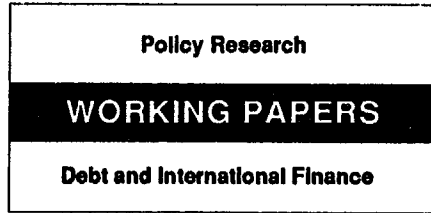


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Fiscal Aspects of Developing Country Debt Problems and Debt and Debt-Service Reduction Operations

A Conceptual Framework

Peter J. Montiel

**The quality of fiscal adjustment programs must improve if Brady
Plan programs are to improve fiscal solvency.**

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This paper — a product of the Debt and International Finance Division, International Economics Department — is part of a larger effort in the department to understand the costs and benefits to countries of debt relief arrangements. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Rose Vo, room S8-042, extension 31047 (January 1993, 29 pages).

The causes and implications of the developing country debt crisis — as well as its solution — all have an important fiscal dimension.

The crisis was triggered by the widespread perception that the public sectors in many heavily indebted countries were effectively insolvent in the international environment of the early 1980s. The actual fiscal response to the resulting liquidity crisis involved increased reliance on domestic financing, the inflation tax, and the curtailment of public investment. This created adverse adjustment incentives for policymakers and resulted in credit rationing, capital flight, assumption of private external claims by the public sector, and poor domestic investment performance.

Solutions involve restoring fiscal health through a combination of debt relief and efficient fiscal adjustment, aimed at mitigating the burden associated with public sector debt service and minimizing the liquidity problems facing the indebted public sector.

The debt and debt-service reduction (DDSR) programs implemented so far under the Brady plan have provided only partial solutions, closing without eliminating the gap between the face value of the external debt and the present value of prospective public sector debt service. They have done so partly by reducing the former and partly by increasing the latter.

Their contribution toward easing the immediate liquidity problems of the debtors has not been encouraging. The amount of debt relief embodied in Brady Plan programs enacted so far has not in itself been sufficient to restore fiscal solvency. Better-quality fiscal adjustment could greatly help improve the situation.

The most important potential contribution of such programs, then, may have been the reduction — through the policy conditionality associated with resources provided by the international financial institutions — of the secondary burden associated with the internal transfer of resources to the public sector.

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FISCAL ASPECTS OF DEVELOPING-COUNTRY DEBT PROBLEMS AND DDSR
OPERATIONS: A CONCEPTUAL FRAMEWORK¹

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¹ I would like to thank, without implicating, the participants in an IECDI workshop at the World Bank for their comments on an earlier draft. The careful comments provided by Eduardo Fernandez-Arias are also gratefully acknowledged.

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I. INTRODUCTION

Since the outbreak of the international debt crisis in 1982, analysis of debt issues has largely been conducted from a perspective that considers external debt as a liability of the debtor country as a whole. This approach pays little attention to sectoral disaggregation within the debtor country itself. The problem of adjustment is interpreted as a balance of payments issue, and the policy focus is on conventional short-run macroeconomic stabilization, "getting prices right", and undertaking longer-term structural measures designed to promote economic growth.

An important empirical observation, however, is that the overwhelming majority of the external debt outstanding in the heavily-indebted developing countries at the time of the outbreak of the international debt crisis was owed by these countries' public sectors. As Table 1 indicates, about three quarters of the total medium and long term gross external debt owed by the highly indebted countries (HICs) as a group in 1982 either represented a direct liability of the public sector or bore a public sector guarantee. This suggests that approaching the crisis from a fiscal perspective may yield insights that would tend to be obscured by treating the debtor country as a single agent. This paper argues that fiscal phenomena have indeed played a key role in determining the timing, breadth, and macroeconomic implications of the crisis. Moreover, fiscal adjustment has a more fundamental role to play in resolving the macroeconomic problems associated with external debt than would be inferred solely from its contribution to short-run macroeconomic stabilization. Specifically, the longer-term fiscal implications of debt and debt-service reduction (DDSR) operations under the Brady plan will be a primary determinant of the success of these operations.

II. THE DEBT CRISIS AS A FISCAL PHENOMENON

It is helpful to begin by sorting out some conceptual issues. The debt crisis resulted in a cutoff of private lending to all agents in the developing countries experiencing debt problems. Suppose that we disaggregate such economies into public and private sectors, both of which engage in financial transactions with external agents. If we adopt the perspective of Krugman (1988), a liquidity problem cannot arise for a domestic borrower in the absence of a crisis of solvency. In other words, as long as each sector is perceived as able to repay, it would be able to attract the foreign lending required to finance current account deficits. In the absence of interactions between the domestic sectors, the emergence of severe financial difficulties for either the public sector or the private sector would result in a "fiscal crisis" or a "private financial crisis", in which one or the other sector would be denied further access to borrowing by its private creditors, but would not result in a "debt crisis" for the country

Table 1 : Heavily-Indebted Countries: Share of Public and Publicly-Guaranteed Debt in Total Debt 1/

	<u>1982</u>			<u>1988</u>		
	<u>Public</u>	<u>Total</u>	<u>Share</u>	<u>Public</u>	<u>Total</u>	<u>Share</u>
Argentina	15.9	27.1	58.6	47.5	49.3	96.4
Bolivia	2.8	3.0	95.7	4.1	4.3	95.9
Brazil	51.7	74.8	69.1	89.9	101.4	88.6
Chile	5.2	14.0	37.5	13.7	16.1	85.3
Colombia	6.0	7.2	83.4	13.8	15.4	90.0
Cote d'Ivoire	5.1	6.2	81.4	7.9	11.6	68.2
Ecuador	3.9	5.5	70.5	9.0	9.1	98.7
Mexico	51.6	59.7	86.4	80.6	86.5	93.1
Morocco	10.2	10.5	97.6	19.4	19.6	99.0
Nigeria	9.1	10.4	87.4	29.3	29.9	98.2
Peru	7.0	8.6	80.7	12.5	13.9	89.8
Philippines	8.9	12.1	73.3	23.0	24.0	95.9
Uruguay	1.7	1.9	89.2	3.0	3.0	97.2
Venezuela	12.4	17.4	71.3	24.6	28.9	85.2
Yugoslavia	5.5	16.3	33.4	14.0	18.6	74.8
Total HICs	196.9	274.8	71.7	392.5	431.9	90.9

1/ Totals are in millions of US \$; shares are in percent.

Source: World Debt Tables, 1991-92.

as a whole.

In practice, however, interactions between the two domestic sectors will ensure that a sufficiently severe crisis of solvency in one sector will spread to the other, reducing the profitability of lending to all agents in the country. More importantly, I argue below that whether financial crises originate in the public or private sector, they are likely to manifest themselves in the form of perceived public sector insolvency, implying that fiscal correction must play a key role in the resolution of the crisis.

A financial crisis may directly originate in the public sector through a change of circumstances that calls into question the sector's future ability to service its debt. However, insolvency of the public sector is also likely to contaminate the private sector through fairly obvious mechanisms. A fiscal crisis will create the need for additional revenues and/or spending cuts, and may even result in default on the domestic obligations of the public sector. All of these may have adverse effects on the financial position of the private sector, and the anticipation of such adverse effects may jeopardize its solvency from the perspective of external creditors.

However, the financial health of the public sector may also be threatened by crises that originate in the private sector, through several mechanisms. First, to the extent that a private sector financial crisis results in a slowdown in private economic activity, public revenues (e.g., tax receipts or sales revenue of public enterprises) will be adversely affected. Second, though standard commercial risk implies that individual cases of bankruptcy will occur in the private sector, generalized insolvency (i.e., a widespread financial crisis) is unlikely in the absence of major policy mistakes or particularly severe external shocks.² A crisis of insolvency in the private sector brought about by inappropriate public policies is likely to result in strong political pressures for relief on the part of the most affected private agents. Finally, a widespread private crisis may engulf the public sector less directly through the macro stabilization channel. Countercyclical spending or tax relief, transfers to distressed private concerns, foreign exchange guarantees, or "nationalization" of private external debts, all undertaken in the pursuit of macroeconomic stabilization, may ultimately threaten the financial solvency of the public sector.

It is worth noting in this connection that, due to the "nationalization" of private external debt, the share of public sector debt in the external debt of the heavily-indebted countries increased markedly over the period between the outbreak of the debt

² Calvo (1989), for example, has documented how "incredible reforms" can lead to overborrowing by the private sector.

crisis and the adoption of the Brady plan. As Table 1 indicates, by 1988 (the year immediately preceding the announcement of the Brady plan) the share of public and publicly-guaranteed debt in the total gross external debt of the HICs exceeded 90 percent. Though the extent to which this assumption of external liabilities by the public sector represented a net transfer to the private sector depends on the terms on which these liabilities were acquired, it seems likely that in some countries this transfer of liabilities avoided widespread bankruptcy in the private sector.

Whether the crisis originates in the public or private sector, then, it is likely to eventually be internalized by the public sector and to manifest itself in the form of public sector financial difficulties. In effect, the political system ensures that the losses associated with a financial crisis are allocated through the public sector, and public sector insolvency is a symptom indicating that the allocation issue is unresolved. Since the government has coercive power over private assets, the country as a whole will be unable to attract external funds as long as the solvency of the public sector remains in question. Moreover, domestic residents will seek to avoid the burden of contributing to the resolution of the country's fiscal problems by moving assets abroad. In this context, the restoration of public sector solvency becomes the sine qua non for resolving the country's financial crisis.

This means that overall current account adjustment is neither necessary nor sufficient to resolve the debt problem. It is not sufficient, because if adjustment takes the form of an improvement in the private sector's current account in the context of sustained public sector insolvency, the public sector can service its external debt only by borrowing from the domestic private sector. Unless credible fiscal adjustment takes place, however, domestic creditors will be no more willing to finance the public sector than will external creditors. Thus, current account adjustment without fiscal adjustment cannot solve a public sector debt problem. Current account adjustment is also not necessary, because as long as successful fiscal adjustment follows the nationalization of a debt problem and the public sector is perceived as solvent by external creditors, such creditors should be willing to finance short-run current account deficits -- i.e., a "foreign exchange gap" would not emerge. In short, when the debt to be serviced is public, the adjustment must ultimately be fiscal.

III. ORIGINS OF THE DEBT CRISIS IN INSOLVENCY OF THE PUBLIC SECTOR

This section will make the empirical argument that the cutoff in the flow of net lending from external creditors to the HICs in the early eighties reflected a sharp reversal in the perceived ability of the public sectors in the HICs to service their debts on market terms -- i.e., as argued in the previous section, from the

perspective of creditors the public sectors in several of these countries indeed became insolvent. This led to a situation in which economic agents, both foreign and domestic, became reluctant to acquire claims on the economies (not just the public sectors) of the HICs. In turn, this reluctance manifested itself, among other ways, in the cutoff of external private funding.

a. The Solvency Condition for the Public Sector

From the perspective of risk-neutral creditors, a debtor will be perceived to be solvent when the present value of its expected future debt service payments, discounted at the safe rate of interest, is equal to the face value of the debtor's total debt³. Only in this case are the expected returns from lending to this particular economic agent equal to the opportunity cost of funds, and only in this case, therefore, will both new and existing creditors voluntarily continue to finance the debtor. This condition can be related to the status of the debtor's comprehensive balance sheet⁴. The comprehensive balance sheet includes not only all currently-existing marketable assets and liabilities (which take the form of stocks), but also the present value (discounted at the safe interest rate) of all anticipated future flows of receipts and payment obligations. The capitalized value of the former represents a current asset of the debtor, while that of the latter is a current liability. The difference between the value of the debtor's assets and liabilities, with both defined in this comprehensive fashion, is the debtor's comprehensive net worth. As long as net worth defined in this manner is nonnegative, the debtor will be solvent, in the sense that the capitalized value of its resources is sufficient to liquidate its liabilities.

In the case of the public sector of a highly-indebted country, straightforward manipulation of the sector's budget identity can be used to show (see Buiter (1985)) that the resources devoted by the public sector each period to the service of debt (both interest and amortization) are equal to the sum of the its primary budget surplus and its seignorage revenue⁵. To see this, let D_t denote the

³ The term "safe rate of interest" refers to the rate of interest applicable to assets that are free of default risk, such as US Treasury bills.

⁴ See Buiter (1983), as well as Guidotti and Kumar (1991).

⁵ The equations that follow can be expressed in a number of ways, depending on whether the income from public sector real and financial assets is capitalized and thereby treated as the value of a stock, or as a flow. Due to the absence of comprehensive data on stocks of public sector assets, the flow option is exercised below.

total gross (external and domestic) debt of the consolidated public sector at time t , i_t the "safe" nominal interest rate, PS_t the public sector primary (i.e., non-interest) surplus, and M_t the stock of base money⁶. The public sector's flow budget constraint can then be written as:

$$\dot{D}_t + \dot{M}_t = -PS_t + i_t D_t \quad (1)$$

That is, the overall deficit of the public sector (consisting of the noninterest component $-PS_t$ plus interest payments $i_t D_t$) must be financed either by issuing debt (D_t) or printing money (M_t). This can be rearranged as:

$$i_t D_t - \dot{D}_t = PS_t + \dot{M}_t \quad (2)$$

The left-hand side of this equation expresses total debt service as the sum of interest payments $i_t D_t$ and debt amortization ($-\dot{D}_t$). Equation (2) shows that this must be equal to the sum of the primary surplus PS_t and seignorage revenue \dot{M}_t . It follows that public sector solvency holds at time t when the present value of the expected primary surplus plus the expected seignorage revenue over all future periods s is greater than or equal to the face value of the gross public sector debt:

$$PV(PS_s^e + \dot{M}_s^e; i_s^e, t) \geq D_t \quad (3)$$

For present purposes, it is useful to rewrite these expressions in slightly different form. Letting lower-case letters denote ratios to nominal GDP (i.e., $d = D/Py$, $m = M/Py$, and $ps = PS/Py$, where y is real GDP and P is the domestic price level), the public sector budget constraint (2) becomes:

$$(r_t - n_t) d_t - \dot{d}_t = ps_t + \hat{M}_t m_t \quad (4)$$

where r_t is the real interest rate at time t and n_t is the rate of growth of real GDP. Similarly, the solvency condition can now be written as:

⁶ For reasons described in footnote 2, PS includes interest receipts on public sector financial assets, but excludes interest on gross public debt.

(5)

$$PV(ps_s^e + M^e m_s^e; r_t^e - n_t^e, t) \geq d_t$$

where the effective discount rate is now $r_t - n_t$, the difference between the real interest rate and the rate of growth of real GDP.

Given constant values of the ratio of the primary surplus and seignorage to GDP, the preceding result implies that the present value of debt service payments will be infinite whenever the rate of growth of real GDP exceeds the real rate of interest. This is so because receipts from the issue of new debt would always be more than sufficient to service existing debt at the market rate of interest without increasing the debt/GDP ratio. In this case, solvency is guaranteed for any initial finite stock of debt, regardless of the value taken by the sum of the primary surplus and seignorage revenue. In other words, when the rate of growth of real GDP exceeds the real rate of interest, the solvency requirement does not impose a constraint on the future values of the sum of the public sector's primary surplus and seignorage revenue, essentially because the existing debt can be serviced by the sale of new debt, rather than out of the public sector's own resources. On the other hand, when the rate of interest exceeds the rate of growth of real GDP, the proceeds from the sale of new debt at a constant debt/GDP ratio are not sufficient to service the old debt, and the public sector must service the debt using its own resources -- i.e., by generating sufficiently large primary surpluses and seignorage revenue. The solvency condition described previously determines just how large the magnitudes of the future resources raised by these means must be, and thus acts as a constraint on the present value of future primary surpluses and seignorage revenue.⁷

b. Why a Debt Crisis ?

The immediate trigger for the debt crisis was a reversal in the relationship between the "safe" real interest rate in international capital markets and the rate of growth of real GDP in the HICs⁸. During most of the decade of the seventies, the real long-term rate of interest in the industrial countries fell well short of the rate of real GDP growth registered by the HICs as a

⁷ See Cohen (1985) for a detailed discussion of the roles of the real interest rate and the growth rate in imposing a solvency constraint on sovereign borrowers.

⁸ See Sachs (1985).

group, as indicated in Chart 1⁹. Under these circumstances the public sectors in these economies could service their existing debt through new borrowing, without the need to generate their own fiscal resources for the purpose. The absence of solvency constraints on fiscal policy in these countries was manifest in large fiscal deficits in many of them during this period (Table 2). This suggests that, for a large subset of the HICs, the origin of the crisis is to be found in the public sector. Based on Table 2, obvious exceptions are Chile and Venezuela, though Colombia also experienced relatively small fiscal deficits, at least through the end of the seventies.

At the beginning of the new decade, tight monetary policies in many industrial countries, designed to combat the inflationary consequences of the second oil shock, combined with expansionary fiscal policies in the United States, reversed the relationship between the real interest rate and the rate of growth of the HICs. As shown in Chart 1, real long-term interest rates began to rise substantially above the trend real rates of growth registered by these countries. Under these circumstances, servicing the existing debt through new borrowing would have become a Ponzi scheme, in which the debt/GDP ratio would have prospectively risen without bound. Creditors could not be expected to acquiesce in such a scheme, since it would imply that the present value of the net resource transfers that they would receive in return for their new loans would fall short of the face value of such loans. Thus the public sector debtors in the HICs found it necessary to begin to service debt with their own resources. This meant that the previous fiscal performance could not be sustained. To maintain the solvency of the public-sector borrowers in these countries, a credible fiscal adjustment was called for that offered the prospect of generating sufficient resources via primary surpluses and seignorage revenue to service the large stock of debt that had been accumulated during the previous decade.

The severity of the adjustment problem confronting the public sector in the HICs was magnified because in many of these countries the public sector had also acquired a substantial amount of domestic debt. Table 3 indicates that in several of the highly-indebted countries, including the major external debtors Argentina, Brazil, Mexico, and the Philippines, domestic debt contributed more than 10 percentage points of GDP to the total debt burden of the public sector by 1982. The relationship between the magnitude of the adjustment burden and the size of the total outstanding gross

⁹ The real interest rate depicted in Chart 1 is the annual average of the monthly series of real ex post annual yields on 30-year US government bonds (IFS line 61), deflated by the US wholesale price index. The average growth rates for the HICs are from the IMF World Economic Outlook.

Chart 1 World Real Interest Rate
and Growth in the HICs

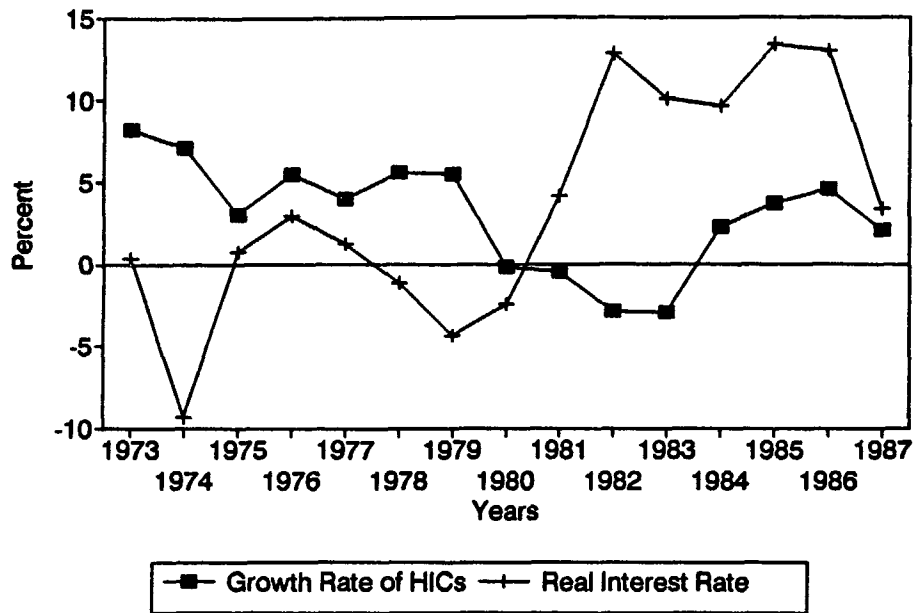


Table 2 Highly-Indebted Countries: Public Sector Deficit as a Percent of GDP, 1974-1982

	1974	1975	1976	1977	1978	1979	1980	1981	1982	Average
Argentina	8.1	15.1	11.7	4.7	6.5	6.5	7.5	13.3	15.1	9.8
Bolivia	-0.7	7.8	10.8	11.5	10.2	8.4	8.7	7.4	5.9	7.8
Brazil	1.0	4.1	5.3	3.9	7.2	13.3	12.2	3.9	5.9	6.3
Chile	5.5	2.1	-4.0	-0.4	-1.3	-4.6	-5.4	-0.3	3.9	-0.5
Colombia	0.9	-0.9	1.9	2.7	1.2	4.0	5.8	6.8	8.9	3.5
Cote d'Ivoire	0.9	2.3	12.4	3.6	8.4	10.3	12.2	11.8	15.9	8.6
Ecuador	-0.8	2.2	3.3	8.3	6.2	2.0	4.6	5.6	6.7	4.2
Mexico	5.9	8.7	8.2	5.4	5.4	6.3	6.8	13.6	16.3	8.5
Morocco	3.9	9.5	18.1	15.8	11.3	10.1	9.0	13.6	9.2	11.2
Peru	6.9	9.8	10.1	9.7	6.1	1.1	4.7	8.4	9.3	7.3
Philippines	n.a	n.a	n.a	n.a	n.a	n.a	n.a	7.5	6.5	1.6
Venezuela	-20.3	-10.0	-6.3	1.6	3.3	-3.8	-4.4	-3.6	5.6	-4.2

Source: See Appendix

Table 3: Heavily -Indebted Countries: Ratio of Public Debt to GDP

	1976			1982			1988		
	Foreign	Domestic	Total	Foreign	Domestic	Total	Foreign	Domestic	Total
Argentina	21.0	4.8	25.8	52.1	14.0	66.1	55.9	17.4	73.3
Bolivia	56.0	0.0	56.0	102.2	0.0	102.2	104.4	0.0	104.4
Brazil	19.3	8.2	27.5	27.7	16.2	43.9	30.1	18.9	49.0
Chile	45.9	0.6	46.6	61.9	1.6	63.5	79.6	6.8	86.4
Colombia	19.2	1.4	20.6	18.7	1.9	20.6	40.9	10.0	50.9
Cote d' Ivoire	30.2	3.2	33.3	88.1	3.2	91.3	123.5	6.4	129.8
Ecuador	16.9	0.1	17.0	47.9	0.0	47.9	98.1	0.0	98.1
Mexico	22.0	5.1	27.1	37.0	14.9	52.0	51.8	22.4	74.2
Morocco	25.5	21.6	47.1	71.1	23.1	94.2	93.2	31.2	124.4
Nigeria	1.8	1.8	3.6	11.4	12.0	23.4	107.2	20.6	127.8
Peru	40.2	8.8	49.1	34.9	2.4	37.3	76.5	3.1	79.6
Philippines	22.4	17.7	40.1	30.8	16.2	47.0	61.6	26.6	88.2
Uruguay	21.1	4.2	25.3	21.3	5.4	26.7	41.8	23.5	65.3
Venezuela	8.8	0.9	9.7	22.4	4.6	27.1	50.6	7.5	58.1
Yugoslavia	19.2	2.6	21.8	25.9	0.9	26.7	31.1	0.0	31.1

Source: Guidotti and Kumar (1991), and World Debt Tables, 1991-92.

debt can be given a more precise definition. Let ps^* denote the "permanent" primary surplus -- i.e., a constant value of the primary surplus equal in present value to a given stream of future primary surpluses. Then, from equation (5), solvency requires that the permanent primary surplus be given by:

$$ps^* = (r-n) d_t - (\hat{p} + n) m^* \quad (6)$$

where r and n are respectively the long-term real interest rate and the economy's long-run real growth rate, \hat{p} is the "equilibrium" rate of inflation chosen by policymakers, and m^* is the inverse of base-money velocity corresponding to the inflation rate \hat{p} . Table 4 presents estimates of the permanent primary surplus as of 1982 for the fifteen HICs, together with the average level of the primary surplus in each country during the period preceding the outbreak of the debt crisis.¹⁰ The required permanent surplus was in excess of six percent of GDP in five cases: Argentina, Bolivia, Chile, Cote d'Ivoire, and Morocco. In the cases of Bolivia, Cote d'Ivoire, and Morocco, this is due to a very large stock of total debt relative to GDP. For Argentina and Chile, it reflects a combination of large debt (in excess of 60 percent of GDP) and slow average growth registered over the period (1968 to 1982) used to estimate the long-run growth rate. Clearly, with the exception of Venezuela, a substantial fiscal adjustment became necessary in all of these countries to preserve public sector solvency when international interest rates rose in the early eighties.

The debt crisis essentially reflected the market's judgment that the necessary fiscal adjustment was not forthcoming in many of the HICs. Consider what happens when conditions change (in some unspecified manner) such that the solvency condition (5), though previously satisfied, now becomes violated ex ante. Suppose, in particular, that the prospective permanent primary surplus falls short of the value indicated by equation (6). Under the new conditions, the public sector will be insolvent in an ex ante sense -- i.e., its comprehensive net worth will be negative. The market, however, will ensure that net worth will not be negative ex post. Adjustment can take several forms. If the prospective fiscal program is unchanged, the public sector may be able to repudiate enough of its domestic debt so as to leave the face value of its remaining total debt equal to what it can expect to service in

¹⁰ For the purpose of these estimates, the inflation rate was taken as the lowest sustainable rate of inflation experienced by these countries during 1968-82, and the estimate of base money velocity was derived from that associated with these rates of inflation.

**Table 4 Heavily-Indebted Countries: Actual and Sustainable Values
of the Primary Surplus, 1982**

(Percent of GDP)

	Actual 1/	Sustainable
Argentina	-7.6	7.3
Bolivia	-6.5	8.3
Brazil	-5.5	1.9
Chile	1.9	6.9
Colombia	-3.4	1.0
Cote d'Ivoire	-7.3	6.7
Ecuador	-4.5	1.8
Mexico	-4.7	2.7
Morocco	-8.6	6.3
Nigeria	n.a.	2.2
Peru	-5.2	3.1
Philippines	-4.7	3.6
Uruguay	n.a.	2.6
Venezuela	2.6	1.9
Yugoslavia	n.a.	1.5

1/ For Argentina, Chile, Mexico, and Peru these are averages for 1974-82.

For the Philippines, the average is for 1981-82 only. All remaining countries use averages for the period 1976-82. Sources of fiscal data are given in the appendix.

present value terms under that program.¹¹ Failing this, the market will simply value the debt at an amount equal to the discounted value of the prospective debt service. Since by assumption this is less than the face value of the debt, the debt will sell at a discount. The discount is precisely the shortfall between the present value of future primary surpluses plus seignorage revenues and the face value of the debt.

When existing debt is selling at a discount, the public sector will be denied fresh funds. To the extent that new loans cannot be credibly assured a senior status relative to existing debt, new credits would immediately be discounted on a par with existing debt. Thus, new lenders would not voluntarily enter the market. While there may be incentives for existing creditors to increase their exposure, they would not do so individually.¹² Thus the absence of fiscal adjustment resulted in the drying up of voluntary lending -- i.e., the debt crisis.

IV. THE NATURE OF THE FISCAL RESPONSE

The substantial discounts that have applied to developing-country external debt since the secondary market in these claims arose in the mid-eighties thus suggests that the degree of fiscal adjustment in response to the reversal in the relationship between the external real interest rate and the long-term growth rate in the indebted countries has indeed not been sufficient to restore the solvency of the public sector in these countries. In principle, the fiscal response can take many forms. In the face of a crisis, adjustment can be postponed as long as a class of creditors can be found who can be induced (or forced) to supply financing. Alternatively, if adjustment is not postponed, primary public sector deficits can be reduced through different types of spending cuts and revenue increases, or debt service can be financed by increased reliance on the inflation tax. Because these alternative responses to the need for fiscal adjustment have very different macroeconomic implications, the macroeconomic consequences of the debt crisis for the debtor countries have largely been a function of the nature of the fiscal response¹³.

As shown in Table 5, the net external resource transfer became negative in many of the HICs after the onset of the debt crisis.

¹¹ This could take the form of a once-for-all capital levy. The repudiation option is only available for domestic debt, of course, since the domestic government has no legal means to compel external creditors to surrender their claims.

¹² See Krugman (1988).

¹³ A recent exposition of this view can be found in Easterly (1989).

Table 8: Highly-Indebted Countries: Response to the Debt Crisis

	Avg. 1976	1982	1983	1984	1985	1986	1987	1988
Argentina								
Resource Transfer	0.9	4.3	-0.2	-2.6	-1.0	-2.9	-2.0	-2.3
Primary Deficit	6.3	8.8	11.7	9.0	3.1	2.4	3.7	5.3
Public Inv.	11.1	8.1	9.5	7.6	6.8	7.0	7.4	
Inflation	163.4	164.8	343.8	626.7	672.1	90.1	131.3	343.0
Bolivia								
Resource Transfer	4.4	-0.7	-2.3	-1.4	-1.7	3.7	1.9	1.4
Primary Deficit	8.2	5.4	4.6	3.0	4.9	11.0	9.4	-1.2
Public Inv.	10.1	6.6	4.6	3.1	3.5	4.7	5.4	
Inflation	19.7	133.3	269.0	1281.4	11749.6	276.3	14.6	16.0
Brazil								
Resource Transfer	1.3	0.2	0.3	0.9	-2.0	-1.5	-1.8	-2.3
Primary Deficit	6.0	2.9	2.1	3.2	8.5	-2.8	-2.7	-4.0
Public Inv.	10.4	8.7	6.4	6.0	6.2	6.2	6.9	
Inflation	60.9	97.8	142.1	197.0	226.9	145.2	229.7	682.3
Chile								
Resource Transfer	-1.1	1.1	4.4	1.9	0.8	-3.1	-3.3	-0.4
Primary Deficit	-4.0	3.4	1.7	2.1	-0.3	-0.2	-2.8	-6.8
Public Inv.	6.2	4.8	4.9	6.3	6.9	7.6	6.9	7.5
Inflation	72.0	9.9	27.3	19.9	30.7	19.5	19.9	14.7
Colombia								
Resource Transfer	0.7	0.9	1.1	1.7	1.2	2.1	-3.2	-1.4
Primary Deficit	2.8	7.3	7.0	4.6	0.9	-2.7	-3.6	-3.4
Public Inv.	7.2	9.4	8.9	9.0	9.6	8.6	7.9	
Inflation	25.0	24.5	19.8	16.1	24.0	18.9	23.3	28.1
Cote d'Ivoire								
Resource Transfer	5.6	6.4	-1.7	-1.6	-4.2	-5.0	ERR	ERR
Primary Deficit	7.0	9.6	5.2	-4.7	-8.5	-3.6	ERR	ERR
Inflation	15.4	7.3	5.9	4.3	1.8	7.3	0.4	7.0
Ecuador								
Resource Transfer	3.7	-6.2	-2.0	-1.2	-1.6	1.6	0.9	0.2
Primary Deficit	3.1	2.2	-3.6	-6.2	-7.0	-0.8	7.2	2.2
Public Inv.	9.7	9.8	7.9	6.4	6.6	8.6	8.4	
Inflation	12.5	16.3	48.4	31.2	28.0	23.0	29.5	58.2
Mexico								
Resource Transfer	2.1	1.5	-3.0	-3.6	-3.7	-4.1	-1.2	-3.1
Primary Deficit	4.0	7.7	-4.4	-4.9	-3.9			
Public Inv.	9.5	10.4	7.6	7.1	7.0	6.1	5.4	
Inflation	22.8	58.9	101.8	65.5	57.7	86.2	131.8	114.2
Morocco								
Resource Transfer	6.0	5.5	-0.4	3.7	0.5	0.9	1.1	-0.3
Primary Deficit	9.3	4.2	6.2	2.6	3.4	0.6	1.2	0.2
Inflation	10.2	10.5	6.2	12.4	7.7	8.7	2.7	2.4
Nigeria								
Resource Transfer	0.9	2.8	1.0	-1.7	-2.9	-0.9	1.6	-3.2
Primary Deficit	0.3	1.0	1.2	1.4	1.6	1.2	1.9	4.5
Public Inv.	15.4	10.6	8.1	4.3	5.9	7.4	8.0	8.8
Inflation	17.1	7.7	23.2	39.6	5.5	5.3	10.3	38.3
Peru								
Resource Transfer	1.3	2.4	5.2	4.2	-0.1	0.1	0.5	0.4
Primary Deficit	4.0	6.4	8.0	1.8	-2.3	-0.0	-0.1	-0.2
Public Inv.	7.0	10.4	10.4	9.5	7.3	8.3	5.0	
Inflation	55.1	64.4	111.2	110.2	163.4	77.9	85.8	667.0
Philippines								
Resource Transfer	2.8	2.6	3.4	0.8	0.7	-1.7	-3.8	-3.8
Primary Deficit	0.9	4.2	1.8	-0.0	-1.5	0.3	-2.3	-2.2
Public Inv.	7.3	7.5	6.4	4.6	3.6	3.2	3.1	3.7
Inflation	12.5	10.2	10.0	50.3	23.1	0.8	3.8	8.8
Uruguay								
Resource Transfer	0.5	2.2	3.7	-4.2	-3.6	-2.0	-1.8	-2.9
Primary Deficit								
Public Inv.	6.4	7.2	4.1	4.1	3.0	2.9	3.1	
Inflation	53.0	19.0	49.2	55.3	72.2	76.4	63.6	62.2
Venezuela								
Resource Transfer	2.4	-1.4	-0.4	-3.5	-3.4	-4.4	-4.9	-2.5
Primary Deficit	-3.5	2.9	-3.3	-11.5	-7.7	-3.4	-3.9	-3.8
Public Inv.	14.4	16.5	14.6	7.7	9.0	12.4	12.6	
Inflation	12.1	9.6	6.3	12.2	11.4	11.5	28.1	29.5
Yugoslavia								
Resource Transfer	0.4	-0.4	0.8	-0.9	-1.9	-3.0	-2.7	-2.1
Inflation	21.9	31.5	40.2	54.7	72.3	89.8	120.8	194.1

Source: Data on the resource transfer are from the World Debt Tables, 1991-92, public investment data are taken from Pfeifferman and Madarassy (1990), and inflation refers to changes in the CPI (IFS line 64). Sources of fiscal data are given in the appendix.

Keeping in mind that the external debt of these countries was largely public, this suggests that the public sectors in the HICs may have begun to service external debt partly out of their own resources. Indeed, as also shown in Table 5, increases in primary public sector surpluses were widespread in these countries after 1982. However, as indicated above, this adjustment was insufficient to maintain the solvency of the public sector in most cases. There are at least two reasons for this. First, though the resource transfer became negative in many cases, debt service nevertheless fell short of the contracted amount, so that arrears and reschedulings became common. Second, the financing of the resource transfer may have led to the perception on the part of creditors that even such transfers as were achieved were unsustainable.

In particular, many countries relied on the inflation tax, rather than the primary surplus, to finance debt service payments. Table 5 indicates that the rate of inflation accelerated after 1982 in the majority of the heavily-indebted countries, particularly those in Latin America (notable Latin American exceptions are Chile and Colombia). Creditors may have been justifiably skeptical that debtors were resigned to living with the associated high levels of inflation forever¹⁴.

Moreover, to the extent that the primary surplus was indeed increased, the brunt of the adjustment was often disproportionately borne by public investment¹⁵. Among the heavily-indebted countries for which the data was available, public investment fell during the eighties -- sometimes drastically -- in all but Chile and Colombia (Table 5). Notice that, from the perspective of creditors, what matters is the present value of all future primary surpluses, not the value of the surplus in a given year. Reducing public investment will indeed increase the surplus in a given year, but can only increase the relevant present value measure to the extent that the cash rate of return on investment is expected to fall short of the discount rate -- i.e., to the extent that the potential investment does not meet a market test. While many potential projects in indebted countries undoubtedly fit this description, it remains true that, as long as the canceled investment projects are not pure consumption, the short-run increase in the primary surplus exceeds its permanent increase under this mode of adjustment.

Finally, in several heavily-indebted countries, the shortfall in external funding was partly replaced by domestic borrowing. Easterly (1989) documents the importance of this response in the

¹⁴ Further, a number of mechanisms exist through which the yield of the inflation tax may be eroded over time.

¹⁵ See Easterly (1989).

cases of Argentina, Brazil, Chile, Mexico, Morocco, and Yugoslavia. This reliance on domestic borrowing partly accounts for the increase reported in Table 2 of the share of domestic debt in total public sector debt for these countries between 1982 and 1988. Notice that, to the extent that such debt was voluntarily acquired by domestic residents, it must either have been regarded as senior to foreign debt or have been sold at a sufficiently high interest rate as to offset the immediate discount on its face value.¹⁶ In either case, the service of this debt aggravates the perceived insolvency of the public sector from the standpoint of external creditors.

When fiscal adjustment is not complete and claims on the public sector sell at a discount under their original face value, it becomes a matter of macroeconomic importance how creditors handle their legal claims. If creditors do not relinquish these claims (that is, if debt is not written down), then the difference between the face value of the debt and its current market value remains as an unresolved claim on the public sector, to be apportioned in an uncertain way among the sector's financial creditors (external and domestic) and domestic agents under the government's jurisdiction. This means, in particular, that further fiscal adjustment, higher levels of inflation tax, and/or future capital levies cannot be ruled out as a way to deal with this "debt overhang". In this setting, any assets within the reach of the fiscal authority in the indebted country are at risk of future confiscation (e.g., through taxation or through a capital levy), and all such assets consequently become impaired¹⁷. As a result, investors will demand high rates of return in order to be induced to hold claims -- financial or real -- on the affected economy. This implies that private investment will be low, domestic market-determined real interest rates will be high, and, unless effective capital controls are in place, capital flight can be expected to be substantial.¹⁸

Table 6 suggests that these consequences have indeed materialized in the heavily-indebted countries in the period

¹⁶ See Dooley (1986). In many countries, however, the acquisition of domestic debt may have been involuntary, in the form of required reserves held by private financial institutions. In this case, of course, the degree of fiscal "adjustment" is understated, since such reserve requirements amount to disguised taxation of the financial system.

¹⁷ See Sachs (1985) and Dooley (1986).

¹⁸ The scope for effective capital controls in developing countries is open to question. Hague and Montiel (1991) present evidence that such controls have been largely ineffective in a large group of developing countries.

following the outbreak of the debt crisis. Since the early eighties, the HICs have undergone a prolonged experience of low private investment coupled with the substantial accumulation of external assets by domestic residents. With the single exception of Colombia, where the slowdown was milder, private investment fell sharply in all the heavily-indebted countries for which data were available after 1982. The measure of private capital flight employed in Table 6 is that which is suggested by the emphasis here on the fiscal dimensions of the debt problem. Taken from Dooley and Stone (1991), and based on Dooley (1988), it measures as flight capital only those private capital outflows which do not remit earnings, thus taking as motivation for the flight of capital the desire to evade prospective domestic taxation. By this measure, only Chile, Ecuador, and Uruguay escaped substantial episodes of capital flight during this period.

V. THE BRADY PLAN AND FISCAL POLICY

These distortionary effects on the domestic economy, and their implications for economic growth in the HICs, provide the motivation for the debt and debt service reduction operations (DDSR) embedded in the Brady Plan. An evaluation of the likely macroeconomic implications of DDSR operations thus requires understanding how these effects come about. Three conceptually distinct mechanisms can be identified through which a large stock of public debt could exert such effects on the domestic economy. All of them, of course, are transmitted through the public sector's budget. In other words, they are all fiscal phenomena.

To clarify these channels of transmission, it is useful to first introduce some notation. Let V_t denote the market value of the public sector's external debt. On the simplifying assumption that domestic debt is zero, V_t is the present value of the public sector's expected future primary surpluses plus seignorage revenue:^{19,20}

¹⁹ The role of domestic debt in what follows depends on whether external debt or domestic debt is treated as senior to the other. If domestic debt were senior, then the present value of expected payments to domestic creditors would have to be subtracted from the right-hand side of equation (7) below. If both types of debt were of equal seniority, then the right-hand side of (7) would be multiplied by the share of external debt in total debt. As it stands, (7) is equivalent to treating external debt as senior. To avoid the straightforward, but tiresome, consideration of each of these cases below, it is simplest to assume that domestic debt is nonexistent.

$$V_t = PV(pS_s^e + \hat{M}^e m_s^e; r_t^e - n_t^e, t) \quad (7)$$

The face value of the debt can then be decomposed into the portion that corresponds to its market value and the "shortfall" $D_t - V_t$:

$$D_t = (D_t - V_t) + V_t \quad (8)$$

Thus $S_t = D_t - V_t$ is the present value of the "unallocated tax burden" (Dooley (1986)) associated with the debt, while V_t corresponds to the portion of the repayment burden that domestic agents expect to bear.

The first channel of transmission operates through V_t . A large value of V_t , regardless of the size of S_t , implies the expectation of substantial future primary surpluses and/or seignorage revenues. To the extent that these are generated through distortionary taxation or reduced levels of productive public expenditure the expected rate of return on domestic private asset accumulation will fall, and the efficiency of domestic resource allocation will be impaired.²¹ Notice that this effect is present even when it is confidently expected that the debt will be serviced fully (i.e., when $S_t = 0$). In fact, in this case the effect appears precisely because full debt service is anticipated, but is expected to be achieved through distortionary means. It is worth noting that, since lump-sum taxes do not exist, any service of preexisting debt must be expected to be achieved through more or less distortionary

²⁰ No attempt is made here to explain why the public sector chooses to repay --i.e., why V_t is not zero. The debt literature contains extensive discussion of this issue, involving sanctions available to external creditors permitting them to appropriate a share of domestic income (see Sachs (1984)). It is assumed that, to the extent that such sanctions fall on the private sector, the political system ensures that they are internalized by the government.

²¹ The observation that an increase in the stock of public sector debt implies future distortionary taxation is, in fact, a commonly-made argument against Ricardian equivalence.

Table 6 Heavily Indebted Countries: Private Investment and Private External Assets, 1980-1988 1/

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Argentina									
Private External Assets	14.0	23.2	31.2	31.1	33.9	35.2	33.1	36.7	35.4
Private Investment	13.0	9.4	8.9	7.9	6.9	5.5	6.0	6.8	
Bolivia									
Private External Assets									
Private Investment	7.3	3.8	5.0	2.0	1.6	3.6	4.9	4.6	
Brazil									
Private External Assets	7.2	9.6	5.9	5.8	12.3	8.2	16.7	31.9	23.6
Private Investment	14.5	12.0	11.7	9.7	9.5	10.5	12.3	12.8	
Chile									
Private External Assets	1.2	-1.4	-1.3	0.6	-0.7	-0.9	-2.6	-3.2	-6.0
Private Investment	15.6	17.5	6.5	4.9	7.3	6.8	7.0	10.0	9.5
Colombia									
Private External Assets	0.5	-0.1	-0.4	0.0	1.6	3.0	4.7	6.5	5.9
Private Investment	11.4	12.0	11.1	11.0	10.0	9.4	9.3	11.1	
Ecuador									
Private External Assets	3.8	3.0	2.8	3.0	3.8	3.8	4.0	4.1	3.8
Private Investment	14.1	11.7	13.0	8.6	9.0	9.5	9.8	14.6	
Mexico									
Private External Assets	16.3	22.9	24.8	35.2	35.3	37.7	42.9	52.3	35.6
Private Investment	13.9	14.7	12.7	10.0	10.8	12.2	13.3	13.5	
Nigeria									
Private External Assets	5.2	3.3	0.8	3.4	4.2	6.0	13.1	21.0	22.0
Private Investment:									
Peru									
Private External Assets	3.5	2.3	3.6	2.4	2.7	4.2	5.5	6.8	6.4
Private Investment	9.7	11.4	11.5	7.9	6.9	6.8	9.3	10.6	
Philippines									
Private External Assets	6.7	7.0	8.7	5.4	4.8	6.7	10.4	10.9	10.1
Private Investment	18.4	18.5	18.1	18.8	14.5	11.4	9.7	10.6	12.5
Uruguay									
Private External Assets	-0.7	-1.1	-0.9	0.3	0.0	0.5	0.2	0.3	-0.3
Private Investment	11.4	10.7	7.9	6.9	5.2	4.5	4.4	5.4	
Venezuela									
Private External Assets	15.2	16.3	15.7	31.9	30.9	30.5	24.8	29.0	23.3
Private Investment	13.0	9.8	7.7	4.5	6.6	6.5	6.8	6.6	

1/Private external assets are in millions of US dollars, while private investment is the share of GDP.

Source: Data on private external assets are from Dooley and Stone (1991).

Private investment data are from Pfefferman and Madarassy (1990).

means.²² The objective of public policy should be to minimize the distortionary effects associated with a given level of V_t . This is a standard problem in public finance.

When the public sector is not solvent, these effects are attached only to the portion of the debt that is expected to be serviced. The remaining, "debt overhang" component, does not generate such effects, because the public sector is not expected to raise domestic resources to service it.

The preceding mechanism operates through the present value of the anticipated future debt service associated with a large stock of debt, and would be present even if no debt service payments were currently being made. More generally, it is independent of the time profile of actual debt service payments. The second mechanism depends on the timing of such payments. For a given value of V_t , when the public sector is insolvent (i.e., when $S_t > 0$) the cost imposed on the domestic economy of achieving the transfer V_t will be greater the sooner the payments are made. This is so because when the public sector is insolvent, it will be unable to obtain voluntary loans from individual creditors on market terms. In this credit-rationed situation, the intertemporal discount rate used by the public sector will exceed the risk-free market interest rate. Thus any current debt service payments made by the public sector will carry a high intertemporal opportunity cost -- i.e., will be more costly to the economy in terms of foregone public investment opportunities or distortionary taxation than payments of equal present value (discounted at creditors' costs of funds) made later on. This separate liquidity effect arises, then, when insolvency leads to credit rationing and is present even when debt service is financed efficiently (in the least distortionary fashion) by the public sector.

As with the first mechanism described above, these liquidity effects are aggravated when political or other constraints impede the efficient financing of debt service payments. The actual service of the debt requires the mobilization of resources, and this can be achieved in more or less distortionary fashion -- for example, by curtailing inefficient taxes or subsidies on the one hand, versus levying high tax rates on a narrow base, on the other. As indicated previously, reliance on inefficient modes of financing negative net resource transfers after 1982, such as the curtailment

²² Notice, in passing, that these arguments do not imply that all public debt accumulation is harmful for growth. To the extent that public borrowing finances investment that meets a market test, or is used for public consumption smoothing in response to a transitory negative income shock, the means to service the debt will be available in the future without the necessity of increasing the distortionary burden of taxation.

of public investment and recourse to the inflation tax, may have exerted an independent effect contributing to the harmful macroeconomic consequences of the debt crisis in the majority of the HICs during the eighties.

A third and conceptually separate mechanism also becomes operative when the public sector is insolvent, and is associated with the "debt overhang" component S_t . Notice that this component of the debt does not, unlike V_t , exert distortionary macroeconomic effects by increasing the expected value of future taxes. These are already included in V_t . To see this at an intuitive level, suppose that the government could precommit its future fiscal program, so private agents face no uncertainty about their future tax obligations. In this setting, the level of expected future taxes and the debt overhang are inversely related-- i.e., the higher the level of expected future taxes the lower the discount on debt in the secondary market. This is so because higher taxes on domestic residents increase the primary surplus, thereby enhancing the solvency of the public sector. Under these circumstances, a large debt overhang -- a substantial discount on debt in the secondary market -- suggests precisely that the anticipated future tax burden is low. Implicitly, domestic agents are treated as senior claimants on public sector resources, and the burden of distortionary domestic taxes is eased by "taxing" external creditors.

Instead, the existence of a "shortfall" component of the debt affects the domestic economy through two other channels. The first is familiar from the now rather extensive literature on the debt overhang, and is related to the incentives facing policymakers under such circumstances. For a given value of expected future debt service V_t , the effects on the domestic economy depend on whether V_t arises from the service of a small stock of debt on contractual terms (so that $D_t = V_t$) or from the expectation that a larger stock of debt will only be serviced partially in some states of nature (so $D_t > V_t$). Specifically, in the presence of a shortfall ($S_t > 0$), the actual value of future debt service is uncertain. Since the resources that creditors will be able to extract from the domestic public sector are likely to increase when domestic macroeconomic outcomes are favorable, creditors will capture some fraction of the payoff to good macroeconomic policies, and this possibility acts as a tax on the returns to such policies, thereby providing a disincentive discouraging policymakers from undertaking them. In terms of our notation, the expected value of this tax is already captured in V_t , but the role of $S_t > 0$ is to introduce a distribution for the actual value of future debt service around V_t . The disincentive effect arises from the fact that actual debt service is likely to increase under "good policies", to a maximum of D_t .

Some simple calculations suggest, however, that the maximum

value of the potential "additional debt overhang tax" on the domestic economy in the aggregate is likely to be small. Letting $s_t = V_t/D_t$ denote the secondary market price of a dollar of debt, and expressing the ratio of the primary surplus plus seignorage to GDP as $ps+Mm = (t-g)$, where t is the ratio of the present value of net tax revenues plus seignorage to the present value of GDP and g is the ratio of the present value of "exhaustive" (consumption plus investment) public-sector spending to the present value of GDP, we can now write equation (7) as:

$$s_t D_t = (t_t - g_t) Y_t \quad (9)$$

where Y is the present value of GDP. This can be expressed as:

$$g_t Y_t + D_t = t_t Y_t + (1 - s_t) D_t \quad (10)$$

The left-hand side of this expression represents the present value of the public sector's "uses of funds" (payment obligations), consisting of the present value of its exhaustive spending program and the face value of its debt. The right-hand side represents its "sources of funds," consisting of net taxes (including seignorage) on domestic residents and its "taxation" of creditors, in the form of debt-service shortfalls. Notice that, given the sector's payment obligations, an increase in the tax rate t on domestic agents reduces the shortfall $(1-s)$ and vice versa, as previously indicated.

Finally, factoring out Y_t from the right-hand side of (10) yields:

$$g_t Y_t + D_t = [t_t + (1 - s_t) \frac{D_t}{Y_t}] Y_t \quad (11)$$

The second term inside the square brackets on the right-hand side represents the potential "additional debt overhang tax rate" on domestic residents. It is the portion of the public sector's payment obligation that is currently expected to fall on external creditors. It would do so, however, only if the portion $(1-s_t)$ of the debt is forgiven. As long as this "shortfall" remains on the books, it represents an unallocated tax, and in particular a potential tax on domestic economic activities. Its size, however, is not large. Using fairly conservative estimates, including a

discount rate of 5 percent (corresponding to $r-n$) for GDP, a debt/GDP ratio of 0.6 (see Table 2), and a secondary market price of 40 cents on the dollar, yields a representative potential "debt overhang tax" on domestic residents amounting to less than 2 percent of the present value of GDP.

Detailed estimates of this tax for alternative values of $r-n$ are presented in Table 7 for all the HICs with available data. These estimates are based on end-1988 values of the secondary market price s_t and of the external debt to GDP ratio. The effective tax rate increases with the real interest rate, which reduces the present value of future domestic resources, and it decreases with the growth rate of GDP. Even with the relatively high value of 7 percent for $r-n$, however, the tax rate reaches maximum values amounting to about 6 1/2 percent of GDP only for the extreme cases of small countries (Bolivia and Cote d'Ivoire) where the debt to GDP ratio is extremely high and debt is considered to be almost worthless on the secondary market. For the largest debtors (Brazil and Mexico) the maximum "debt overhang" tax rate is in the range of 1-2 percent of GDP.

The extent to which a maximum additional loss of this magnitude could provide a serious disincentive for the adoption of otherwise desirable policies is certainly open to question. However, the fact that the maximum additional tax is small by no means rules out disincentive effects on policymakers. Among other things, what ultimately matters is the marginal tax that creditors are able to impose on potential increases in domestic income. While the maximum additional tax may amount to a small fraction of the present value of GDP, it may represent a large fraction of any additions to GDP that could be secured through improved policies.

The existence of a potential additional debt overhang tax may affect not just the incentives facing policymakers, but also those facing private individuals. Would the marginal tax that creditors may impose on the economy in the aggregate -- and thus the marginal tax rate that may confront policymakers -- discourage the undertaking of new income-producing activities by private individuals? The answer to this question is probably not. New activities are unlikely to be taxed differentially from old ones at the margin, and thus can be expected to face the economywide average tax rate. While creditors may extract a high proportion of the economy's increase in income, resulting in a high marginal tax rate as perceived by policymakers, this burden would be borne by new and old private activities alike through an increase in the average tax rate applicable to both. Even with a high marginal tax rate extracted by creditors on increases in domestic income, the change in the economywide average tax rate associated with any single domestic project is likely to prove infinitesimal, and thus would not be internalized by private agents contemplating new activities. It follows that the "additional debt overhang tax" is

Table 7 Heavily Indebted Countries: Implicit Debt Overhang Tax Rate

(in percent)

Values of (r-n)	7.00	5.00	3.00	1.00
Argentina	3.09	2.21	1.32	0.44
Bolivia	6.57	4.70	2.82	0.94
Brazil	1.26	0.90	0.54	0.18
Chile	2.40	1.71	1.03	0.34
Cote d' Ivoire	6.65	4.75	2.85	0.95
Ecuador	5.97	4.27	2.56	0.85
Mexico	2.07	1.48	0.89	0.30
Morocco	3.39	2.42	1.45	0.48
Peru	5.09	3.63	2.18	0.73
Philippines	2.20	1.57	0.94	0.31
Uruguay	1.17	0.84	0.50	0.17
Venezuela	2.09	1.49	0.90	0.30

Source: Underlying data were provided by the World Bank. Calculations are described in the text.

unlikely to prove a major direct source of disincentive for individual agents. Thus the standard "debt overhang" argument applies to the behavior of policymakers, rather than to that of individual agents.

While the marginal tax rate applicable to new private economic activities may not be made to differ from the economywide average tax rate by the potential "additional debt overhang tax", the future value of this average domestic tax rate will be subject to uncertainty as long as a "shortfall" exists, and uncertainty about future taxes can itself discourage new private economic activities. The figures in Table 7 suggest that the range of prospective variation in the average tax rate associated with servicing the "shortfall" may not be large, but these numbers may understate the degree of uncertainty involved for private agents, for several reasons. First, in the event of a breakdown in negotiations with external creditors, the costs of sanctions to the domestic economy may exceed the "shortfall". Second, to the extent that a transfer to external creditors is financed inefficiently by the public sector, costs to domestic residents will exceed the value of the transfer. Finally, the "micro" uncertainty associated with tax incidence on individual activities may exceed the uncertainty attached to the average tax rate. This is so because, since the shortfall is not expected to be serviced under the current policy regime, the servicing of this debt may signal a regime switch, involving new taxes, for example, as part of a fiscal reform. Since the distribution of distortionary taxation in the new tax policy regime would be difficult to foresee, the potential is created for large individual losses, even when the change in the average burden of taxation is not itself large.

The additional uncertainty about future taxes for private domestic agents associated with the shortfall S_t represents a separate channel through which S_t may adversely affect the domestic economy, over and above any disincentive effects on policymakers. In the presence of such uncertainty, irreversible private activities such as investing in physical capital and acquiring claims on the domestic financial system (that may later be subjected to capital controls) are likely to be postponed until the uncertainty is resolved. This effect may account for the behavior of private investment and capital flight in the HICs during the early eighties.²³ Evidence has now accumulated that uncertainty

²³ To attribute all of these dislocations to the "uncertainty effect" would, however, undoubtedly be an overstatement, because it would fail to take into account the possible role of the quality of (partial) fiscal adjustment undertaken by the HICs after 1982. As suggested previously, the mode of fiscal adjustment may have played an independent role in generating unfavorable macroeconomic outcomes. Disentangling the direct debt overhang effects on the

of this type can deter private economic activities that have an irreversible aspect.²⁴

On this reasoning, the costs of ex ante public sector insolvency per se (as opposed to those arising from the anticipated servicing of the debt) arise from credit rationing as well as from the distortions introduced into the decisions of both policymakers and individual economic agents by the uncertainty associated with the shortfall (in a present value sense) between the public sector's resources and its obligations.

In this setting, DDSR operations, broadly defined to include not just the financial operations associated with debt conversion, but also the full range of macroeconomic conditions attached to "Brady plan"-type operations, can make several contributions:

a. From the point of view of the debtor country, the first and most obvious contribution would be to reduce the present value of anticipated future debt service payments, V_t . This would spare the country not only the burden of effecting the external resource transfer, but also the "secondary burden" associated with distortionary taxation. Since doing so would benefit the residents of the country concerned at the expense of external creditors, DDSR operations of a voluntary nature are unlikely to produce this result. It is possible, indeed, that the fiscal conditions attached to the negotiated adjustment programs that precondition "Brady plan" DDSR operations could increase the value of V_t . Notice that the effect of the operation on V_t cannot be inferred from secondary market prices alone (since such prices depend on both V_t and the face value of the debt D_t), nor from the immediate post-operation market value of the debt (since a portion of the payments received by creditors may come from third-party grants or concessional loans). The effect on V_t must be extracted from the post-operation value of the debt (including any up-front payments), net of the grant element (if any) in third party contributions.

b. Given V_t , a second potential contribution of DDSR operations would be to restrict the excess "secondary burden" associated with the financing of the transfer of V_t to the public sector's

economies of the highly-indebted countries from the indirect effects transmitted through the mode of fiscal adjustment remains an unfinished research task.

²⁴ For the effects of potential taxation on capital flight from developing countries, see Dooley (1988). A theoretical analysis of the negative effects of uncertainty on private investment in developing countries is presented in Rodrik (1991). Bizer and Sichel (1988) present empirical evidence on the existence of irreversibility in private investment for the United States.

creditors. This could be accomplished through the fiscal conditions attached to the adjustment program. In particular, such conditions should seek to ensure that the transfer is effected at minimum distortionary cost. No single indicator would suffice to measure the degree of success in this regard, but the relevant broad public finance principles are well known --e.g., promotion of a tax system that relies on a broad base as well as low and uniform tax rates, replacement of import quotas by low and uniform tariffs, protection of public investment that meets a market test, etc.

c. The ultimate goal of DDSR operations should be, of course, to remove the debt overhang. This removes distortions associated with credit rationing, as well as disincentive effects on both policymakers and individual agents. In fact, the most important potential contribution of DDSR operations may be to resolve the allocational issue associated with the "unallocated tax burden" and to the greatest possible extent remove this source of uncertainty. A reasonable single indicator of the success of such operations in this regard, based on the reasoning above, may be the percentage reduction in the shortfall (secondary market discount times the stock of outstanding debt) as a result of DDSR.

d. Finally, to the extent that a shortfall is expected to remain at the conclusion of a DDSR operation, the positive effects of the operation from the standpoint of the debtor country will depend on its cash-flow implications.

At the present time, five DDSR deals have been concluded under the aegis of the Brady plan, involving Costa Rica, Mexico, the Philippines, Uruguay, and Venezuela.²⁵ Among the four ways listed above that such operations could have contributed to easing the macroeconomic problems confronting these countries, the extent to which three of them have been accomplished can be directly quantified. These are the change in V_t , the reduction in the shortfall, and the change in the time profile of debt service payments. The extent to which the fiscal conditions attached to the macroeconomic adjustment programs associated with DDSR operations may offer the prospect of reducing the secondary burden arising from the financing of V_t is much more difficult to ascertain. It requires the determination of a fiscal counterfactual in each case, as well as both a detailed examination of the fiscal conditions attached to each program and an assessment of the likely effectiveness of conditionality in bringing these desired outcomes about.

Conceptually, the change in V_t can be measured as the change in the market value of the total external debt plus any up-front

²⁵ For information on the details of the individual deals see Claessens, Diwan, and Fernandez-Arias (1992).

cash payments minus "new money" (whether from official or commercial sources) minus grants (or their equivalents, if any) received from third parties.²⁶ Several problems arise in applying this definition, however. Among these, two are most important. First, official debt is not traded in a secondary market, so the effect of DDSR operations on the value of both existing and new official debt requires making an assumption about its seniority status relative to "eligible" commercial-bank medium and long term debt. Second, the ex ante market price of bank debt cannot be unambiguously observed, since it has to be purged of the effects of the anticipations of the operations. The change in V_t as a result of the DDSR operations in the five programs negotiated so far has been estimated by Claessens, Diwan, and Fernandez-Arias (1992). Table 8 presents their estimates of the increase in V_t for each of the five Brady plan countries on the alternative assumptions that official debt is senior and that commercial and official debt are of equal seniority:

Table 8 Brady Plan Countries: Effects of DDSR Operations on V_t

(in US \$ millions)

	Official Debt Senior	Equal Seniority
Costa Rica	193	907
Mexico	2,189	8,074
Philippines	451	3,112
Uruguay	53	392
Venezuela	2,444	5,345

Source: Claessens, Diwan, and Fernandez-Arias (1992).

The first column of this table assumes that official debt is not subject to country risk, while the second column assumes that official and commercial debt are of equal seniority. Though the differences between the two columns are substantial, suggesting

²⁶ Notice that, when measured in this way, an up-front payment made out of the country's own resources would have no effect on V_t , because the market value of the debt would fall by the amount of the payment. This reflects a reduction in the resources available to service debt in the future.

that the estimates are very sensitive to this assumption, these results imply that V_i increased in all cases. While this would not be surprising in the context of strictly voluntary debt exchanges (see Bulow and Rogoff (1991)), the Brady plan deals contained features intended to avert "free rider" problems and to give these operations aspects of concertedness. These outcomes imply, then, that commercial banks have retained a substantial amount of bargaining power.

Regardless of what happens to V_i , the arguments above indicate that the reduction of the shortfall potentially provides an independent benefit to highly-indebted countries, by improving the incentive structure facing policymakers and reducing the level of uncertainty for private agents. Since the shortfall is the difference between the face value of the debt and its market value, it can be reduced by reducing D_i and/or increasing V_i . Since effects on V_i have been discussed above, we now consider changes in D_i , expressed as a fraction of the original shortfall in the five Brady plan countries. This information is presented in Table 9. This table is constructed on the assumption that all external debt is of equal seniority. Thus the total shortfall is calculated in the third column by multiplying the total stock of external debt outstanding at the time negotiations on DDSR were undertaken in each of the five countries (column 1) by the secondary market discount for medium and long-term commercial bank debt prevailing at that time (one minus the price of debt reported in column 2). Column 4 presents total net debt reduction in each of the five countries as calculated in Fernandez-Arias (1992). This is expressed as a proportion of the original shortfall in the final column. Overall, net debt reduction as a percent of the original shortfall was greatest in Costa Rica, and was negligible in the Philippines. More importantly, total net debt reduction amounted to a fifth or less of the original shortfall in four of the five countries.

Combining Table 8 with the fourth column of Table 9, it is obvious that the DDSR operations undertaken up to the present have had limited aims. In particular, they have not sought the complete elimination of the shortfall. The total shortfall, as given by the third column of Table 9, has not been eliminated in any of the five countries that have so far concluded DDSR operations. The extent to which it has been reduced by reducing D_i , on the one hand, versus increasing V_i , on the other, depends on which of the estimates of the increase in V_i reported in Table 9 one adopts. In view of the limited scale of the operations, it is not surprising that the debt of these countries continues to sell at a discount in the secondary market, and that access to new voluntary credits has been restored only on a limited basis and only in the cases of Mexico and Venezuela.

In this vein, the time profile of debt service payments

**Table 9 Brady-Plan Countries: Debt Reduction in DDSR Operations
as a Percent of the Initial Shortfall**

	Debt	Price	Shortfall	Net Debt Reduction	Debt Reduction as Percent of Shortfall
Costa Rica	4.8	0.56	2.1	1	47.3
Mexico	100.4	0.36	64.3	16.6	25.8
Philippines	29.4	0.46	15.9	0.5	3.1
Uruguay	3.6	0.36	2.3	0.7	30.4
Venezuela	34.8	0.3	24.4	4.3	17.7

Source : Data from Fernandez-Arias (1992)

associated with these operations becomes a relevant concern. Unfortunately, as shown in Fernandez-Arias (1992), using reasonable counterfactuals each of these operations seems to have had adverse liquidity effects over the first four years, with external payments increasing in four of the five countries (the exception being the Philippines) during the first year, while decreasing only moderately over the subsequent three years.

VI. SUMMARY AND CONCLUSIONS

This paper has argued that sectoral disaggregation within the debtor country is indispensable in analyzing the causes and consequences of the international debt crisis, as well as in evaluating prospective solutions. Public-private disaggregation within the debtor is important because, regardless of where they originate, the nature of the political process tends to ensure that severe financial crises are internalized by the public sector and thus manifest themselves in the form of public sector financial difficulties. When the public sector is perceived to be insolvent, distortions are introduced into the behavior of private agents -- both external creditors and domestic residents -- by the desire to avoid future "taxation", and these distortions can have adverse macroeconomic effects. In this context, aggregate current account adjustment is neither necessary nor sufficient for the resolution of debt problems, whereas a credible, sustainable fiscal adjustment that allocates the losses associated with the crisis in an efficient manner-- and thereby restores public sector solvency -- is a sine qua non.

The debt crisis was triggered by a widespread perception that the public sectors in many HICs were rendered effectively insolvent in the changed international environment of the early eighties by their large stocks of both external and domestic debts as well as by domestic political constraints that impeded credible fiscal adjustment to the new circumstances. The crisis had severe domestic macroeconomic repercussions in the debtor countries, in part because public-sector insolvency itself has direct macroeconomic consequences for the domestic economy by creating disincentives to the adoption of appropriate adjustment policies as well as by engendering uncertainty for private agents. In addition to this, however, the drying up of external financing due to insolvency resulted in a liquidity crisis which required some form of fiscal adjustment as a matter of accounting necessity. The actual fiscal response to the liquidity aspects of the crisis -- involving increased reliance on domestic financing, the inflation tax, and the curtailment of public investment -- was highly inefficient in many countries, leading to adverse macroeconomic effects in the form of capital flight, low investment, and slow growth, while resulting in neither actual nor prospective full debt service, leaving the problem of insolvency in place. Both the ability of the public sector in many countries to continue to borrow at home after external creditors had pulled out and the

extent to which macroeconomic dislocations in the debtor countries were due to direct "debt overhang" effects rather than to the nature of the fiscal response to the liquidity aspects of the crisis remain matters for future research.²⁷

Solutions to the crisis -- and removal of its harmful macroeconomic effects -- must involve some combination of writing down the face value of the debt and increasing prospective public sector debt service at minimum distortionary cost to the domestic economy. Failing a restoration of solvency and renewed access to the market on voluntary terms, partial solutions should at least mitigate the "secondary burden" associated with any given level of public sector debt service and ease the liquidity problems facing the indebted public sectors. The DDSR programs so far implemented under the Brady plan have indeed represented only partial solutions, closing without eliminating the gap between the face value of the external debt and the present value of prospective public sector debt service. They have done so in part by reducing the former and in part by increasing the latter. Their contribution to easing the immediate liquidity problems of the debtors, however, has not been encouraging. The most important potential contribution of such programs, then, may have been the reduction, through the policy conditionality associated with resources provided by the international financial institutions, of the secondary burden associated with the internal transfer of resources to the public sector.

²⁷ As indicated above, it is unclear how much of this domestic financing was the result of voluntary market transactions.

APPENDIX: SOURCES FOR FISCAL DATA

No single uniform source was available for the fiscal data used in this paper. Country data was generally culled from various sources. Sources of flow fiscal data are listed below for individual countries:

1. Argentina
Overall public sector deficit and primary deficit are from C. Rodriguez (1991).
2. Bolivia
Overall public sector deficit is from Morales (1986). Primary deficit was calculated by deducting external interest payments as derived from World Bank (1991).
3. Brazil
Overall public sector deficit is from Larrain and Selowsky (1991). Primary deficit was calculated by deducting external interest payments as derived from World Bank (1991), as well as domestic interest payments estimated by applying a constant interest rate of 5 percent to the stock data from Guidotti and Kumar (1991).
4. Chile
Overall public sector deficit and primary deficit are from Marshall and Schmidt-Hebbel (1991).
5. Colombia
Overall public sector deficit is from Easterly and Schmidt-Hebbel (1991). Primary deficit was calculated by deducting external interest payments as derived from World Bank (1991), as well as domestic interest payments estimated by applying a constant interest rate of 5 percent to the stock data from Guidotti and Kumar (1991).
6. Cote d'Ivoire
Overall public sector deficit is from Easterly and Schmidt-Hebbel (1991). Primary deficit was calculated by deducting external interest payments as derived from World Bank (1991), as well as domestic interest payments estimated by applying a constant interest rate of 5 percent to the stock data from Guidotti and Kumar (1991).
7. Ecuador
Overall public sector deficit is from Easterly and Schmidt-Hebbel (1991). Primary deficit was calculated by deducting external interest payments as derived from World Bank (1991), as well as domestic interest payments estimated by applying a

constant interest rate of 5 percent to the stock data from Guidotti and Kumar (1991).

8. Mexico

Overall public sector deficit and primary deficit are from Hierro and Sanguines (1991).

9. Morocco

Overall public sector deficit is from Easterly and Schmidt-Hebbel (1991). Primary deficit was calculated by deducting external interest payments as derived from World Bank (1991), as well as domestic interest payments estimated by applying a constant interest rate of 5 percent to the stock data from Guidotti and Kumar (1991).

10. Peru

Overall public sector deficit is from Paredes (1991). Primary deficit was calculated by deducting external interest payments as derived from World Bank (1991), as well as domestic interest payments estimated by applying a constant interest rate of 5 percent to the stock data from Guidotti and Kumar (1991).

11. Philippines

Overall public sector deficit is from Easterly and Schmidt-Hebbel (1991). Primary deficit was calculated by deducting external interest payments as derived from World Bank (1991), as well as domestic interest payments estimated by applying a constant interest rate of 5 percent to the stock data from Guidotti and Kumar (1991).

12. Venezuela

Overall public sector deficit is from M. Rodriguez (1991). Primary deficit was calculated by deducting external interest payments as derived from World Bank (1991), as well as domestic interest payments estimated by applying a constant interest rate of 5 percent to the stock data from Guidotti and Kumar (1991).

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