_1(t) = \alpha Q_t$). But let us also assume that, once this one-shot loss is paid, the country has no further obligation and can stay at financial autarky (and consume $C_t = Q_t$). The reservation level of the country can then be written as :

$$(4) \quad \underline{V}_t = u[Q_t(1-\alpha x)] + \sum_{s=t+1}^{\infty} \beta^{(s-t)} u[Q_s]$$

Call $R_t = \lambda_t Q_t$ the fraction of its resources that the country will be required to pay to its creditors. R_t must be chosen so that :

$$\forall t \quad V_t \geq \underline{V}_t$$

To put some back of the enveloppe figures behind these numbers, assume first that $\gamma = 0$ (i.e $u(x) = \text{Log } x$).

In that case, one simply gets that, *for any interval of time* during which the credit ceiling is binding:

$$\sum_{s=t}^{\infty} \beta^{(s-t)} \text{Log}(1-\lambda_s) = \text{Log}\,(1-\alpha x)$$

which immediately yields that λ_t is a constant, λ, such that :

(5) $\text{Log}\,(1-\lambda) = (1-\beta)\,\text{Log}\,(1-\alpha\, x)$

When, say, $\beta = 0.85$, $\alpha = 0.3$ and $x = 1/3$ (which corresponds to paying upfront 4 months of imports) one finds $\lambda = 1.6$ %. The number to be explained is $\lambda \# 3$ % of GDP, so we solve here about half of the problem.

If instead one solves a similar equation when $\gamma = -2$ (which corresponds to an intertemporal elasticity of substitution of 1/3), we then have to solve (when neglecting growth) :

$$(6)\quad \frac{1}{(1-\lambda)^2} = \beta + \frac{1-\beta}{(1-\alpha x)^2}$$

with the some values of the parameters one now finds $\lambda = 1.7\%$. So we're somehow going towards solving (60% of) the puzzle.

These calculations leave aside, however, all bargaining considerations. But, perhaps were there actually none to the extent that credit lines are offered by a very large number of small participants which puts the country in no situation to bargain (see Cohen 1991a, Ch.3). They also leave aside the fact that investment could (dramatically) dampen the fluctuation of income at the time when the trade credits line are cut. From this perspective it may be that -beyond the one-shot loss- a more *permanent* risk of trade disruption is also there, which induces the country to not sever its links with the financial community.

At any rate, if one trusts the credit line story -which is the one routinely repeated when the question is asked- then one sees how vulnerable the creditors might be. Indeed , just as in the thirties, trade credits are not exactly supplied by the same creditors as those

which supplied the rest of the debt. So the risk of a panic is really what drives trade creditors off in case of a debt crisis. If, say, the country could stay in good terms with the suppliers of "credibility" (IMF and World Bank) while defaulting on its commercial banks it may turn out that *not* servicing the commercial debt would become harmless.

Incidently, in the models that we spelled out above, we have shown that the service of the debt -*when the credit ceiling binds*- was proportionate to the direct sanctions (x) that the creditors can impose on the country . When there are no such costs, that is when the creditors can only impose financial autarky as a threat, they can recapture nothing (*again* : when the credit ceiling binds). To see the generality of the result, consider a continuous time model and take any interval]a,b[on which the credit ceiling binds. One then has :

$$\forall t \in]a,b[\quad \int_t^{\infty} e^{-\delta(s-t)}\, u(C_s)\, ds = \int_t^{\infty} e^{-\delta(s-t)}\, u(Q_s)\, ds$$

Assuming (importantly) that Q_s is continuous one can differentiate both sides and find $u(C_t) = u(Q_t)$ i.e. : $Q_t = C_t$ and get the no net transfers result. This no transfer result should *not* be taken to imply that no credit is feasible when only financial autarky is available as a threat. Take for instance the case when u(.) satisfies the Inada condition, and assume that Q_t goes -repeatedly- through zero values for some positive amount of time. (I borrow this idea from the very useful survey by Eaton, 1991.) Then, surely, the country will never want to default (and to get stuck to financial autarky). But, in this case, the repayment of the debt will be *voluntary* : it will not take place during an episode when the credit ceiling binds.

II - THE SECONDARY MARKET AND THE PRICE OF THE DEBT

Debt repurchases have played an important role in the solution of the debt crisis of the thirties. Secondary markets (or at least secondary market pricing) have now become, once again, the core of many proposals to end the debt crisis (and indeed is already a key part of the Brady plan). We now turn to review briefly their potential role such as it has been couched in the recent literature on the subject (and,

especially, such as this role has been criticized in the academic literature by Bulow and Rogoff (1988), or Dooley (1989)). We then proceed to give some empirical evidences on the issue. This will open the route to an analysis (in Section III) of the negotiated settlement under way with the Brady plan deals.

I - A theoretical background: marginal and average prices

To set up the ideas in an explicit model, consider a simple two periods model of a country which owes a debt at time t=2. Assume that the country always has the option to repudiate its debt and also assume that the banks can (credibly) impose - in retaliation- a sanction that amounts to a fraction λ Q of the country's income. Finally, assume that the banks can always get the country to pay that fraction λ Q that the country would forego by defaulting. Call dF(Q) the density of the (random) distribution of the country's income. Let us take the banks to be risk-neutral and (for simplicity of notations) take the riskless rate to be nil. One can write the market value of a debt whose contractual value is D to be :

$$V(D) = \left[\int_0^{D/\lambda} \lambda \, Q \, dF(Q) + \int_{D/\lambda}^{\infty} D \, . \, dF(Q) \right]$$

The first term in the bracket represents how much the banks can get when the income of the country is so low that the country would rather default than servicing the debt fully (λ Q$\leq$ D). The second term measures the expected payments that accrue to the banks when the country honors the contractual value of the debt (an event which has a probability 1-F(D/λ)). (This model and its extensions are exposed at greater length in Cohen 1991a ; see also Eaton, Gersovitz and Stiglitz, 1986.)

The market price of the debt (such as observed on the secondary market) can simply be written as :

$$q(D) = \left[\int_0^{D/\lambda} \frac{\lambda Q}{D} \, dF(Q) + 1-F\,(D/\lambda) \right]$$

If a country were, say, to repurchase one dollar of its debt on the secondary market, this is the price that it would have to pay. If instead the country wants to repurchase an amount B and is *known* to be willing to do so, then -as Dooley (1989) first pointed out- the price at which the transaction will be undertaken can only be the *ex-post* equilibrium price. (Otherwise, no lenders will actually sell its claim). One then gets that the price for the transaction has to be :

$$q(D-B) = \left[\int_0^{(D-B)/\lambda} \frac{\lambda Q}{D-B} \, dF(Q) + 1-F\left[(D-B)/\lambda\right] \right]$$

Obviously, if a debtor country is known to be willing to repurchase *all* of its debt (B=D) then the only price at which the transaction will be undertaken is q=1.

This crucial remark makes it very undesirable to set up, say, an institution -endowed with a given amount of money- which would operate openly to repurchase LDC debt. Such an institution would immediately raise the price and defeat its own purpose.

The point which is made by Bulow and Rogoff radicalizes this critique. Assume that the country (or an institution acting on its behalf) repurchases a small fraction of the debt so that, say, the measure the benefit that is captured by the country. For the country, what matters is the reduction of the market value of the debt, i.e :

$$\rho(D) \equiv V'(D) = 1-F(D/\lambda)$$

which is strictly (perhaps much) lower than q(D). So even if the country was repurchasing a fraction B of its debt one dollar after the other, repeatedly taking the creditors by "surprise" (i.e they never expect that the next dollar will be repurchased, but they always know -at each point in time- what is the exact stock of debt), it would still be over paying its debt since it would pay :

$$\rho = \int_{D-B}^{D} q(D) \, dD$$

which is strictly more expensive that :

$$\Delta V = V(D) - V(D-B) = \int_{D-B}^{D} \rho(D)\, dD$$

Bulow and Rogoff (1991) concluded that this wedge between the cost of a debt buy-back and its real effect on the market value of the debt makes it unlikely to turn buybacks into a profitable investment. Does this reasoning apply to the debt crisis of the 30s and lead to interpret the large buy-backs which were then performed as an unworthy investment? Not necessarily. As we pointed out in Cohen and Verdier (1990b) a buy-back can be good if it is done *secretly*. If -say- Morgan repuchases Brazil's debt -held by Citicorp- on Brazil's behalf without revealing for whom the purchase is made, there are no limits to the extent of the repurchases which can be made by Morgan at the given price. (It is only when Brazil's actions are discovered that the price rises since only in that case the reduction of its outstanding external debt raises the price.) Obviously, in the thirties, the Latin American buy-backs were only revealed *after* they were completed.

Yet, as far as the open buy-backs such as those that the Brady deal encourages, it is obviously crucial to make sure that the price at which the buy-back is undertaken is appropriately priced. This involves a comprehensive *ex ante* agreement with the creditors, so that none of them can free-ride on the others. This is exactly what the Brady deal has done. In a process called "novation", it was agreed that all the previous debt had to be exchanged against one of the three options which were open.

In order to evaluate empirically how the Brady deal has worked I will first analyze how the distinction between average and marginal price can be reconstructed empirically.

2 - Econometric estimates

Previous econometric estimates of the secondary market involve Sachs and Huizinga (1988), Fernandez and Ozler (1991), Huizinga and Ozler(1992) or Cohen and Portes(1990). I will rely here on the price of

20 middle income countries for which the transactions are relatively frequent. (Cf. *Financial Flows to Developing Countries*, Dec.91).

To the extent that we are interested in distinguishing the average and the marginal price of the debt, we want to estimate a price equation which yield explicitly such a distinction. Following my earlier work (Cohen,1989) I will use a logistic function of the prices to account for this discrepancy. Specifically, I obtain (for 1989 data):

$$(7) \quad \text{Log}\ \frac{q}{1-q} = \underset{(-3.44)}{-\ 2.71\ -\ 1.47\ \text{Log}\ D/Q} \underset{(5.31)}{+\ 5.48\ \text{HUN}}\ ;R^2 = 0.72$$

in which D is the stock of the debt, Q is per capita income (such as measured by Summers and Heston, in % of 1980 US per capita income). HUN is a proxy for Hungary (Hungary is controlled for because it is the only country in the sample which did not reschedule its debt).

By differentiating both sides, we get :

$$\frac{dq}{q} = -\ 1.47(1-q)\ \frac{dD}{D}.$$

Call V = qD the market value of debt, one gets

$$(8) \quad \frac{dV}{V} = [1\ -\ 1.47\ (1-q)]\ \frac{dD}{D}$$

There is consequently a threshold price for which the elasticity of price with respect to debt is (in absolute value) smaller than one. The price, here, is

$q^* = 0.32$ cents.

In part coincidently, this price is not significantly different from the average price (=0.35) of the representative middle income debtor at the end of 1989.

One can also rewrite equation (8) as:

$$\frac{dV}{V} = 1.47\ [q-q^*]\ \frac{dD}{D}\ ,$$

or equivalently, we can write that the marginal price is :

$$\rho = 1.47\ (q-q^*)\ q.$$

Below that price q^* there is a case of "debt Laffer curve" as Krugman (1988) puts it. Reducing the face value of the debt may *raise* its market value. As I emphasized in my earlier paper, however, there are only very few countries for which -with 95 % confidence- this mechanism is bound to appear. Around that threshold point, however, we can take the marginal price of the debt to be nil. Lenders, as a whole, are essentially indifferent between one more or one less dollar on their books. For countries which would repurchase their debt to the left of the price q^*, the deal would offer the bankers a "boondogle", as Bulow and Rogoff have put it for the Bolivian buy-back which occurred in 1987.

Another illustration of equation (7) comes as follows. Consider a debt which is originally priced at 32 cents. Assume that the debt is unilaterally written down by 50 %. What is the real cost for the bankers of such a write-down ? Using equation (7), one gets that the 50 % write-off would bring the price to 0.57 so that the market value would go from 0.32 to 0.285. This only represents a 11 % write-off in real terms. In nominal terms, the result is more spectacular : a 50 % write-off only cost 3.5 % of the original value of the debt ! With a debt-to-GDP of 100 % (which is the average middle-income debtor level) this represents 3.5 % of GDP.

These calculations show the formidable consolidation that could be brought by a debt settlement -if only it could be was appropriately priced. (Similar conclusions are reached in the simulation studies of Bartollini and Dixit, forthcoming and Cohen, forthcoming). We shall compare these numbers to the negative effects of debt on growth in section B below.

III - A VIEW ON THE BRADY DEAL

1 - Test of the seniority hypothesis

A simple test of the seniority hypothesis amounts to analyzing the significancy of the composition (among private and public creditors) of the total debt on the price of the commercial debt. Let us call D_1 the debt of the IFIs'debt. The results are given below :

$$\text{Log}\ \frac{q}{1-q} = -2.72 \underset{(-3.07)}{-1.46\ \text{Log}\ \frac{D}{Q}} \underset{(-0.05)}{-0.02\ \text{Log}\ \frac{D_1}{D}} \underset{(4.83)}{+5.46\ \text{HUN}} \quad ; \quad R^2=0.7$$

(t statistic in parenthesis)

We find that the composition of the debt is not significant at the 95 % level of confidence. More IFIs debt does not depress (when holding the aggregate level constant) the price of the commercial debt. This rejects the seniority hypothesis. Indeed, if the IFIs' debt were senior, then -ceteris paribus- more of it (holding the agregate debt constant) would reduce the share of the pie that the commercial banks are expecting to get and should degress the commercial debt's price. (Now it may also be the case that two conflicting effects are at work. More IFIs money may depress the price of the commercial banks on the one hand, but it can also raise the prospect of growth of the country so that, at the end, the banks would get a lower slice of a larger pie).

2 - The redistribution of wealth after the Mexican deal

A simple way to analyze a Brady Deal is to consider that it amounts to have the IFIs lend ε new dollars to the country against a write-off of η dollars from the commercial banks. The IFIs bring ε_1 dollars in cash, ε_2 of which is handed to the commercial banks, ε_0 of which is handed to the country. Along the line of the model presented above, let us analyze what are the distributional implications (for the country, the IFIs and the commercial banks) of such a combination in each of the two cases when the IFIs are senior or have equal status. Let us call

$V_i(D_1,D_2)$, i= 1,2, the value of the debt D_i held by the IFIs (i=1) or the commercial bank (i=2) and D the aggregate debt.

a) *When the IFIs are senior creditors*, V_1 (.) only depends on D_1 and is worth :

$$V_1(D_1) = \int_0^{D_1/\lambda} \lambda Q \, dF(Q) + [1-F(D_1/\lambda)] \, D_1$$

while

$$V_2(D_1,D_2) = \int_{D_1/\lambda}^{(D_1+D_2)/\lambda} [\lambda Q - D_1] \, dF(Q) + D_2 \, [1-F(D/\lambda]$$

Let us now investigate, in such a case, the implications of a Brady settlement.

i) The IFIs nominally raise their exposure by ε dollars against ε_1 dollars in cash. In terms of the model developped above, one can write that the IFIs consequently gain :

$$\Delta G_1 = \varepsilon \, [1 - F(D_1/\lambda)] - \varepsilon_1$$

in which the first term is bracket is their probability to get repaid.

ii) The commercial banks get the ε_2 in cash and reduce their exposure by η, but they also lose because the senior creditors have raised their exposure by ε. One can calculate that the banks get :

$$\Delta G_2 = \varepsilon_2 - \eta \frac{\partial V_2}{\partial D_2} + \varepsilon \frac{\partial V_2}{\partial D_1}, \text{ i.e :}$$

$$\Delta G_2 = \varepsilon_2 - \eta \, [1 - F(D/\lambda)] - \varepsilon \, [F(D/\lambda) - F(D_1/\lambda)]$$

iii) Finally, the country reduced its debt by $\eta-\varepsilon$, and get ε_0 in cash, so that it gains :

$$\Delta G_0 = [\eta-\varepsilon] \, [1-F(D/\lambda)] + \varepsilon_0$$

One can check that the game is a zero-sum game. (Indeed, in this exercice, we do not take account of the potential efficiency gains). So, for sure, if the banks do not lose, the game is a negative sum game between the IFIs and the country. Consider instead the simple case (which is the must favorable to the IFIs) when $F(D_1/\lambda) = 0$: The IFIs (which are senior creditors) expect to be paid fully, and also assume that $\varepsilon_1 = \varepsilon_2 = \varepsilon$. In that case, the banks' gain turn out to be :

$$\Delta G_2 = [\varepsilon - \eta] [1 - F(D/\lambda)]$$

and the game is simply now a zero- sum game between the commercial banks and the country. If their *nominal* write-off commercial exceeds the cash injection of the IFI's, they lose, no matter what. The reason (behind this -perhaps- paradoxical result) is that they lose on two accounts : They cut their exposure by η and they let the senior creditors raise their exposure by ε.

b) *When the IFIs have an equal status*, then one can write :

$$\forall i = 1,2 = V(D_i) = \frac{D_i}{D} \int_0^{D/\lambda} \lambda Q \, dF(Q) + [1-F(D/\lambda)] \, D_i$$

The balance then comes as follows. Call (as before) q the average price and ρ the marginal price of the aggregate debt. One can use the cross derivative to calculate that the IFIs gain :

$$\Delta G_1 = - \varepsilon_1 + \varepsilon \rho + (q - \rho) \left[\varepsilon \frac{D_2}{D} + \eta \frac{D_1}{D} \right]$$

while the commercial banks gain :

$$\Delta G_2 = + \varepsilon_2 - \eta \rho - (q - \rho) \left[\varepsilon \frac{D_2}{D} + \eta \frac{D_1}{D} \right]$$

and the country gains :

$$\Delta G_0 = (\eta - \varepsilon) \rho + \varepsilon_0$$

c) *Empirical evaluation of the Mexican deal*

As the study which have analyzed in detail the Mexican deal have shown (see especially Diwan and Kletzer,1990;Claasens and Van Wijnbergen, 1990 and Van Wijnbergen,1991), the banks have written off their claim by about $ 12 billion while the IFIs' exposure has been raised by ε = $7 billion which were used to guarantee the new bonds. Let us interpret these guarantees as a cash payment to the banks whose value is ε_2= $7(1-$\rho$) bl (since they will not be used with a probability ρ). With this interpretation, we must consequently take that the banks have written down their debt by 12 + ε_2.

To the extent that the deal may have been anticipated, it is hard to say what the "pre-deal" price of the debt actually was. Using a simulation study, Van Winjbergen takes it to be 0.39 ; using an econometric equation Diwan and Kletzer also conclude that it is around 0.40. They also estimate that the post-deal price is about 0.50. We follow their calculations and take the average "average" price (around which we calculate the marginal values) to be about 0.45.We consequently get the following numbers:

$$q = 0.45,\ \rho = 0.086,\ \varepsilon = \varepsilon_1 = 7.0,\ \varepsilon_2 = 6.4,\ \varepsilon_0 = 0.6,\ \eta = 18.4,$$

$$\frac{D_1}{D} = 1/3,\ \frac{D_2}{D} = 2/3.$$

One then gets :

$$\begin{cases} \Delta G_1 = -2.5 \\ \Delta G_2 = +0.9 \\ \Delta G_0 = +1.6 \end{cases}$$

So the deal now appears to amount to a transfer from the IFIs to the country, with the banks gaining only marginally. (Diwan and Kletzer finds that the banks gained, while Van Winjbergen also finds that they stayed at par).

5 - Is the Brady deal the appropriate vehicle for settling the debt crisis?

While the deal appears to not have been detrimental to the country, it does not perform what it was supposed to. What one would want is to allow the country to repurchase (out of its own ressources) a *large* amount of its debt (say 50 %) at a price which is the correct (marginal) value of the deal rather than a *small* amount out of the IFIs' money.

Taking the numbers which we previously offered, one wants to offer the country the possibility to spare, say, an extra $ 5 billion so as to repurchase in one block $ 50 billion.

The difficulty for such a deal is that -if the country does accumulate $ 5 billion- it will then become the prey of the banks that will want to seize the $ 5 billion (without giving up their claims). So what we would really need is a *commitment* from the banks that they will sell (say over 3 or 5 years) their claims at a price arranged ex-ante. In that case, one opens the country the opportunity to accumulate reserves so as to benefit from the deal (see Cohen and Verdier, 1990, for a dynamic model which explicitly deals with the strategic considerations associated with such a scheme). Such a deal really makes it profitable for the country to embark into an adjustment program. It opens the possibility to write-off an important piece of the deal out of an *extra*-effort which is correspondingly compensated for.

SECTION B : DEBT AND GROWTH

In this section we now want to adress the correlation between debt and growth. We shall first investigate the extent to which the debt build up of the early eighties can be identified as an important cause of the slow down of growth during the past decade. This will open the way to an empirical analysis of the potential efficiency gains that a debt write-off could deliver. We shall then attempt to draw more broadly the lessons of the debt crisis to assess the extent to which one should

expect (in the future?) foreign finance to speed up growth in the poor countries.

I - GROWTH FROM THE SIXTIES TO THE EIGHTIES

I - A "Quasi Accounting" framework

We shall set up, here, a "quasi-accounting" framework which builds on the "augmented" Solow model analyzed in Mankiw, Romer and Weil (1990) (henceforth MRW) . Assume that production can be written as :

$$(1)\quad Q_t = K_t^{\alpha} H_t^{\beta} (A_t L_t)^{\alpha}.$$

K_t is physical capital, H_t is "human" capital, L_t is raw labor and A_t is an exogeneous productivity term.
and write :

$$(2)\quad \begin{cases} \dot{K}_t = -\,d\,K_t + I_t & (2\text{-a}) \\ \dot{H}_t = -\,d\,H_t + Z_t & (2\text{-b}) \end{cases}$$

Call, $Y_t = (Q_t/L_t)$ output per capita, $a_t = \text{Log } A_t$, $y_t = \text{Log } Y_t$.One can log-linearize (1) and (2) as :

$$(3)\quad \frac{d}{dt} y_t = a_t - (1-\alpha-\beta)(d + n + \mu)(\hat{y}_t - y_t)$$

in which, $\hat{y}_t$ is :

$$(4)\quad \hat{y}_t = a_t + \frac{\alpha}{1-\alpha-\beta} \text{Log } \frac{I_t}{Q_t} + \frac{\beta}{1-\alpha-\beta} \text{Log } \frac{Z_t}{Q_t} - \frac{\alpha+\beta}{1-\alpha-\beta} \text{Log } (d+n+\mu)$$

In MRW, $\hat{y}_t$ is taken as a proxy of the (Log of the) income per capita steady-state towards which the economy is converging. There is no ground to make such an hypothesis since $\frac{I_t}{Q_t}$ and $\frac{Z_t}{Q_t}$ can very well vary with the level of income. Equation (3) is simply obtained by differentiating (1) (around its initial value) while taking account of

(2) to measure the increase of capital. In particular, an equation such as (3) is plainly consistent with a model of endogeneous growth (in which the growth of human capital can go unbounded). It nevertheless remains the case that one can interpret equations (3) and (4) as a "quasi-accounting" framework. It is on such an interpretation that we shall draw in order to decompose the origin of the growth slowdown in the eighties.

2 - A benchmark equation

In this section, we first offer to estimate equation (3). To the extent that we want to pay a specific attention to the shift of the pattern of growth over the years, we shall pool the time averages over the following four sub-samples : 1960-1966 ; 1967-1973 ; 1974-1980 ; 1981-1987. We use the Summer-Heston data (1991) and complement them with World Bank data. Z_t/Q_t is proxied by secondary school enrollment. (In Cohen 1991, I show that MRW's procedure essentially amounts to that). The results are shown in appendix 1,column 1.These results are consistent with the estimation of equation (1) when $\alpha = 0.55$ and $\beta = 0.24$. While the sum $\alpha + \beta = 0.79$ is in line with the results in and MRW (who respectively defended $\alpha + \beta = 0.8$ and $\alpha + \beta = 0.66$). The share of capital is larger than in MRW (which defended the view that $\alpha = \beta = 1/3$).

The main feature which appears from this regression is the very significant slowdown of growth in the eighties. Growth in the eighties was 2.5 % below the level that was reached in the sixties ("all things equal"). It is crucial to note that this reduction is obtained even though the "conditional dynamics" that we estimate take account of the investment decision. It is therefore *not* the shift of investment which explains the slowdown of growth that we are identifying but a loss of "productivity" (which obviously must take account of the fact that the recession of the early eighties has pushed the economies within their production possibility frontiers).

3 - The debtor nations and the terms of trade

We now investigate the specific pattern of growth of the debtor countries and take account of the terms of trade (a prime suspect for the developing countries troubles). We shall distinguish two sub-groups. One group is the group of "moderately and severely indebted countries" such as defined by the World Bank (henceforth the SM group). The other group is composed of those countries which got into "refinancing difficulties" which we define as countries which rescheduled their debt more than once in the eighties.

We then add a last explanatory variable : the "trend" of the terms of trade in the seventies and in the eighties. The "trend" is taken by regressing the rate of growth of the terms of trade (within each period) on a time trend. (For lack of comprehensive data, we do not include the terms of trade in the sixties. For the subgroup of countries for which we did get them, we did not find the terms of trade to be significant in the period prior to the seventies).

We consequently ran the following regressions

$$(9)\quad g = \hat{a} + \hat{b}D_i + \hat{c}D_{80} + \hat{d}D_i * D_{80} + \hat{e}\,\text{linv} + \hat{f}\,\text{tot} + Z_i$$

in which D_i is a dummy for (respectively) the group of large-debtors or the group of rescheduling countries. D_{80} is the dummy for the eighties ; $D_i * D_{80}$ is the product of the two ; inv. and tot are investment and the terms of trade ; Z_i are the other time dummies.

The results are in column 2 and 3, appendix 1. We now find that the non-debtor countries experienced a significant "productivity" slowdown in the eighties of about 2.3 percentage points. Beyond this general slowdown, the group of severely indebted countries experienced an additional fall of about 0.9 % (which is only significant at the 10% degree of confidence) while the group of rescheduling countries experienced an additional slowdown of 1.4% (which is significant at the 5% degree of confidence). In addition, the debtors experience a lower "trend" in the rate of growth of their aggregate productivity : it is

worth about 0.6% in both groups (and is only significant at the 10 % degree of confidence).

This slowdown of aggregate "productivity growth" is obtained when controlling for the (adverse) effects of the investment slowdown and of the terms of trade shocks. In order to get a measure of these two additional terms, we have estimated an investment equation and measured similarly the investment slowdown which was experienced : 1) in the eighties (for all countries) 2) for the debtors groups (prior to the debt crisis) 3) for both debtor groups in the eighties. Using the measured elasticity of growth with respect to investment such as obtained in equations (2) and (3) (in appendix 1) we then calculated the specific effect of the investment slowdown on growth. We similarly decomposed the specific effect of the terms of trade (prior and uring the debt crisis) on the growth of each of the two subgroups of debtors. The results are summarized in Table 5 below.

TABLE 5 - SLOW GROWTH IN THE EIGHTIES

	"Productivity" Slowdown	Slower growth due to investment	Slower growth due to term of trade	Total fall
All countries : (1)	- 2.3	- 0.2	-	- 2.5
Additional fall in the large debtors :				
2) Trend (2)	- 0.6	- 0.1	+ 0.2	- 0.5
3) 80's (3)	- 0.9	- 0.2	- 0.8	- 1.9
Total for the large debtors : (4) : (1)+(2)+(3)	- 3.8	- 0.5	- 0.6	- 4.9
Additional fall in the rescheduling countries :				
5) Trend	- 0.6	- 0.4	+ 0.1	- 0.9
6) 80's	- 1.4	- 0.1	- 0.5	- 2.0
Total for the rescheduling countries (7) : (1)+(5)+(6)	- 4.3	- 0.7	- 0.4	-5.4

This table must be read as follows. In the eighties, growth in the large debtor group was 4.9 percentage point below the previous average of the non-debtor countries. Of this (extraordinary) reduction, about half (2.5 percentage point) was a world-wide phenomenon. Another half a percentage point is a general feature to prevail in these countries. Finally the specific slowdown of growth in the large debtor group is 1.9 percentage point, 0.2 of which is due to another round of lower investment and 0.8 to a bad terms of trade shock. So, at the end, out of a fall of a 4.9 percentage points, we are left with a remaining ("unexplained") productivity slowdown of 0.9 percentage point. This is how much (besides the investment effect to which we shall return below) has, perhaps, to be explained by the debt crisis.

Another synthetic way to measure this "total" fall of the debtors' growth can be (roughly) obtained by estimating a growth equation *without* controlling for the investment and the terms of trade effect. This is shown in columns (4) and (5) in appendix 1. We now estimate a general fall of the growth rate in the 80's 2.5 %, specific lower growth of the SM group of 1 % (prior to the debt crisis) and a specific fall in the eighties of 1.6 % so that, at the end, we get a lower growth of the SM group of 5.1 % (which is of the same magnitude that the aggregate reduction of 4.9 % that we estimate in Table 5). Similarly, for the rescheduling countries, we get an overall fall (with respect to the previous average of the non-debtors) which amounts to 5.5 percentage points (compared to 5.4 percentage points in Table 5).

7 - The "unexplained" residual

Let us now turn to analyze the extent to which we can trace back to the debt factor the origin of the "productivity" slowdown (such as measured left by the residual analyzed above). There are (at least) 6 terms that we can think of as correlated to the debt crisis and which can explain the specific reduction of growth in the debtor countries: 1) The stock of debt ; 2) the net ressources that were *actually* transferred by the debtors to their creditors ; 3) the variation of the share of import in GDP ; 4) the variation of the tax burden imposed on the country by the government ; 5) the variation in the share of government expenditure; 6) the rise of inflation.

When taking all these 6 factors together, we got that *none* is statistically significant, that the debt factor is wrongly signed and that the unexplained residual is *raised* (in absolute value) to 1.1 percentage point !

After a few iterations, the only robust factor to emerge is the reduction in the share of imports in GDP, which is only significant at the 10% degree of confidence. One gets -by taking account of this item only- that the unexplained residual for the group of large debtors falls to 0.5 percentage, and again is only significant at the 10% degree of confidence.

The same paradox emerges with the group of rescheduling countries. When taking account of "everything", the unexplained residual is not reduced. When taking account of the variation in the share of imports only, it is -again- reduced by 0.5 percentage point. In this case, the unexplained residual is still statistically significant and worth 0.9 percentage point.

8 - Conclusion

The fact that the group of large debtors -and especially the group of reschedulers- experienced a specific slowdown of their growth rate (even after taking account of the fall of investment and the variations of their terms of trade) is confirmed by the econometric analysis. Yet it is puzzling to find that this slowdown does not appear to be a function the parameters that are (one would guess) highly correlated to the debt crisis (the stock of debt or the flows of net payments). One simple interpretation is that a country with a good prospect of growth can perhaps easily remburse its debt while -at the other extreme- a country which is vunerable to sanctions may have to reimburse its debt at the cost of a lower growth so that no obvious correlation between growth and payment is likely to be obtained.

As far as the rescheduling countries are concerned, it can also be that once a country gets into financial difficulties (whatever their magnitude may be) it suffers of a loss of confidence due to capital flight, external liquidity problems and the forth which leads to a "productivity slowdown" that the rescheduling dummy is capturing (with little explanatory power left to the other debt factors).

Albeit one can always point to other factors, let us take here as a benchmark measure of the pure *waste* due to the debt crisis the unexplained performance of the reschedulers i.e. : 0.9 percent of GDP over the six years 1983-1988, or about 5.5 percent of GDP. As we have shown in section A, it may cost 3.5 % of GDP to write down half of the debt of the rescheduling countries. With half its face value, we have also shown that the debt would have been sustainable (and below the 1980 level) so that one can assert that having written down half the debt may have avoided the crisis. This would have implied a return of about

60 % ! We obviously do not ask to take these numbers at face value but given the low cost of cutting off a large fraction of the nominal debt it does not take to estimate much of a net benefit to get that repurchasing (at the right price) the debt is a profitable investment. At a more intuitive level, it is not shocking to argue that a country would have willingly wanted (with the benefit of hindsight) to pay -say over two or three years- an extra cost amounting to 3% of its GDP to get its debt reduced by half and avoid getting into the rescheduling limbo.

II - BEYOND THE DEBT CRISIS : CAN FOREIGN FINANCE SPEED UP GROWTH ?

1 - Introduction

Let us now look ahead and try to draw the lessons of the debt crisis. What should we think of the failure of the group of large debtors to grasp the opportunities that were offered by the access to the world financial market ? Should we think that it was only "bad luck" (the Reagan-Volcker shock) or more deeply should we think that the world financial markets are not likely to help a poor country very much?

The question already arises for the (former) East European Countries. Should the West lend them the money they need to build up their capital stock ? Is it the case that a free access to the world financial markets could help these countries catch up their western counterpart more rapidly ? We have, before our eyes, the case of East Germany which is a reduced version of what the total release of specific sovereign risk can produce. Large amounts of ressources are flowing from the West to the East (more than $ 50 billion a year, for only 16 million people ; scaled for Russia (only) this would correspond to more than $ 500 billion a year !). Even in this narrow case, voices have expressed doubts on the ability of East Germany to catch up "rapidly" West Germany. Barro and Sala-i-Martin (1991), in particular, have extrapolated the results that they found for *regions* across Europe or across the U.S and *nations* around the world to the German case. The speed at which poor regions (within a nation) appear to catch up the rich ones appears to be at 2 % of year, a number which is -remarkably- about the same as the speed at which -they found- the poor *nations* are catching up the rich ones. According to their calculations, it would

then take (no matter what) about 25 years to close *half* the gap between the Western and the Eastern part of Germany. A number certainly bound to disappoint Chancellor Kohl and likely to be even more despairing for the countries which count on foreign finance to raise their growth rates.

In another way, Krugman (1991) makes the same claim that one should not expect capital mobility to do much to reduce the gap between the rich and the poor nations. Past historical episodes (before the debt build up of the 1970s), for one thing, never really shows the North financing the South. The cases in which one can point towards some success in this matter are the regions of "recent settlements" such as Australia, Canada, New Zealand and the U.S (and also Argentina) in which capital flows certainly helped financing substantially capital accumulation in these countries. (In the case of Canada, for instance, up to 40 % of domestic capital accumulation has been financed from abroad). In contrast, India (which was many times more populated) only absorbed a marginal part of British surplus. In conclusion, Krugman argues that the idea that foreign finance might speed up growth in the poor countries has been "oversold".

2-Theoretical background

Krugman epitomizes the problem as follows. Either we trust the Solow model (in which, say, $Q = AK^{1/3}L^{2/3}$) and then capital accumulation only plays a minor role in explaining growth (indeed, asymptotically, no role at all). Or we trust the Lucas-Romer model, but then there is no reasons for capital to flow from the rich to the poor countries (if there are no decreasing returns, capital is *not* more profitable in the South, where it is scarce). Let us follow here the middle ground which is in MRW and assume again that :

$$(11) \quad Q_t = K_t^{\alpha} H_t^{\beta} (A_t L_t)^{\gamma}, \quad \text{with} \quad \alpha + \beta + \gamma = 1$$

The (simple) point that I would now want to make is the following: whether a poor country can count on foreign finance to speed up growth critically depends on its physical-human capital ratio. When it is low (as, perhaps, is currently the case in Eastern Europe) then there is room for foreign finance to speed up growth in a poor country.

In appendix 2, I sketch a simple model in which I attempt to replicate theoretically the results which have been found empirically by Barro and Sala-i-Martin. If one takes "nations" to be closed economies (which must count on domestic savings to accumulate capital), then the domestic stock of capital is running after a moving target which corresponds (at any point in time) to the level K_t^c for which domestic saving would stabilize the capital output ratio, that is a level K_t^c such that :

$$s(K_t^c)^{\alpha} H_t^{\beta} (A_t L_t)^{\alpha} = (d+n+\mu) K_t^c$$

in which s is the domestic saving rate, d is the depreciation rate, n is the rate of growth of labor, μ is the rate of growth of productivity. Equivalently, in log terms, one can write :

$$k_t^c = \frac{\beta}{1-\alpha} h_t + \theta_c$$

in which $k_t^c = \text{Log} \frac{K_t^c}{A_t L_t}$ $h_t = \log \frac{K_t}{A_t N_t}$ and $\theta_c = \text{Log} \frac{s}{d+n+\mu}$.

Now, if we take "regions" to be open economies for which the marginal product of capital is equalized to a given interest rate r, one finds that the open economy target K_t^0 is defined through :

$$\alpha(K_t^0)^{\alpha-1} H_t^{\beta} (A_t L_t)^{\gamma} = r+d$$

so that

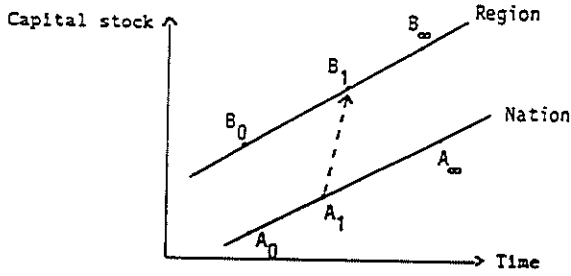
$$k_t^0 = \frac{\beta}{1-\alpha} h_t + \theta_0$$

in which $k_t^0 = \text{Log} \frac{K_t^0}{A_t L_t}$, $\theta_0 = \frac{1}{1-\alpha} \text{Log} \frac{\alpha}{r+d}$.

As one sees the closed and the open economy targets have the same functional form. (This is due to the fact that the closed economy's

saving rates determines the average productivity of capital while the open economy determines the marginal productivity ; in the Cobb-Douglas case they are proportional to each other). This explains why the pattern of growth of open and of closed economies may appear to be qualitatively similar. (See appendix 1 for more details). Within such a framework, regions and nations will appear to converge at the same speed towards their steady-states (the speed depending essentially on the law of motion of human capital), as found in Barro and Sala-i-Martin.

Yet, this famework should help seeing why Barro and Sala-i-Martin's conclusion about the effect of turning a nation (East Germany) into a region (Eastern Germany) is misleading. It may very well be that both regions and nations appear to converge towards their (own) steady-state at about the same speed and yet when a nation *becomes* a region (by being integrated to a larger nation) its capital stock may well be shifted to a new point, from which it will get back converging (at perhaps "2 % a year") towards its new steady state. If one takes the case of a closed nation in which the saving rate is low, turning this "nation" into a "region" which faces a lower interest rate would then (rapidly) lift up the capital stock.



In terms of the figure above, a nation would go from an initial point A_0 to a terminal point A_∞ at 2 %. East-Germany instead go from A_0towards B_∞ ; it converges at 2 % a year towards its steady state only after it has been lifted up to B_1.

In other words, a *new* access to the world financial market may speed up growth (even though open regions are not observed to grow more rapidly than closed nations) if the capital stock of the nation is initially low. In order to analyze when this will be the case, and when *sovereign risk* constraint are likely to be binding, one needs to be more specific on the reasons why a "poor" country may want to raise its stock of capital. In terms of the model sketched above:

a) It may wants to speed up its transitional dynamics towards its ("instantaneous") closed economy steady-state k^C.

b) It wants to raise "permanently" its capital stock to the level, k^O, which is consistent with the equalization of the (social) rate of return to the rich countries' returns.

In the first case, sovereign risk need not be binding : financial markets simply help the countries go *faster* to a point which is consistent with their domestic ability to save. The second motive is most likely to be impossible for nations : large transfers of sovereignty (on the ownership of capital) would indeed be *permanently* needed. (If savings are too low in the debtor country). They are very unlikely.

This typology is also useful in adressing Krugman's point according to which only regions of recent settlement seem to have enjoyed the benefit of foreign finance (before WWI). This may be due to the fact that they were essentially places which hardly started their transitional dynamics (being characterized by low initial physical capital and large initial human capital) so that foreign lending was indeed the right vehicle to speed up growth.

3 - The "poverty of nations" : a typology

Let us now investigate empirically which of the causes outlined above is to explain the poverty of the "poor" nations (characterized by a "low" per capita income) and consequently assess the extent to which the access to the world financial markets may help them.

More specifically, we want to decide if these countries are poor because of a "low" initial stock of physical capital or, simply because of a low initial productivity. "Low" capital stock has two potential meaning : 1) Vis-à-vis the steady-state to prevail in the closed economy; 2) vis-à-vis the benchmark case in which the free mobility of capital would equalize the rates of returns across nations.

Let us consequently define two measures of "poverty" :one which measures how far a country's initial capital stock (k_0) stands with respect to the level to prevail under a free access to the world financial markets (k^o) and one which measures how far an economy stands with respect to its closed economy benchmark (k^c). (Each of these two benchmarks are calculated at the *current* level of human capital. They are consequently aimed at assessing whether a country is poor or rich in physical capital *relatively* to its stock of human capital). We consequently define the open economy criterion as:

$$\omega^o = k^o - k_0,$$

while the close economy benchmark is defined as:

$$\omega^c = k^c - k_0 .$$

Taking account of the fact that $y = \alpha k + \beta h$, one can write, up to a multiplicative constant ($\frac{1}{1-\alpha}$) and to an additive constant (θ_0) :

$$\omega^o = [y_0 - k_0]$$

and

$$\omega^c = \omega^o + \log s_1$$

We consequently only need to know the physical stock of capital and in order to calculate ω^o and ω^c (see Cohen 1991b on the data). (s_1 is the average investment rate in 1970-88).

The results are shown in table 6. We report the values obtained for the 20 countries that we examined in section A and for the average OECD countries in 1970 and in 1988. It is first extraordinary to note the

wide differences of capital-output ratios across the world. (This point is also emphasized in MRW). When interpreted in terms of rate of returns, these amount to differences that range from 15.5% in the case of France and Germany to about 45.5% in the case of Thaïland and Philippines.

TABLE 6 - DISTANCE "OFF" OPEN ECONOMY (OMEO) AND CLOSED ECONOMY (OMEC) BENCHMARKS

	1970		1988	
	OMEO	OMEOC	OMEO	OMEOC
Algeria	0.16	3.50	-0.79	2.55
Egypt	1.78	3.58	0.82	2.63
Ivory Coast	0.98	3.27	0.39	2.68
Morocco	1.29	3.54	0.41	2.66
Nigeria	1.09	3.59	0.09	2.58
Sudan	3.52	4.04	2.10	2.62
Zaire	1.83	4.17	0.10	2.45
Mexico	-0.41	2.58	-0.33	2.67
Argentina	-0.54	1.91	-0.17	2.28
Brazil	-0.52	2.46	-0.04	2.94
Chile	-0.72	3.20	-0.04	2.44
Colombia	-0.33	2.47	-0.19	2.62
Ecuador	-0.48	2.75	-0.48	2.75
Peru	0.13	2.85	-0.16	2.57
Venezuela	0.19	3.02	-0.06	2.76
Pakistan	-0.46	2.07	0.58	3.11
Philippines			0.31	3.28
Turkey	-0.28	2.82	-0.36	2.74
Large Debtors	0.70	3.17	0.16	2.67
OECD	-0.82	2.40	-0.65	2.57
(OECD standard deviation)	(0.79)	(0.76)	(0.24)	(0.15)

While most LDCs are off the open economy benchmark, only a few (9) of them were (two OECD standard deviations) off the closed economy

benchmark in 1988. The later are : Malawi, Tanzania, Zimbabwe, Hong-Kong, Pakistan, Brazil, Philippines, and Thaïland (plus Australia which is the only OECD country to be "capital poor" with respect to the open economy target.). When one tests specifically where does the group of the large debtor stand, one finds that - in 1988- they are significantly off the OECD average as far as the open economy criterion is concerned but not significantly (at the 95 % degree of confidence) off the OECD average as far as the closed economy benchmark is concerned. One the other hand, in 1970, one finds that they were off *both* benchmarks. So, to some extent, they did accomplish their transitional dynamics over the past two decades. Were they helped by the access to the world financial markets ?

3 - Capital accumulation in the group of large debtors prior to the debt crisis.

In order to find out if this is the case, we have analyzed the speed of capital accumulation in the group of large debtors and compared it to capital accumulation in the other non-debtor developing economy in the seventies (prior to the debt crisis). Specifically, we regressed the growth rate of physical capital (dk) upon the initial value of (the log of) per-capita income (y_0) and of physical capital per head (k_0).

We first analyze capital accumulation for a sample of 48 developing countries, while controlling for the group of large debtors (dummy DSM). We get :

$$dk = -0.10 - 0.026\ DSM + 0.0823\ y_0 - 0.0610\ k_0 \quad ; \quad R^2 = 0.66$$
$$\qquad\qquad (-2.25) \qquad (6.71) \qquad (-9.1)$$

(t statistic in parenthesis). Period of estimation : 1970-80.

This regression is interesting in its own right. Capital accumulation appears to be positively correlated to initial income and negatively correlated to the initial stock of physical capital. When one takes the view that $y_0 = \frac{1}{3}(h_0 + k_0)$, this also implies a positive correlation with initial human capital and a negative correlation with

initial physical capital. The key result of interest to us however is that the group of severely indebted countries's capital grew *less* rapidly than in the other developing countries.

A key feature of the large debtor countries'capital accumulation is revealed when one tests for the stability of the partial correlation of capital accumulation with respect to y_0 and k_0. When one restricts the sample to the sub-group of debtors only, one gets :

$$dk = -0.15 + \underset{(5.7)}{0.083}\, y_0 - \underset{(-7.3)}{0.059}\, k_0 \quad ; R^2 = 0.64 \text{ (t-statistics in parenthesis)}$$

Period of estimation : 1970-80.

As one sees the coefficient obtained for the subsample of large debtors appear to be essentially identical to the coefficient for the developing countries at large. (A Chow test formally rejects the hypothesis that the coefficients are different).

One conclusion that one draws from these results is that the 1970s failed to change the qualitative pattern of capital accumulation in the group of large debtors. In those countries, capital accumulation was less rapid, but for exogeneous rather than for endogeneous reasons. One consequently gets the intuition that the group of large debtors behaved more like a closed economy with a low saving rate rather than as an open economy.

4 - Domestic saving and investment off and at financial autarky

In order to get a more specific account of the distance of investment with a closed economy benchmark, let me -briefly- built on a previous work to calculate a "financial autarky" investment rate and see how far off that benchmark the group of large debtors have stood over the past three decades.

In order to calculate the rate of investment which would have prevailed at financial autarky, let us assume that investment is a

function of an exogeneous (pre-determined) set of variables (x_i) and of a shadow cost of capital, ρ. One then writes :

$$\frac{I}{Q} = \sum_i a_i x_i - \alpha \rho + \varepsilon$$

Similarly, assume that saving can be written as:

$$\frac{S}{Q} = \sum_i b_i x_i + \beta \rho + \eta$$

Given the national account identity, one knows that :

$$S = I + TB$$

with TB the resource balance. Substituting for the value of ρ which is consistent with the availability of funds, one gets:

$$(15) \quad \frac{I}{Q} = \frac{1}{\alpha+\beta} \left[\sum_i (\beta a_i + \alpha b_i) x_i + \beta \varepsilon + \alpha \eta \right] - \frac{\alpha}{\alpha+\beta} \frac{TB}{Q}$$

The first term in bracket is nothing else but the "financial autarky" investment rate, that is the rate to prevail when ρ is (domestically) set so as to impose I=S. The second coefficient is a crowding in or out coefficient. Perhaps more intuitively one can characterize $\frac{\beta}{\alpha+\beta}$ as the "leakage" of foreign finance out of investment into aggregate consumption.

While the relation (15) is *always* true, whether $\frac{TB}{Q}$ is determined endogeneously or exogeneously set out of a rationned access to the world financial market, it can only be econometrically tested in the later case.

In a previous work (Cohen, 1990), I have tested this correlation over the sixties and during the eighties for the group of rescheduling countries, on the ground that both these sub-samples were characterized by a restricted access to the world financial market. I found that over both sub-periods, the coefficient $\frac{\alpha}{\alpha+\beta}$ were not statistically different and worth around 0.30. This shows that the "leakage" of foreign finance out of investment (the coefficient $\beta/\alpha+\beta$) is very large since it

amounted to 2/3 of the foreign impulse (whether its sign was positive as in the sixties, or negative as in the eighties).

Let me simply report here the results of a regression in which the impact of the trade balance onto investment is distinguished acording to the time sub-periods (60s, 70s and 80s) and -in the 80s- according to the status of the developing country (rescheduling, non-rescheduling). One gets:

$$\frac{I}{Q} = \underset{(2.28)}{5.27} - \underset{(-3.02)}{3.17}\,DLA - \underset{(-2.42)}{2.90}\,DAF + \underset{(2.09)}{2.37}\,D7481 - \underset{(-1.76}{1.76}\,D8287$$

$$+ \underset{(1.92)}{1.14}\,POPERT - \underset{(-2.23)}{0.29.10^{-1}}\,INFL + \underset{(4.31)}{0.17}\,\frac{X}{Q} + \underset{(2.40)}{0.21}\,y_0$$

$$+ \underset{(5.12)}{0.10}\,ENROL1 - \underset{(-4.64)}{0.33}\,KTB60 - \underset{(-2.58)}{0.17}\,KTB70$$

$$- \underset{(-8.29)}{0.31}\,KTB80R - \underset{(-6.38)}{0.20}\,KTB80NR \quad ; \quad R^2 = 0.56$$

(t-statistics in parenthesis).

in which DLA and DAF are Latin American an African dummies ; D7481, D8287 are time dummies for 74-81 and 82-87, POPERT is population growth; INFL is the inflation rate, X/Q is export-to-GEP, y_0 is beginning of period per capita income, enroll is primary school enrollment KTB60, KTB70, KTB80R and KTB80NR are the trade balance in the sixties, seventies and 80s in the group of rescheduling and non-rescheduling countries respectively.

All attempts to instrument the trade balance in the seventies reduced the crowding out coefficient. Furthermore, when one uses a regression based on the *sixties* only to forecast the seventies one finds that the regression *over*-predicts the share of investment in GDP by about 1 % for all countries and 1.5 % for the debtor countries (albeit the differences is not significant). Albeit the potential endogeneity of the trade balance is not appropriately dealt with in the seventies and -for the non-reschedulers- in the 80s, we are led to a

simple conclusion : the impact of foreign finance on investment never seems to have exceeded the level that it reached in the sixties, of about 0.3. (See also Warner, 1991, for an analysis that rejects the hypothesis that the debt crisis caused the investment slowdown). As I show in my earlier paper, this is consistent with the view that the intertemporal elasticity of substitution is worth 1/3 (which is quite reasonable). In other words the leakage of foreign finance onto consumption is a feature that one should expect whenever a poor country starts borrowing. As the case study of Singapore by Young(1992) shows, however, there are cases when this feature can be avoided through (a quite authoritarian) government policy.

5 - Conclusion

One sees that investment never appears to have gone very far-off the closed economy benchmark in the group of large debtors. This explains why we found no *endogeneous* difference in their rate of capital accumulation. With the numbers that we got, even a deficit of 6 % of GDP would only raise domestic investment by 2 %. To get an estimate of its impact on growth, one can take equation (3) to see that it would only generate an additional growth of 0.4 percentage point. The success story of East Asia teaches -from that perspective- a simple lesson. It saves 60 % more than the rest of the developing countries and this may generate (from equation 3) an extra growth of per capita income of 3 percentage points. Taking account of the leakage coefficient that we estimated this would require an external deficit of 30 % of GDP ! When one remembers that -at best- the large debtors seem capable to servicing no more than 3 % of GDP one sees why sovereign risk comes very quickly to be a binding constraint. (See Marcet and Marimon, 1990, for a similar conclusion.) This is why *regional* integration could make a difference. However big the number may look like, 30 % of their GDP may well actually be what East Germany is currently receiving form the West.

Do these results foreclose the role of foreign finance as a vehicle to speed up growth? Not entirely. For one thing, direct investments are always welcome to the extent that they help transferring technologies. But even debt finance can play a role if it helps speeding up (rather

than shifting up) the transitional dynamics of a poor country from an initially low level of physical capital to a higher level, provided that the higher level is consistent with domestic saving. In order to have foreign finance perform such a role, it must be (besides controlling its saving rate) that the "poor" country is relatively well endowed in human capital and relatively poor in physical capital. Albeit this is a rare combination, this may be a good description of Eastern Europe to-day.

APPENDIX 1

- DEPENDENT VARIABLE : GROWTH RATE

OF PER-CAPITA INCOME 1960-87

	(1)	(2)	(3)	(4)	(5)
c	$0.37.10^{-2}$	0.029	0.030	0.068	0.058
		(1.66)	(1.78)	(4.09)	(3.78)
D6773	$0.90.10^{-3}$	$0.16.10^{-2}$	$0.15.10^{-2}$	$0.27.10^{-2}$	$0.24.10^{-2}$
	(0.23)	(0.42)	(1.62)	(0.67)	(0.62)
D7480	$-0.98.10^{-2}$	$-0.62.10^{-2}$	$-0.63.10^{-2}$	$-0.89.10^{-2}$	$-0.95.10^{-2}$
	(-2.44)	(-1.57)	(-1.62)	(-2.13)	(-2.33)
D8187	-0.03	-0.023	-0.022	-0.025	-0.026
	(-7.39)	(-4.50)	(-4.75)	(-4.66)	(-5.35)
DSM		$-0.60.10^{-2}$		-0.010	
		(-1.62)		(-2.63)	
DSM81		$-0.89.10^{-2}$		-0.016	
		(-1.38)		(-2.50)	
DRES			$-0.57.10^{-2}$		$-0.99.10^{-2}$
			(-1.60)		(-2.87)
DRES81			-0.014		-0.019
			(-2.22)		(-2.96)
TT7481		0.18	0.18		
		(4.01)	(4.26)		
LINV	0.020	0.017	0.014		
	(2.84)	(4.60)	(3.66)		
LYI	$-0.74.10^{-2}$	$-0.91.10^{-2}$	$-0.88.10^{-2}$	$-0.92.10^{-2}$	$-0.81.10^{-2}$
	(-2.70)	(-3.31)	(-3.28)	(-3.24)	(-2.94)
LENR2	$0.85.10^{-2}$	$0.82.10^{-2}$	$0.93.10^{-2}$	0.12	0.012
	(2.84)	(2.73)	(3.21)	(3.88)	(4.14)

t statistic in parenthesis.

APPENDIX 2

Assume that output is:

(A1) $Q_t = K_t^{\alpha} H_t^{\beta} L_t^{\gamma}$

and write the law of motion of capital to be:

(A2) $K_{t+1} = - d K_t + I_t$

in which I_t is the amount of investment undertaken at time t.

Assume that H_t ("human capital", or perhaps more appropriately "immaterial capital") can only be accumulated domestically and follows a law of motion that can be written as :

(A3) $H_{t+1} = - \delta H_t + s_2 H_t^{\lambda} K_t^{\nu} L_t^{1-\lambda-\nu}$.

in which s_2 is the number of hours spent on education (and, say, collinear to enrollment shcool data) while $H_t^{\lambda} K_t^{\nu} K_t^{1-\lambda-\nu}$ is a measure of an "aggregate" stock of knowledge which education builds upon.

Let us now assess, within such a framework, the extent to which the access to the world financial market change the pattern of growth of a nation.

a) *Dynamics in the closed economy*

So as to simplify the analysis of the dynamics, let me assume that $d = \delta = 1$, so that the time interval is, say, one generation.

Assume that $I_t = s_1 Q_t$ in which s_1 is the propensity to save (say of the young generations). In this case, one can write (in Log terms) the dynamics of the economy as :

(A4) $k_{t+1} = \text{Log } s_1 + \alpha k_t + \beta h_t$

(A5) $h_{t+1} = \text{Log } s_2 + \nu k_t + \lambda h_t$

The system is converging towards a steady-state (which only depends on s_1 and s_2) if and only if $(\alpha-1)(\lambda-1) - \beta \nu > 0$.

b) *Dynamics in the open economy*

Assume now that the country has a totally free access to the world financial markets so that capital can freely flow in up to the point where

$$\frac{\partial f}{\partial K}\,(K_{t+1}, H_{t+1}, N_{t+1}) = 1 + r$$

so that

$$(A4')\quad k_t = \theta_0 + \frac{\beta}{1-\alpha}\, h_t \ .$$

Assume furthermore that the law of motion of human capital is not dependent upon the way physical capital is accumulated One then finds that the system (A4') and (A5) is converging towards a steady-state if and only if $\frac{\nu\ \beta}{1\ -\alpha} + \lambda - 1 < 0$, which is the *same condition as in the closed economy case.*

c)*Intuition*

The result is intuitive because the open economy's capital stock is

$$k_t^0 = \frac{\beta}{1-\alpha}\, k_t + \theta_0 \quad ; \quad \text{with } \theta_0 = \text{Log } \frac{\alpha}{1+r}$$

while the law of notion of capital in the closed economy can be written:

$$k_{t+1} - k_t = (1-\alpha)\,[k_t^c - k_t]$$

in which

$$k_t^c = \frac{\beta}{1-\alpha}\, h_t + \theta_c \ : \text{ with } \theta_c = \text{Log } s_l.$$

Up to a constant,the closed economy is running after a target which has the same dependency on human capital as the open economy capital stock. If one system is converging towards a steady-state, so must be the other one. To go one step further in the analysis of the dynamics, first consider the simple case in which $\nu=0$. In that case, the closed economy has two eigenvalues which are simply λ and α while the open economy has only one, λ. If $\alpha > \lambda$, then the closed and the open economy look different. The closed economy asymptotically converges towards its steady-state at a speed $1-\alpha$ while the open economy converges at a speed $1-\lambda$. If instead $\lambda > \alpha$ (as it is intuitively the case, and as appears to be the case when testing directly an equation such as (A3)) then, asymptotically, human capital accumulation will be driving the growth rate of the economy in both cases and both of them will asymptotically converge at the speed $(1-\lambda)$. In the general case when $\nu \neq 0$, this is still qualitatively true if $\frac{\beta\ \nu}{1-\alpha}$ is small with respect to λ.

APPENDIX 3

HOW MUCH DID THE LARGE DEBTORS PAY ? : MEASUREMENT PROBLEMS(1)

This introduction to the data is made necessary because of a critique by Lindert (1989), against the WDT data. Lindert has argued that the net transfer data of the World Debt Tables are not appropriately measuring the ressources which the countries have been transferring abroad. The issue is a crucial one, since it leads Lindert to argue that only 3 countries,in his view, actually serviced their debt (while the World Debt Tables point -as we show in the text- to quite a different conclusion).

Take as a benchmark the case when all the debt is short-term and in one currency only. One can then surely write its law of motion as :

$$(1)\quad D_t = (1+i_t)\, D_{t-1} + NT_t$$

in which i_t is the nominal interest rate paid on the debt and NT_t is the *net* transfer paid to all categories of creditors.

(1) is perhaps better understood when written :

$$(2)\quad (D_t - D_{t-1}) = i_t\, D_{t-1} + NT_t$$

The left hand side is the increase in the total amount of lending to the country. It is equal to the sum of the interest due and of the new *net* transfers which are made to the country. When, say $NT_t = -i_t \cdot D_{t-1}$, the country has a negative net transfer which is just enough to pay the interest falling due ; the debt is then constant ; no new *net* lending takes places, but the lenders indefinitely "disburse" the (same) amount of principal.

---

(1) I thank -without implicating- John Underwood for his help on these issues.

In pratice however, the debt is neither entirely short-term nor denominated in one single currency. For *any* currency i,however, one can call (following the World Bank Classification) :

1) X_t^i = The disbursments, which are the drawings on loan commitment during the year t (in currency i).

2) Y_t^i = The principal repayment

3) $Z_t^i = X_t^i - Y_t^i$: The *net flows* which measure the new lending that has been recorded over the year

4) I_t^i : The interest paid during the year t

5) NT_t^i : The net transfers (on all debts denominated in currency i) $= I_t^i - Z_t^i$.

The net transfer is the correct *flow* measure of *net* ressources which are transferred from the creditor to the debtor, when it is positive, from the debtor to the creditor when it is negative.

For each currency, one should have :

(3) $D_t^i = D_{t-1}^i + I_t^i + NT_t^i$

Except for currency composition problem, this relation should then also hold when aggregated over all loans. Yet, it does not and some important discrepancies amounting sometimes to more than 6 % of the debt appear.

Besides the currency problem (to which I get back below), what other problems may explain these discrepancies ? Let us review briefly the problems which have been raised by Lindert.

1) Interest arrears are not included in the definition of I_t^i in the WDT and instead are counted as a separate item. This treatment, however, has no repercussion on (3) since the arrears are also substracted from X_t^i. An alternative treatment would have been to record all interest (whether in arrears or not) and to raise X_t^i by the corresponding amount.

2) "Involutary" refinancing (such as reschedulings or Paris-Club agreements) are not included either in the definition of X^i_t (disbursements). But, similarly, it is not included in the definition of Y^i_t. Again, this does not violate (3).

3) When the short term debt is consolidated into long term debt, the WDT have chosen to not report these conversions as disbursments. This *does* violate equations (4) and (5) when one analyzes, for instance, the long term data only. Yet -what is important to us- it does not bias the definition of the net transfers in (3), *precisely* because the consolidation of short-term debt is not recorded in X^i_t (in which case it would have *minorred* the amount of ressources transferred by the debtor). While there is, here, a potential problem (if, say, an *unrecorded* build up of short term debt has actually lifted the debtors to service their long term debt), it is *not* a discrepancy that can be inferred from the WDT themselves. For the years during which estimates of short term net transfers exist(1985-1989), one gets net payments from the country (rather than net resources borrowed through that window).

The largest source of errors which explains why (5) does not hold in the *debt tables* actually comes from the currency composition of the debt. Let us call e^i_t the dollar value of currency i and aggregate equation (3) over all currencies. One gets:

$$(4)\quad e^i_t D^i_t = \left[e^i_{t-1} D^i_{t-1} + e^i_t I^i_t + e^i_t NT^i_t \right] + \left[(e^i_t - e^i_{t-1}) D^i_{t-1} \right]$$

The term in bracket is -say- the dollar version of equation (3) and the last term is the currency composition effect. When read in dollars the first three terms in the right-hand side do not add, to the dollar increase of the debt since one must now re-evalue the currency effect. Over the 1980s, the fluctuations of the dollar have so large as to make this effect a significant one of about 4% of the debt. This discrepancy, however, has *no* bearing on the economic interpretation of $NT_t = \sum_i e^i_t NT^i_t$ since this is a *flow* of ressource (appropriately) valued at its market rate. For the countries which,in net terms, have been servicing their debt, the *net transfer* item is the appropriate measure of the ressources that they have foregone (and with which, at world market prices they could have imported additional commodities).

REFERENCES

Barro, R. and Y.Sala-i-Martin (1991) - "Convergence Across States and Regions", Brookings Papers on Economic Activity, n°1.

Barro, R. and X. Sala-i-Martin (1990) - "Economic Growth and Convergence Across the United States", NBER Working Paper n°3419.

Bartollini, L. and A. Dixit (forthcoming) - "Market Valuation of Illiquid Debt and Implications for Conflict Among Creditors", IMF Staff Papers.

Bulow, J. and K. Rogoff (1991) - "Debt Buy-Back : No Cure for Debt Overhang", Quaterly journal of economics.

Bulow, J. and K. Rogoff (1989) - "LDC Debt : is to Forgive to Forget", American Economic Review, March.

Cardoso, E. and R. Dornbusch (1989) - "Brazilian Debt Crises : Past and Present", in International Debt Crisis in Historical Perspectives, Eichengreen and Lindert eds.

Claessens, S. ans S. Van Winjbergen (1990) - "Secondary Market Prices under Alternative Debt Reduction Strategies : An Option Pricing Approach with an Application to Mexico", Working Paper, World Bank.

Cohen, D. (1986) - "Monnaie, Richesse et Dette des Nations", Editions du CNRS, Paris.

Cohen, D. (1989) - "How to Cope with a Debt Overhang: Cut Flows Rather than Stocks", In Dealing with the Debt Crisis, Husain and Diwan eds, the World Bank: Washington D.C, USA.

Cohen, D. (Forthcoming) - "A Valuation Formula for LDC Debt", Journal of International Economics.

Cohen, D. (1990) - "Slow Growth and Large LDC Debt in the Eighties", CEPR, WP n°461.

Cohen, D. (1991a) - Private Lending to Sovereign States : A Theoretical Autopsy, MIT Press.

Cohen, D. (1991b) - "Tests of the Convergence hypothesis : A Critical Note", CEPREMAP, Mimeo.

Cohen, D. and R. Portes (1990) - "The Price of LDC Debt", CEPR Discussion Paper 459.

Cohen, D. and T. Verdier (1990a) - "Debt, Debt Relief and Growth: A Bargaining Approach", CEPREMAP, Working Paper n° 9105.

Cohen, D. and T. Verdier (1990b) - "'Secret" Buy-Backs of LDC Debt", CEPR WP # 462.

Diwan, I. and K. Kletzer (1990) - "Volontary Choices in Concerted Deal", World Bank PPR, Working Paper 527.

Dooley, M. (1988) - "Buy-Backs and the Market Valuation of External Debt", IMF Staff Papers, Vol. 35, n°2, pp.215-229.

Eaton, J. (1991) - "Sovereign Debt : A Primer", Mimeo, the World Bank.

Eaton, J., M. Gersovitz and J. Stiglitz (1986) - "The Pure Theory of Country Risk", European Economic Review, 30, 481-513.

Eichengreen, B. and P. Lindert (eds) (1989) - "The International Debt Crisis in Historical Perspective", MIT Press.

Einchengreen, B. and R. Portes (1989) - "After the Deluge : Default, Negotiation, and Readjustment during the Interwar Years" in "The International Debt Crisis in Historical Perspectives, Eichengreen and Lindert eds.

Eichengreen, B. and R. Portes (1986) - "Debt and Default in the 1930s: Causes and Consequences", European Economic Review, 30, 599-640.

Eichengreen, B. and R. Portes (1989) - "Debt and Default in the 1930s and the 1980s" In M. Husain and I. Diwan, Dealing with the Debt Crisis.

Fernandez, R. and R. Rosenthal (1990) - "Strategic Analysis of Sovereign Debt Renegotiations", Review of Economic Studies, 57, p.331-49.

Fernandez,R. and S. Ozler (1991) - "Debt concentration and secondary market prices: a theoretical and empirical analysis" NBER WP# 3654

Financial Flows to Developing Countries (Dec.1991) - Debt and International Finance Division, The World Bank.

Huizinga, H. and S. Ozler (1992) - " Bank exposure, Capital and Secondary Market Discounts on Developing Countries Debt 3 NBER WP 3961

Husain, M. and I. Diwan (1989) - "Dealing with the Debt Crisis", World Bank : Washington D.C.

Jorgensen, E. and J. Sachs (1989) - "Default and Renegociation of Latin American Foreign Bonds in the Interwar Period", in International Debt Crisis in Historical Perspectives, Eichengreen and Lindert eds.

Krugman, P. (1988) - "Financing vs Forgiving a Debt Overhang: Some Analytical Notes, Journal of Development Economics, December, 29, 253-268.

Krugman, P. (1991) - "International Financial Integration and Economic Development", Mimeo.

Lindert, P. (1989) - "Response to the Debt Crisis : What is Different About the 1980s ? in International Debt Crisis in Historical Perspectives, Eichengreen and Lindert eds.

Lucas, R. (1990) - " Why can't Capital Flow from Rich To Poor Countries?" American Economic Review, Papers and Proceedings.

Mankiw, G., D. Romer and D. Weil (1990) - "A Contribution to the Empirics of Economic Growth", Harvard University.

Marcet, A. and R. Marimon (1991) - "Communication, commitment and growth" Universitat Pompeu Fabra

Ozler, S. (1989) - "The Motives for International Bank Rescheduling, 1978-1983: Theory and Evidence", American Economic Review.

Ozler, S. (1990) - "Have commercial Banks ignore History?", Forthcoming, Journal of Development Economics.

Sachs, J. (1988) - "The Debt Overhang of Developing Countries", In J. de Macedo and R. Findlay (eds), Debt, Growth and Stabilization : Essays in Memory of Carlos Dias Alejandro, Oxford: Blackwell.

Sachs, J. (ed) (1989) - Developing Country Debt and Macroeconomic Performance, University of Chicago Press.

Summers, R. and A. Heston (1988) - "A New Set of International Comparisons of Real Product and Price Levels", The Review of Income and Wealth, March, 1-25.

Van Winjbergen, S. (1990) - "Mexico's External Debt Restructuring in 1989/90 : An Economic Analysis", Economic Policy.

Warner,A. - " Did the debt crisis cause the investment crisis ", forthcoming, Quaterly Journal of Economics

World Debt Tables (1989) and (1991) "External Debt of Developing Countries", The World Bank : Washington, D.C.

Young, A.(1992) "Tales of two cities: Singapore and Hong-Kong" *this volume.*