CHAPTER 4

DEBT MANAGEMENT IN THEORY

This chapter provides an outline of the theory of the optimal borrowing under default risks. Modelling of international borrowing under Pareto optimality conditions became popular during eighties when a generalized debt crisis broke out in the open for Latin America. In principle, these theories explain the loan supply schedule faced by individual borrowers and also the optimal loan selection on part of an individual borrower and lenders. The optimum borrowing models (henceforth, OBMs) can thus be used to interpret the creditworthiness of individual debtors which in turn determines the flow of loan supply to individual countries. An individual borrowing country's low creditworthiness indicates, according to the OBMs, high default risks relative to the prevailing interest rates, an outcome which results in a simultaneous drop in credit flows in their direction. Based upon certain underlying micro-theoretic maximising postulates, these models attempt to set up optimal credit limits to individual borrowers in an uncertain world. In doing so, they distinguish between liquidity, solvency and default risks in the debt process of an individual borrower. These issues along with other broader conceptual issues involved in the OBMs will be dwelt at length in this chapter.
Earlier attempts to model optimal borrowing limits for borrowing nations in the post war period can be traced back to the debt-cum-growth models of development planning which came up during sixties. In those models it was the solvency of the borrower which was held as the prime factor determining its optimum borrowing limit. According to the OBMs, it is the default risk, which is distinguishable from solvency and liquidity constraints, plays the prime most role in the determination of optimum borrowing limit for an individual borrower. Growth targets for borrowers in the earlier models are substituted by social welfare maximising behaviour, subject to constraints set by foreign loan availabilities. The latter is decided upon by lenders who operate on profit maximising principles, calculating the returns net of risks in lending. Considerations of borrowers' liquidity, long term solvency and risks of default in an uncertain world are the three factors which determine, at each real rate of interest, the limits to safe lending, particularly for the lenders. The debt-cum-growth models of sixties tried to formulate the conditions which would enable a borrowing country to successfully retire its entire debt while attaining economic growth. In the OBMs, the debt process of an individual borrowing nation is analysed so that maximising objectives of different economic agents are satisfied simultaneously under uncertainty and when risks of default are prevailing. This departure, as can be noticed in the OBMs, from the earlier models is no doubt historical being probably necessitated by empirical events and situations of eighties which were quite different from those prevailing in sixties. It will be quite useful if we, before.
embarking upon discussion at length on the OBMs, take a look at the debt-cum-growth models of sixties.

The plan of the chapter is as follows: Section 1 entails a brief discussion on the debt-cum-growth models of the sixties vis-a-vis the OBMs of the eighties. An overview of the OBMs is provided in section 2. Section 3 offers a survey of different OBMs along with the major theoretical issues involved therein. An attempt has been made to evaluate the OBMs in Section 4. A summary of the major findings of the chapter is provided in the last section.

4.1 : Debt cum Growth Models of the Sixties and the OBMs:

The debt cum growth models of the mid sixties were originated in an environment when the third world developing nations, most of which after gaining independence from their colonial rulers, were undertaking efforts to foster economic development domestically. External credit flows provided the vital financial support to these countries in their attempts of economic development. The pertinent question for those newly liberated nations was how to usher in economic development on a sustainable basis without getting trapped in external debt process. That is how to succeed in retiring their entire debts owed to foreign creditors and at the same time achieve their objectives of independent economic development. The debt-cum-growth models, like the one formulated by Avramovic (1964), addressed these questions while setting up the conditions under which a growing developing nation could
successfully retire its entire debt. \(^1\) Whether a debtor country will be able to retire its external debts depends on the target rates of growth of output, the capital output ratio and the marginal as well as initial savings ratios. An adverse terms of trade effect may further restrict the country's ability to make debt payments.

If \(F, I, S\) and \(Y\) denote the foreign capital inflows, investment, savings and real output respectively, \(k, r\) and \(s\) denote capital output ratio, growth rate of output and savings ratio respectively, and the subscripts \(n\) and \(o\) refer to the final and initial period respectively, then in symbols

\[
F_n = I_n - S_n - (kr - s)Y_n - s_oY_o. \tag{4.1}
\]

For a trade constrained economy where \(M, X, m\) and \(x\) respectively refer to imports, exports, ratio of import to GDP and ratio of exports to GDP, foreign capital inflows in the \(n\)-th time period can be expressed as:

\[
F_n = M_n - X_n = m(Y_n - Y_o) + m_oY_o - x(Y_n - Y_o) - x_oY_o.
\]

\[
= Y_n(m - x) - Y_o(m - m_o - x + x_o) \\
= (m - x)(Y_n - Y_o) + Y_o(m_o - x_o) \tag{4.2}
\]

In terms of equation (4.1) if \(F_n\) has to be terminated in period \(n\), it is necessary that \(s > kr\), provided the savings gap dictates the foreign capital requirements. In other case with a dominant trade gap \(m < x\) provides a similar outcome, as can be seen from equation (4.2).

\(^1\) See Avramovic, D. (1964); op. cit.
The above account of a successful debt-cum-growth process can be interpreted as a solvency criterion, a notion which also featured in the OBMs. During sixties most of the debt flows were between official agencies. Disbursements of ODA were at times linked to growth performances of the recipient borrowing nations. Estimates of foreign capital requirements were generated from growth targets and related parameters in the borrowing country, the majority of which retained a certain degree of state control over allocations of resources.

Limits to borrowing were set in the initial formulations of the OBMs, by both long term solvency as well as short term liquidity situation for the debtor. Either constraint was estimated in terms of the assumption that the future debt requirement capacity of the borrower could be assessed with certainty. A 'default risk' calculable under certainty, constituted the third determining variable in determining the outcome. Problems were compounded by uncertainty related risks, an aspect which has been handled in the more recent OBMs.

4.2: An Overview of Optimum Borrowing Models:

Analytical issues concerning debt dwell on a set of macro and micro parameters, and the different debt models of optimum borrowing variety have generally sought to incorporate the relevant parameters by centering the discussion around three main issues viz., solvency, liquidity and the probability of
loan default\textsuperscript{2}. Interestingly, even before the Mexican move to announce a moratorium on loan repayments in August 1982, the issue was analysed in a seminal piece of work on debt with potential repudiation\textsuperscript{3}. Since then defaults and risks of repudiation have occupied the centre stage of all the optimum debt models. We propose here to take a broad overview of the basic thematic construction of these models, dealing with the three central issues mentioned above.

As mentioned at the onset of this chapter, the debt models in general have addressed questions concerning the debt crisis and its management. An analysis of the debt crisis entails an expository probe into the facts which culminated into the crisis and also an attempt to stylise these facts in the form of some meaningful paradigms. The specific models, we have chosen to discuss, aim at tracing the path that might have led to the huge debt pile up during seventies, and which ultimately pushed an individual debtor nation on the threshold of default by early eighties. In doing so, the different models have laid down some common denominators which capture the following facets of the debt process in the indebted developing countries:

(a) the distinction between the short run liquidity crunch and the long run solvency constraint of individual borrowers,
operating under certainty and perfect knowledge in a competitive loan market; and,

(b) the possibility of default and its implications on loan supply, bargaining, penal actions and sidepayments.

The immediate concern of the OBMs has been to find out a solution that would prevent an individual indebted country from default and, also, would save the international financial system from an impending collapse. The conclusions drawn from these models address these questions while striving to evolve a viable debt management strategy. What ensued in the process boils down to the analysis of the following interrelated issues which follow from the above mentioned concerns:

(i) How much a creditor bank should lend to an individual borrowing country so that the debtor cannot pose a potential threat of default? Stated differently, what should be the optimum exposure of an individual bank in a debtor country?

(ii) How to cope with the problem of debt servicing so that all the debts are repaid and private credit flows to the third world are resumed?

The first question is related to the creditworthiness of individual borrowers. The analysis of creditworthiness of individual borrowing countries when default risks are prevailing decides the nature of loan supply schedule for a debtor country. From the loan supply schedule appropriate credit limit to be imposed on the borrowing country by the creditors is determined.
The second question mentioned above indicates the issues involved in different debt management strategies which follow as a logical sequel to the models' own understanding of the debt build up process. The basic aim of the debt management strategies is to resolve the problem of debt overhang under potential risk of repudiation. Debt overhang is defined in terms of the debtor country's potential repayment ability vis-a-vis its debt burden. When a country's debt obligations exceed the amount it is likely to be able to pay, these obligations act as a high marginal tax rate on the country. If it succeeds in doing better than expected, the main benefits accrue to its creditors. This discourages the country from doing well in two respects. The debtor country government will be less willing to undertake painful or politically unpalatable measures to improve economic performance if the benefits out of the improved economic performance accrue to its foreign creditors. Secondly, the burden of the national debt will fall on the domestic residents through taxation, and importantly through taxation of capital; so the overhang of debt acts as a deterrent to investment. When the debtor country's debt obligations far exceed its potential repayment ability a situation may arise when it may think to default. The greater the debt burden subject to the country's potential repayment capacity the greater will be the risks that it may decide to default. The major concern of the OBMs, initially, was to find a way to avert this immediate threat of default. Debt management strategies which follow from these models are centered around this question basically. The relevant issues which the various models have addressed in this regard are:
(i) Should the creditor banks continue to lend new money to the heavily indebted nations? If yes, then to what extent should they lend and what would be the optimum exposure of a bank in an indebted nation? If not, then what will be its impact on the banking community as a whole and on the individual bank in particular?

(ii) Should new lending to an indebted nation be unconditional or should it be linked with some forced policy action and adjustment in the debtor economy?

(iii) Should the terms and conditions of some past debt obligations of the heavily indebted countries be renegotiated with the creditors which would provide some relief to these countries and, at the same time creditors would also not lose their claims over these debts?

(iv) What would be the role of the official creditors, especially, that of the multilateral financial institutes? Should they lend new money to a problem ridden debtor countries and intervene in its debt process?

(v) Should some debts of the heavily indebted countries be forgiven or written off or should their debt obligations be converted into some kind of instruments by which some debts of these countries could be retired and creditors would also get back some past debt repayments?
All these questions have been addressed by the OBMs gradually with the turnouts of empirical events in the heavily indebted countries vis-a-vis their creditors, mainly the international commercial banks, in eighties.

In the initial phase of the crisis international financial community was prompted with the daunting task of immediate aversion of the possibility of debt default. In doing so it was felt that it would not be prudent on their part to cut off all the credit lines to the heavily indebted countries because that, instead of enabling the debtor countries to repay their debt obligations, would encourage them to default. But the individual creditor banks were not willing to extend any new money at that time. Question (i) is related to this problem. Through the involuntary concerted lending approach which was evolved then this problem was tried to be sorted out. Debt models which were built up at that time address this question as well as the analytical issues involved in the concerted approach.

Simultaneously, it was realised that past debt repayments would not be forthcoming in the near future. More so the past debt burdens would help to aggravate the debt servicing problems and, thereby, would increase the risks of default. In that context, it was felt that some debt relief operations might help the debtors to get rid of the prevailing impasse and also, would enable the creditors to realise payments due to them. This was when debt rescheduling exercises were carried out with individual debtor countries. These issues, which are related to
the question (iii) above, have been raised in the OBMs while these models were analytically probing the pros and cons of debt relief as a mean to resolve the crisis. Debt relief can be defined as any measure that reduces the present value of the payments that are due to the creditors. Debt rescheduling is one form of debt relief for it reduces the present value of the payments, either interest payments or principal repayments or both, that are due to the creditors. The OBMs of mid eighties attended the theoretical issues associated with debt relief operation as a debt management strategy which we will see later.

From the very beginning of the debt crisis it was felt that in choosing a debt strategy for an individual country it is crucial that the availability of external finance should be consistent with a policy framework that the debtor country will follow. This issue was originated from the belief that the debt crisis of the eighties is the manifestation of both imprudent over-lending to the third world developing countries by the creditor commercial banks and also internal problems of the debtor economies matched by misguided policy framework. It was thus felt that provision of new money by the external creditors should not be unconditional. Some conditionalities should be attached with the provision of new external finances which would compel debtor countries to adopt policy framework consistent with the prevailing debt management strategies. This issue is related to the question (ii) above. OBMs have raised this issue in an effort to appraise the adjustment efforts undertaken in several
debtor economies as conditionalities are imposed on individual borrowing countries.

*Question (i) and (ii)* above, in turn, pose another important problem as far as the imposition of conditionalities and implementation of various debt management strategies are concerned. The pertinent question is: who will ensure that creditor banks extend new money to the heavily indebted countries and debtor governments undertake adjustment initiatives in their domestic economies. This concerns with the role of the official creditors, especially that of the multilateral financial institutes like the IMF and the World Bank which is related to the *question (iv)* above. The OBMs attended this question while appraising the third party intervention in managing the debt crisis.

The first four questions, mentioned above, are concerned with the aversion of immediate default risks. When that concern was no longer prevailing in the late eighties and also it was clear that creditor commercial banks were out of the danger it remained to be seen whether existing debt obligations can be reduced through various debt conversion schemes in order to tackle the problem of debt overhang. Although there was no immediate default risks, as long as debt overhang is remaining the chance, that risks of default may arise, still persists in the creditors' perception. Debt reduction in this sense refers to, according to Sachs (1989), any formula for restructuring the debt that leads to a reduction in the present value of payments
that are due to the creditors. However, it is best be defined as any measure that reduces the debt owed by a country, for example, through the exchange of debt for equity. In that respect it reduces the present value of debt payments, which refer to mainly principal repayments, due to the creditors. This aspect of debt management strategies is raised in the question (v) above. It is important to distinguish at this juncture debt forgiving and debt reduction. Debt forgiving refers to the reduction in the nominal value of debts whereas debt reduction actually stands for reduction in the present value of debt payments due to the creditors. OBMs have addressed both the cases. In reality it is hard to come across any incidence of outright debt forgiving by the creditors. This may be because of the fact that creditors do not prefer to sacrifice their claims on a debtor in order to benefit from good fortune if it arises. The issue of forgiving debt overhang versus reduction of present value of debt payments dominated the OBMs in the late eighties.

The aspect of debt renegotiation and different debt restructuring measures have drawn attention to an important aspect of debt management strategies - that of bargaining between creditors and the individual debtor countries. The nature of bargaining decides the quantity and the terms and conditions on which money will be lent and also the nature of penal actions which are warranted against a debtor in case of default. The

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5 Penal actions by lender banks or creditor government may pose a credible threat to an indebted nation. However, in reality, such penalties may not be enforced in absence of a collusive action on the part of the lending banks, and, also, on part of the different creditor governments.
OBMs have dealt with this aspect of debt management in an endeavour to find out an optimum equilibrium in bargaining games between creditors and individual borrowing countries.

What ensues from the above discussion is the fact that the analytical issues were developed gradually as debt management underwent different phases since the outbreak of the crisis. These issues can be classified in terms of different debt management strategies as: debt financing through concerted lending approach, debt relief, debt reduction through debt conversion schemes and debt forgiveness. OBMSs are basically concerned with these different types of debt management strategies as we will see in the following section.

4.3: A Formal Overview of Different Debt Management Strategies in OBMs:

The distinction between the liquidity and solvency aspects of the debt problem has been captured in detail by Cooper and Sachs (1985). A liquidity crunch may take place when, in a given period, a debtor country owes more to its creditors than it can service, due to non-availability of assets in the form of money or as assets which are easily convertible into foreign exchange. The situation simply amounts to a cash flow problem in the short run, so that in absence of new loans it turns out rather difficult for debtors to service its debt which is overdue.

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4 See Cooper and Sachs (1985); op. cit.; pp. 22-25.
Formally, if in period ‘t’ a percentage of outstanding debt falls due, then it may well happen that

\[(r + a)D_t > Q_t\]  

(4.3)

where \(D_t\) is the total outstanding debt in period \(t\), \(r\) is the rate of interest, \(r_d_t\) is the interest payment due in period \(t\), \(a\) is proportion of debt fallen due in period \(t\), \(a_d_t\) is amortisation payment due in period \(t\), \((r + a)D_t\) is total debt service payment due in period \(t\), \(Q_t\) is tradeable goods in period \(t\).

Independent of this short run aspect the inability of a country to service its debt in the long run may also restrict its borrowing capacity in the current period. In absence of any uncertainty the limit to a country’s long run access to international capital market is decided upon by the present value of its future stream of net income from abroad. As long as the present value of the future stream of net income from abroad exceeds its external indebtedness the borrowing country is said to be solvent. A country is thus considered to be insolvent, if

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7 Tradeable goods rather than the GDP of the debtor have been considered here because debt service payments are to be made from the foreign exchange reserves, namely US dollar, which can only be earned through exports of tradeable goods. Condition (4.3) can also be written as, \((r + a)D_t > b.Q_t\), where \(Q_t\) is GDP at time \(t\), \(b\) is proportion of tradeable goods in GDP at \(t\).

8 Uncertainty about future here refers to one that is concerned with future income flows and interest payments.

9 The present value of future income stands for the economic definition of national wealth that the country possesses.
\[ (1+r)D_t > \max \sum_{i=t}^{\alpha} (1+r)^{-(i-t)}TB_i \]  

(4.4)\textsuperscript{10}

where \( D_t \) is total outstanding debt at the beginning of period \( t \), \((1+r)D_t\) is total debt service payments, \( r \) is the invariant real rate of interest, \( TB_i \) is trade surplus at time \( i \). The right hand side of (4.4) refers to the maximum discounted sum of current and future trade balances earned over the period.

The problem of optimum borrowing has been set in a dynamic framework of a formal model under certainty regarding future income flows from abroad and interest rate.\textsuperscript{11} In the model developed by Sachs (1983) the precondition for sustainability of international borrowing seems to lie in the debtor nation’s intertemporal budget constraint in a world with perfect certainty. New loan bridges the gap between total absorption and GNP, net of factor payments abroad (primarily interest payments), in every period. This gap also equals the non-interest current account deficit. A country’s external borrowing thus obeys its intertemporal budget constraint if the present value of its debt becomes zero in infinite time horizon i.e. the borrowing programme is self-financing. The condition implies

\[ \lim_{t \to \alpha} (1+r)^{-t}D_t = 0 \]  

(4.5)

where \((1+r)^{-t}D_t\) is present value of debt outstanding at time \( t \).

\textsuperscript{10} The country’s available resources for external debt servicing in each period is indicated by its trade surplus. If the maximum discounted sum of current and future trade balances is less than the current debt obligations, the debtor country is then unable to pay back its debt out of its own reserves. This is the indication of the country’s insolvency.

\textsuperscript{11} See Cooper and Sachs (1985); op. cit.; pp. 22.
Using (4.5) Sach's (1982) solvency criterion can be expressed as:

\[
\sum_{i=0}^{\alpha} (1+r)^{-i} [Q_i-(C+I+G)_i] = \sum_{i=0}^{\alpha} (1+r)^{-i}TB_i = (1+r)D(o)
\]

(4.6)

where \( Q_i \) is national output, \( (C+I+G)_i \) is total absorption, \( TB_i \) is trade balance at time \( i \), \( D(o) \) is the initial debt stock.

Equation (4.6) spells out the condition for sustainable domestic spending and external borrowing. In other words it spells out the condition for fiscal self-sufficiency\(^{12} \) for the debtor country over time. This is one of the major conditionalities laid down in the standard adjustment programmes. Thus to achieve a flow of sustainable domestic spending, the discounted sum of future trade balances must equal the initial external indebtedness of the economy which, in turn, implies that over time trade surpluses and deficits must balance each other. Therefore, current account deficits in each period can be financed through external borrowing only if the solvency criteria is satisfied over time.

Cooper and Sachs (1985) has modified the solvency criterion described by Sachs (1982). The solvency constraint should be such that debtor economy's debt must not exceed the discounted sum of its productive wealth net of its minimum consumption expenditure. Formally,

\[
(1+r)D_t \leq \max_{i=t} \sum_{i=t}^{\alpha} (1+r)^{(-1-t)[(Q_i-I_i)-C_i^*]}
\]

(4.7)

\(^{12}\) See also section 6.1 in chapter 6.
where \((Q_i - I_i)\) is productive wealth\(^{13}\) of the economy at time \(i\), \(Q_i\) and \(I_i\) being real GDP and gross capital formation respectively, \(C_i^*\) is the minimum or subsistence level of consumption possible at time \(i\).

Note that solvency problem does not emerge if the rate of growth of productive wealth \((Q_i - I_i)\) in the steady state exceeds the interest rate. One interesting point to note is that even if a debtor country is insolvent creditors may go on lending if the rate of growth of the creditors' economy exceeds the interest rate. This is popularly known as Ponzi financing which arises because when creditors' economy is growing at a rate greater than the interest rate new lending forms a small fraction of the creditors' productive wealth and, creditors will then assume that the debtor will be provided with new loans by the future lenders\(^{14}\).

A question can now be asked as to what the loan supply schedule would look like in absence of default risks and liquidity constraint. Sachs (1982) and Cooper and Sachs (1985) have both considered a perfectly competitive loan market. The supply schedule is kinked at the maximum solvency limit, \(D'(t)\), with perfectly elastic credit at the real rate of interest \(r\) until \(D'(t)\) is reached as can be seen from the figure 4.1. Competitive financial institutions whose aim is to maximise interest earnings will not make additional loan when \(D > D'(t)\)

\(^{13}\) Productive wealth as distinct from national wealth refers to that portion of GDP at a time which is capable of generating future income flows.

\(^{14}\) See Cooper and Sachs (1985); op. cit.; pp. 23.
since the market value of these loans would be inevitably negative. Hence, there is a market determined credit ceiling at \( D^* \).

In Sachs (1982),

\[
D^*(t) = \alpha \sum_{i=t}^{\alpha} (1+r)^{-t-(1-t)}Q_i
\]  

(4.8)

provided \( C, G, I > 0 \) and, \( \lim_{t \to \alpha} (1+r)^{-t} = 0 \). 

In Cooper and Sachs (1985),

\[
D^*(t) = \max_{\alpha} \sum_{i=t}^{\alpha} (1+r)^{-t}(Q_i-I_1)
\]  

(4.9)

Figure 4.1

Credit rationing may result in when individual bank's lending decision is affected to a great extent by exogenous factors which include bank regulations and actions by other banks. For instance, if due to regulation on bank capital-asset ratio, a bank lends \( L \) amount of money to a country such that

\[
L \leq L^* \leq [(r+a)D_t - Q_c]
\]  

(4.10)
where \( L^* \) is the maximum amount set by regulation that a bank is permitted to lend and \( L \) is the actual amount it is willing to lend.

Then a single bank's lending cannot make a country honour its current debt obligations. However if there are, say, \( n \) number of banks and if each of them lends \( L \) amounts of money such that

\[
nL \geq [(r+a)D_t - Q_t]
\]

(4.11)

then the country can honour its current debt service payments, provided it is solvent.

However, if an individual bank thinks that other banks are going to lend and it will, in any case, receive some debt payments out of the new money lent to the debtor by other creditor banks it may decide not to lend. If all banks start thinking alike then, in the end, it may turn out that no bank is actually lending new money. This is the typical problem of free riding on part of the individual banks which may make situation worse for a debtor country, facing liquidity crunch. It will not be able to make the current debt payments just for the dearth of adequate financial resources. If this continues for long then arrears on debt service payments will pile up and the country may ultimately become insolvent. Thus contraction in credits from individual commercial banks in the event of free-riding may render a credit constrained debtor insolvent.
It would be rational for individual banks to collectively lend enough of new money so that the current liquidity gap is bridged if a solvent debtor faces liquidity crunch in the current period. In doing so the creditor banks can avert risks of default which may crop up when arrears on debt payments start mounting up. This is what is known as concerted lending approach in the debt literature. Let us digress it a bit here in terms of the subjective discount on debt - the percentage by which existing creditors expect the present value of actual repayments on debt to fall short of a country's contractual obligations.

If D is the nominal value of the existing debts of a country and l is the fraction of the existing debts by which the creditors expect to lose when a debtor country defaults. The creditors will receive only (1-l) of the nominal value of their claims, D, if the borrowing country defaults. Market value of the debts then becomes (1-l)D. Suppose the individual creditors are induced to lend collectively a sufficiently large amount of money, say L dollars. Then it may be possible to reduce the expected loss of the creditors from l to l'. Market value of the debts then will be (1-l')D. Note that each additional dollar is lent at an expected loss of l' but it increases the market value of the existing debts by (1-l')D. The expected loss from such collective lending is l'L and the expected benefit is (1-l')D. Creditors will be encouraged to lend new money in this approach as long as

\[(1-l')D > l'L\]

or, \[L/D < (1-l')/l'\] \hspace{1cm} (4.12)
Looked in isolation an individual creditor is extending new loan at an expected loss. In such an event the possibility of free riding strongly prevails. New creditors will not be induced to lend then. It is in the collective interest of the affected creditors that new loans should be provided by them. The process of concerted lending can overcome this problem of free riding when the affected creditors coordinate with each other at the insistence of a third party, e.g. central banks of the creditor countries or an international financial institute like the IMF. New money extended to a debtor country in this way is like a public good.

If a solvent debtor faces liquidity problem in the current period then it may be possible for it to find new loans voluntarily. But that may not be the case when it is not solvent. A debt crisis can only occur when the solvency of the debtor is at stake. Short term liquidity crunch does not create much of a problem to the creditors as well as to the debtors. In a certain world where competitive creditors have perfect knowledge about the debtor country they will lend new money as long as the latter is solvent despite its liquidity crunch in the current period.

A parallel arises in the real world under uncertainty when the debtor's future stream of income is difficult to estimate. Thus one cannot be sure whether the problem is one of liquidity or solvency. Krugman (1985) in his model of debt with uncertainty showed that in an uncertain world it is difficult to adjudge
solvency of debtors due to imperfect knowledge about its future flows of income. Creditors are concerned mainly with the risks of default. So it becomes important to apprehend whether there exists any possibility of default on debt payments.

In their seminal piece of article Eaton and Gersovitz (1981) attempted to model borrowing by individual debtor countries in the international capital markets when risks of default are prevailing. They have argued that the borrowing by the individual countries in the international capital market is characterised by the absence of explicit penalties for non-payment. Rather, the debtor country which repudiates faces future exclusion from the capital markets. Costs of default may include (1) seizure of assets in whatever amount creditors can, (2) a reduced access of the defaulting nation to international capital market as it is unable to borrow again, (3) embargo on defaulting country’s trade in the international market. In the real world, the costs of default are difficult to assess due to uncertainty.

In terms of a cost-benefit framework it was shown that default will not take place if the cost of default to debtors exceeds the benefits accrued from it. Benefits of default depend on the magnitude of outstanding debt - the greater the magnitude of outstanding debt the greater will be the incentive for non-payment. Default can, thus, be prevented by imposing credit ceiling on the debtor which, in turn, influences the loan supply
schedule\textsuperscript{15}. The amount of this ceiling depends on the lenders’ perception of debtor’s disutility of exclusion from the capital market. The borrower is rationed if the credit ceiling imposed by the lenders lies below its desired level of borrowing.

In models of borrowing with default risks\textsuperscript{16}, optimal amount of external borrowing is determined residually as capital inflows which, when added to the domestic savings of the debtor country, helps to realise the optimum level of investment. Optimum level of investment refers to that level of investment which maximises debtor’s social welfare subject to solvency, liquidity and default risks. Default risk is distinguished from solvency and liquidity constraints in terms of debtor’s unwillingness to pay. The other two constraints are related to the debtor’s ability to pay. From these definitions of different risks associated with sovereign lending it can be said that a solvent country, having no liquidity problem, may decide to default if benefits from default outweigh costs of default. As a result, it may face a credit ceiling in the loan market. However in an uncertain world it is rather difficult to differentiate between a debtor’s inability and unwillingness to pay.

Default risks are estimated by comparing a debtor’s utility from non-payment and that from payment. In symbols, a country will choose to default if $U^0 > U^{ND}$ where $U^0$ and $U^{ND}$ denote utility

\textsuperscript{15} See Krugman (1985); op. cit.; pp. 80.

\textsuperscript{16} See Sachs (1982) and Cooper and Sachs (1985); op. cit. s.
from default and non-default respectively. The probability of default, say \( p \), is then given by
\[
p = \text{Prob.}[U^d > U^{nd}].
\]

The above mentioned utility is an increasing function of total inherited stock of debt that is debt overhang. The probability of default increases with the debt overhang. Clearly then default risks can be averted if debt overhang is reduced. However, the creditors are often reluctant to reduce contractual values of debt even when the market values of the debts are quite low. Creditors always hold that there may arise possibility of a favourable capacity or willingness to pay of the debtor in future. If the contractual values of the debts are lowered then the creditors will not be able to benefit from such an improvement in future. The creditors may be interested to provide debt relief to the debtor. This may be conferred on the debtor through debt rescheduling and various other measures which involve a change in the pattern of repayments, shifting repayments forward into the future. It can be shown that creditors may benefit from such exercises than straight away writing off some portion of the total stock of debts owed by the debtor.

Suppose there is an inherited stock of debt and in the next period $10 billion of payments is due. The market value of this payments is, say, $6 billion which is the actual payment limited by debtor’s capacity to pay. Then there will be an 40% discount in the market. Now debt relief may benefit the creditors if it helps to increase the actual payments above $6 billion. A debt
relief which reduces the contractual payments to $8 billion may enhance the actual payment to $7 billion, say, for the following reasons:

(i) If a debtor is granted debt relief from making debt payments in the short run it will have more resources available initially. As a result of reduction in its current contractual obligation its net outward resource transfer (interest payments and principal repayments less new credits) will be reduced in the current period. It may then use the additional real resources for investment which may augment its capacity to pay in future. Hence there may be a net gain to the creditors if the debtor is willing to make payments in future.

(ii) Default entails certain costs which are to be imposed on the debtor in order to forestall the repetition of default. These costs include the effects of penalties such as loss of trade credit, losses from trade restrictions imposed on the debtor, and loss of reputation which may affect the debtor's creditworthiness and trading later. If these costs are avoided then a potential Pareto improvement may result in and some of the benefits may accrue to the creditors also. In fact, this consideration might have provided the main short term motivation to the creditors to reschedule debts in the early years of the debt crisis.
A debt overhang may act as a disincentive for a debtor country to increase its ability to pay by undertaking rigorous and politically unpalatable adjustment efforts. If there exists a large stock of debt then the debtor government and its citizens may not be induced to sacrifice more in the present period to increase the capacity to pay as most of the benefits from this increase will go to the foreign creditors, not to the debtor country. In such case reduction in the contractual obligation may actually benefit the creditors through higher capacity to pay brought about by a greater incentive to invest in the present period.

Note that creditors gain collectively, not individually. Every debt relief granted by an individual creditor is made at an expected loss in the current period. Creditors will be collectively induced to grant debt relief, like in the case of involuntary new lending discussed above, as long as net benefit from such debt relief in future exceeds the present cost in terms of reduction in contractual obligations. However, like in the concerted lending case, there exists free rider problem. An individual bank does not have the incentive to grant debt relief because a large part of the benefits out of it will spill over to other creditors who might not have granted any relief. This may explain the reason behind the creditor commercial banks’s reluctance in extending new loans or granting debt relief.
But there may be another reason which may explain possibly the commercial banks' reluctance in granting debt relief in the later years of the crisis. Further relief will reduce the contractual obligations of payments too much and will thus lower the actual repayments in case of favourable capacity or willingness to pay later. Also, there is uncertainty whether capacity to pay will increase or not. The capacity may be affected by terms of trade effect which is exogenous to the factors determining creditors' debt relief decision.

The above arguments in favour of concerted lending or debt relief can be shown in a formal model with uncertainty following Krugman (1985). It is relevant at this point to ask the question as to how the credit market tends to react to uncertainty. As noted above, to lenders the larger a country's size of outstanding indebtedness the higher is the probability of a default. A premium will thus be charged by lender on additional lending which would also add to borrowing country's debt burden. The borrowing country will then face a backward bending supply schedule of foreign loans.
The schedule $\pi = 0$ represents the locus of expected profits to lenders which is reduced to zero owing to competition among them. Along the schedule probability of default will just offset the premium of the interest rate over the riskless rate $r$.

The borrowing country’s preferences between new loans 'L' and $r$ are represented by indifference curves $I^a$, $I^b$, and $I^c$. It will prefer to borrow more (less) L at low (high) $r$. The equilibrium is attained at E.

In a multiperiod framework, debtor is in a situation where it continues with both repayment of old loans and new borrowing or debt relief at the same time. With rise in the debtor’s outstanding indebtedness probability of default increases and as a result new loans offered by banks start drying up. Cline
(1983) was first to point out that a failure to continue lending or granting debt relief at this juncture may provoke a default and thus may cause a loss to the lenders of their existing claims. Thus from the point of view of creditors new lending or debt relief assumes the character of a public good. Krugman (1985) incorporated Cline's argument in a more general setting taking into consideration both debtor's and lender's perspectives.

The option of immediate default for the borrowing country allows it to have some reservation level of expected utility $U^{\text{min}}$. If with the prevailing loan supply schedule $U^{\text{min}}$ is not attained, a situation will be created where immediate default becomes probable. Now the question is whether at E the country will service its debt or choose to default (see fig. 4.2). If $U^{\text{min}}$ corresponds to $I^rI^s$, then given the loan supply schedule $\pi = 0$, the debtor country can attain an equilibrium represented by the point E in figure 4.2. If $U^{\text{min}}$ corresponds to $I^cI^c$ then default will take place. In a two period framework the necessary condition for default at E is that $D_1 > L$ where $D_1$ is the debt outstanding at the end of first period and $L$ is new lending. Thus the decision to default crucially depends on the inherited stock of debt in the first period.

We have mentioned earlier that the loan supply schedule $\pi = 0$, is obtained on the basis of competition among the lenders. However, this competition may lead to a very low level of lending so that the debtor is led to default as $U^{\text{min}}$ lies outside the $\pi=0$
schedule. Krugman (1985) argued that the creditors can sustain the value of existing debts only if they coordinate with each other in extending new money or granting debt relief to the individual debtors. This new lending or debt relief is involuntary and is crucially dependent on the collusive behaviour of lenders who push new money as a defensive measure. This has already been pointed out earlier in this section.

As has been already indicated, this new money is advanced by an individual creditor at an expected loss. The gain out of it will be the payments of first period debt services and some chance of getting back second period’s payments as well. If \( D_1(1+r) \) represents first period’s debt service payment, \( p \) the probability of default, and \( (1-p)D_2 \) expected repayment in the second period then, the expected gain out of new lending can be indicated by the expression \([D_1(1+r)+(1-p)D_2]\).

New lending or debt relief will take place only if expected loss does not exceed expected gain i.e. new lending takes place if and only if \( \pi > \pi^{\text{min}} \) where \( \pi^{\text{min}} = [-D_1(1+r)-(1-P)D_2] \).

Note that \( \pi=0 \) no longer remains the loan supply schedule under collusive lending.

A debt crisis results in when \( U^{\text{min}} \) cannot be attained through competitive loan supply schedule \( \pi=0 \). To avert default then collusive action on the part of creditors is necessary so that \( \pi^{\text{min}} \) schedule lies at least partly outside \( U^{\text{min}} \).
Fig. 4.3

ABC in figure 4.3 is indicative of a set of arrangements between debtor and creditors. Point A denotes minimum agreement point that is just sufficient to avert immediate default. Any arrangement depicted by points left of A will not be acceptable to the debtor as $U^{\text{min}}$ will then not be attainable. On the other hand, C denotes the maximum agreement point which is the maximum amount of new money or debt relief the creditors will be willing to extend involuntarily. Any arrangement to the right of C is not acceptable to creditors because then $\pi < \pi^{\text{min}}$. 
Ultimately, success of either concerted lending approach or debt relief operation depends upon the factors which influence the debtor's capacity to pay in future and which lie outside the control of the private creditors. One of the basic argument posed in favour of debt relief or concerted lending is that by either of these measures debtor government is induced to sacrifice more in the current period to increase its capacity to pay in future. This is already discussed. This warrants a domestic adjustment programme to be pursued by the debtor government. It can be shown formally following Sachs (1982) and Cooper and Sachs (1985) that pre-commitment of an adjustment programme while negotiating a debt relief agreement may result in a Pareto improving situation which benefits both debtor and creditors. The emphasis here is on the adjustment programme, spelt out in the models as minimum investment required to maintain debtor's ability to pay.

In analogy to a typical game-theoretic situation two kinds of debt management strategies can be considered viz. cooperative and non-cooperative strategy\(^\text{17}\). Cooperative strategy refers to the one where the availability of new loans from the creditor depends upon the debtor pre-committing itself to an investment programme. As a contrast, under non-cooperative strategy new loans are arranged by the creditors without such pre-commitment. Let us consider a two period framework. The debtor's objective function is specified as:

\[
U(C_1, C_2) = [U(C_1) + U(C_2)]/(1+\delta); \quad (U' > 0 \text{ & } U'' < 0) \quad (4.13)
\]

\(^{17}\) See Sachs (1982) and Cooper and Sachs (1985); op. cit.
where $\delta$ is the pure rate of time preference, and, $C$ refers to consumption.

National output at time $i$ is given by

$$Q_i = Q(K_i), \quad (i = 1, 2) \quad (4.14)$$

where the capital stock, $K$, at time $i$ is

$$K_i = K_{i-1} + I_i \quad (4.15)$$

where $I$ is the investment or net addition to capital stock.

National indebtedness is equal to first period's current account deficit i.e.

$$C_1 + I_1 - Q_1 = D_1 \quad (4.16)$$

In absence of default, intertemporal budget constraint is given by

$$C_1 + C_2/(1+r) = Q_1 + (Q_2 - I_1)/(1+r) \quad (4.17)$$

where $r$ is the world safe rate of return.

If the debtor does not default then,

$$C_2^{nd} = Q_2 - (1+r)D_1 \quad (4.18)$$

If the debtor chooses to default then

$$C_2^p = (1-\phi)Q_2 \quad (4.19)$$

where $\phi$ is a fraction of national output which captures all possible costs of default: trade disruption, exclusion from future borrowing, seizure of assets and so forth\(^\text{16}\).

The country will default both in cooperative and non-cooperative setting if $C_2^p > C_2^{nd}$. So, creditor banks will be safe in extending loans as long as

$$C_2^p \leq C_2^{nd} \quad (4.20)$$

i.e. $(1-\phi)Q_2 \leq [Q_2 - (1+r)D_1]$

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\(^{16}\) $\phi$ is only a cost to the debtor in case of default. But it brings no benefit to the creditors.
i.e. \((1+r)D_1 \leq \phi Q_2\)

i.e. \(D_1 \leq \frac{\phi Q_2(K_0 + I_1)}{(1+r)}\)

\[= h(I_1), \quad (h' > 0 \quad \text{and} \quad h'' < 0) \quad (4.21)\]

Note that \(\delta h/\delta \phi > 0\) and \(\delta h/\delta r < 0\).

Let \(I'(D_1)\) be the minimum level of investment such that \(D_1 < h(I_1)\).

**Cooperative strategy** warrants that the debtor country pre-commits \(I_1\) after which creditors extend \(D_1\) such that \(D_1 < h(I_1)\). The debtor's optimisation problem is then specified as:

Maximise \(U^c\) subject to

\[D_1 < h(I_1)\] \(\quad (4.22)\]

\[C_1 = Q_1(K_0) + D_1 - I_1\]

\[C_2 = Q_2(K_0 + I_1) - (1+r)D_1\]

There exists maximum \(U^c\) for every level of debt \(D_1\).\(^{19}\) Suppose the optimum is attained at \(D_1^c\). The banks will provide it since by construction \(D_1 < h(I_1^c)\).

Under **non-cooperative strategy** \(D_1\) is set first without any prior commitment from the debtor regarding \(I_1\). Then \(C_1\) and \(I_1\) are chosen to maximise \(U^{nc}\). Debtor evaluates between default (D) and non-default (ND) scenario, which implies:

\[U^{nc} = \max (U^p, U^{nd})\] \(\quad (4.23)\]

where

\[U^p = \max U(C_1) + \left[\frac{U(C_2)}{(1+\delta)}\right]\]

\(^{19}\) Note that the problem has taken care of both solvency and liquidity constraints. \(D_1 < h(I_1)\) promises in a way generation of income sufficient to service debt in the second period. The third constraint takes care of liquidity.
subject to $C_1 = Q_1 - I_1 + D_1$

$C_2 = (1-\phi)Q_2$

$U^{nd} = \max U(C_1) + [U(C_2)/(1+\delta)]$

subject to $C_1 = Q_1 - I_1 + D_1$

$C_2 = Q_2 - (1-r)D_1$. 

Fig. 4.4
Note that for $D_1 > D_1^*$, default takes place as $U_{p} > U_{p0}$. For $D_1 \leq D_1^*$, $U_{p0} > U_{p}$ and hence no default will occur. Therefore, $D_1^*$ is the credit limit to be imposed by the creditors in order to avoid default. So, $I_1 > I''(I_1)$ if and only if $D_1 \leq D_1^*$. Therefore $U_{p0} = U_c$ for $D_1 \leq D_1^*$. Otherwise, $U_{p0} > U_c$ since in the cooperative strategy an additional constraint $D_1 < h(I_1)$ is there while the other two constraints are same with those under the non-cooperative strategy. The conclusion that follows is that cooperative solution is better than non-cooperative one because $U_c(D_1^*) > U_{p0}(D_1^*)$. If default is entirely ruled out, for example, by a world policeman then the debtor country can attain $U_{p0}(D_1^*) > U_c(D_1^*)$. So, default possibility strikes country's utility by freezing its credit line. Again under certainty as $\phi$ tends to 1, $D_1^*$ approaches $D_1^c$. Interestingly the model implies that debtor's insistence must be for high penalties for default, in order that it can avail larger credit as can be noticed from (4.22). Or stated differently if the creditors are sure that they can realise the full amount of their payments by imposing a penalty such that $\phi = 1$ in case of default they may extend $D_1^c$.

The results do not change even if it is assumed that there exist some initial debts in the beginning of the first period. Then also cooperative strategy confers a better option for the creditors and debtors than the non-cooperative strategy when the default risks are prevailing.

What ensues from the above discussion is the fact that the debtor country is better off if it pre-commits a minimum level
of investment which is necessary to maintain a sustainable debt process. This is why a debtor country is asked to undertake an adjustment efforts in its economy and it forms the logical basis of adjustment in an indebted nation in the debt literature of the eighties. Adjustment increases the likelihood that the debt will be repaid.

As noted above, the full resolution of the debt crisis warrants that debt overhang be eliminated. "The real cost of the overhang is that many high-yielding investments in debtor countries go unexploited because these countries are shut out of credit markets and cannot borrow. One particular set of such investments is called "adjustment policies". Just like other investments, adjustment policies have benefits in the long run but costs in the short run."

We have noted above that overhang creates a dis-incentive effect on debtor’s investment decision. Of all the factors creating dis-incentive the lack of liquidity has been cited as the most important one which adversely affects debtor’s investment programmes. The problem is sought to be tackled by eliminating directly some portion of the existing debt overhang through market based debt reduction measures. This perhaps explains the logical basis of the Brady formulation.


The basic aim of the *market based debt reduction* measures was to restore the private capital flows to the developing countries. In the secondary market for the developing country debts highly indebted countries' debt obligations were traded at deep discount. Through market based debt reduction measures market prices of these debts were sought to improve. It was assumed that improvement in market prices of the developing country debts would help to restore private capital markets' confidence in these economies.

The entire concept of market based debt reduction schemes is centered around the *secondary market's own valuation of the developing country claims* of the creditors. The contractual value of debt refers to the present value of the stream of debt payments set out in the initial contract between the debtor country and its creditors on the presumption that these payments will be made by the debtor with certainty. The market valuation of that contract is the present value of the market's expectation of the stream of payments that will actually be made by the debtor in future periods. In most cases the contractual value lies above the market value. Existence of deep discount testifies to the fact that creditors do not expect that payments will be made in full by the debtor.

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22 See chapter 5 for a discussion of secondary market for developing country debts.

The major debt conversion instruments are debt buy-backs, debt-equity swaps, debt securitisation and contingent claims. Debt conversion schemes allow investors to acquire claims on a country through a transaction with the country's creditors rather than its domestic residents. The potential benefits may be twofold:

(i) Debts may be replaced by other liabilities whose payment streams are different from that of interest payments. The interest burden of the debtor country may get reduced as a result of this.

(ii) As a result of debt conversion some debt stock may be reduced. Thus there occurs some debt forgiving. At the same time investors may acquire assets at an expected present value less than the face value of the converted debts.

However, there are costs as well associated with a typical debt conversion measure:

(i) Debt conversion scheme may divert capital inflows that would otherwise have taken place through other channels. In this regard one has to take into account the opportunity costs of such inflows through debt conversion schemes. Some authors have indicated that opportunity costs of net capital inflows through market based debt conversion schemes are quite high\(^{24}\).

(ii) Different debt conversion schemes may adversely affect the fiscal and monetary position of a debtor country.

\(^{24}\) See Krugman (1988), op. cit.
Let us consider here two most important debt conversion measures - buy-backs and debt-equity swaps - to examine different conceptual issues involved in debt conversion measures.

**Buy-backs** refer to a straightforward transaction in which a debtor country government *repurchases* its own debts for cash acquired through a current account surplus or sales of reserve assets or cash acquired from foreign donors. From the debtor's point of view amortisation at a discount is certainly preferable to that at its contractual value. It would be desirable if the savings on interest payments and principal on retired debts would exceed the benefits that could otherwise be derived from the alternative uses of these financial resources which finance buy-backs. However, as indicated by some authors, buy-backs may not be beneficial for a debtor country\(^2\). In a buy-back marginal debt is repurchased at average debt prices. Thereby, a debtor country pays more for the amount of debt it repurchases from its creditors. Some benefits may accrue to the debtor if it negotiates substantial concessions or compensations for undertaking the repurchase.

Buy-backs would allow creditor banks to dispose of some of their developing country claims in the market and is a natural response to a changing perception of the value of the debt held in banks' portfolios. Loan loss provisioning has made it possible for the commercial banks to realise the losses that accompany

sales of developing country debts. While the size of bank reserves currently varies across creditor countries, there took place rise in reserves since 1987. Some authors have argued that buy-backs reduce the possibility of full recovery of loans for the creditors if in future debtor's capacity to pay is enhanced substantially.26

In debt-equity swaps debts are replaced by equity liabilities27. In most cases a debtor government offers to swap its debts for domestic currency on the condition that the currency be used to purchase local equity. First, the investors acquire existing debts in the secondary market. Then they exchange these debts with the debtor government for local currency and the debts are retired. Finally, they use the domestic currency, thus acquired, to purchase local equity or finance approved domestic projects.

As far as the debtor country is concerned, some of its foreign currency denominated debts are retired through debt equity swaps. These swaps can be financed in a number of ways. From the debtor country's balance of payments a prospective flow of public sector interest payments are replaced by a flow of private sector dividend payments. This has a number of implications both for the time profile of payments and for the degree of risk spreading involved. When there are dividends rather then interest payments, more of the risks of terms of

26 See Krugman (1989); op. cit.

trade change, for example, are likely to be shared by the equity holders.

However, if an investor purchases a foreign currency denominated debt instrument at a 50% discount, say, and sells it to the debtor country government for 100% of the equivalent domestic currency price, the government can be thought of as offering a favourable exchange rate for this transaction. The investor would then get more domestic currency than he could have obtained at the prevailing market prices.

The net result of debt-equity swap is not certain for a debtor country. There will be pressure on domestic currency to the extent debts are retired. If the debtor government in order to generate trade surplus devalues its currency then the pressure will be more. But at the same time attractiveness of foreign private investment is increased which may enhance the inflow of private capital. Whether such foreign capital inflows are additional or not is not certain. If they replace the domestic capital then there will not be any additional investment.

An important constraint to debt-equity swaps is the fact that in most instances the equity, attractive to private investors, is owned by the private sector of the debtor country while the debt is owned by the government. It follows that the debtor government must finance the swap as it would finance any other expenditure. It must increase taxes or reduce other expenditures, borrow from domestic market or print money. The
internal fiscal problem remains at the heart of the problem and is brought forward in time. It is a frequent concern that the method of financing would be inflationary. An alternative means of financing is for the debtor country government to sell domestic-currency denominated securities to domestic residents. But the ability of the domestic credit market to absorb such sales may limit the scope for debt-equity swaps.

The fiscal problem could be avoided if public sector enterprises were privatised and the equity of the privatised enterprises were then swapped for debts. If privatisation of public sector enterprises led to rise in efficiency, the debtor government would gain from a fall of both in its external debt and in the need to subsidise the public enterprises. Note that here foreign equity investment would crowd out public investment and also there would not occur any additional capital formation, except change of ownership of the public sector enterprises. Moreover, if government swapped debt for equity in currently profitable public sector enterprises the fall in government’s future tax receipts would have to be set against the fall in payments on external debts.

The question is whether debtor and/or creditors benefit from debt buy-backs and debt-equity swaps. The answer to it can best be provided with the aid of debt-relief Laffer curve (DRLC), as developed by Krugman (1989). DRLC shows the relationship between debt and expected payments. The basic idea behind it stems from

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28 See Krugman (1989); op. cit.
the notion of Laffer curve associated with tax revenue which states that government should reduce tax rates in order to increase tax revenue. On the horizontal axis face value of a country's existing debt is measured. On the vertical axis actual expected payments are measured. The 45 degree line from the origin, OP, denotes the outcomes when nominal claims are expected to be fully paid. At low levels of debts such possibility always exists. However, with higher levels of debts the possibility of non-payment arises and the curve ABCD traces out such possibilities. The slope of a ray from the origin to the curve - the ratio of expected payments to face value of debt - is taken as the approximate secondary market price of debt. After point B secondary market prices for debt increase with increase in the level of debt. Because of disincentive effects of debt overhang the curve turns down after point C. Reduction in debt will increase the secondary market prices of debt only if a debtor is on the right of point C, say at D. Debtor is stated to be on the wrong side of the DRLC. Debt reduction will not enhance secondary price and actual payments if a debtor is on the right side of the curve, i.e. on the left of point C. Hence, whether market based debt reduction will increase the actual debt payments or not depends on the debt levels of the country. Hence, it cannot be asserted with certainty that debt reduction measures will always benefit debtor and creditors alike. The outcome may or may not be a Pareto improving one depending on the extent of initial debt overhang of the country.
Securitisation involves exchanges of new securities for the existing claims of the creditors. Exchanges of new securities for existing debt would benefit debtors as long as the cost of the new security is less than the interest payments on the existing debt. Whether it would increase the actual payments by debtor would depend upon whether it is on the wrong side of the Laffer curve. The impacts of securitisation are like those of debt-equity swaps.

The transformation of existing debt into equities or tradeable securities would provide an opportunity to make further payments by debtors contingent upon developments that would
affect their ability to pay. Since problem debtors would share in improvements in their economic performance this could provide better incentive for economic adjustment discussed above. For example, a contingent contract might link interest payments to growth in exports. Moreover, since existing floating rate contracts are contingent on market interest rates, it may be beneficial for debtor to insulate interest payments from this source of uncertainty.

While existing contracts may be poorly suited to the needs of developing countries, contingent claims are better suited to allocate the risk of changes in the economic environment in the debtor country in advance than to allocate loss after conditions have changed. Thus an important lesson from the difficulties that have confronted many developing countries was that their contractual obligation should henceforth better reflect the uncertainties surrounding their ability to pay. Nevertheless, an exchange of debt for contingent claims would not necessarily help to resolve the existing debt problem since addition of a contingency clause to an existing claim would not necessarily change its market value.

In a nutshell market based debt reduction measures intended to reduce the developing country exposures of the creditor commercial banks. The effects of different debt reduction strategies are not certain. They depend on the initial level of indebtedness and also on other factors, e.g. terms of trade effect, which are exogenous to the measures.
Starting from concerted lending approach to debt relief and debt reduction measures, conditionality element associated with any negotiation played an important role in compelling individual debtor countries to follow macroeconomic adjustment efforts. For this a third party intermediation was necessary. Apart from this the pertinent question was what was the guarantee that the debt relief or involuntary concerted lending would work. First of all, there might arise a conflict of interest between debtors and creditors. Here comes the question of bargaining. Both sides may attempt to establish strong bargaining positions by committing themselves to a higher minimum relating to respective utility or profits. Consequently, the two parties may end up with a mutually inconsistent minimum demands, preventing a mutually acceptable agreement. Secondly, free riding problem, as indicated already, might pose a threat to the concerted lending or debt relief measures.

Precisely for these reasons, a third party intermediation²⁹ in the debt management strategies is warranted. The third party role in debt negotiation has been spelt out in a bargaining theoretic framework by Bulow and Rogoff (1989). Suppose debtor faces a complete or a partial trade embargo by lenders, when it defaults. It is assumed that the debtor can store, in principle, its export good while negotiating a rescheduling agreement. A credit ceiling is imposed and through negotiation amount of debt repayments is decided. The central argument of the model is that

²⁹ The conceptual basis of third party role in managing third world debt is dealt with in chapter 6. See Section 6.1.
if the creditor country enjoys sufficiently large gains from trade with its debtor, it may be induced to facilitate rescheduling by contributing money or by compensating to policy changes that would be conducive to debtor and/or creditor banks.

Since a conflict of interests between debtors and creditors is involved, bargaining issues seem central to the developing country debt contracts. This is so because traditional market mechanisms for determining levels of private international lending or their price are clearly not operative in these contexts. Hence, we cannot expect a unique solution from standard supply-demand mechanism. Rather the situation forces both parties viz., borrower and lenders, to take to negotiation.

Let us now take a formal view of Bulow and Rogoff’s (1989) model of the bargaining of loan contracts between debtor and creditors. Following Rubinstein (1982) they have adopted the alternating offer framework of bargaining. The debtor and creditors each take turns during each period at making offers on how much the debtor has to pay so that it can trade freely its current production and any of the export good it has in storage. An agreement implies a rescheduling of debt payments which places the country in good standing on its debt until the next period. No agreement means rejection of debtor’s offer of the amount of repayment by banks or vice versa. Debtor then

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places its production in storage to await further negotiation. Here lies a fundamental difference between Bulow and Rogoff (1989) and Rubinstein (1982). In Rubinstein (1982) if an agreement is final no renegotiation is possible, whereas in Bulow-Rogoff (1989) scope for renegotiation exists.

In multilateral bargaining, the question of rescheduling is related to third party sidepayments. The key parameter governing sidepayments is the relative magnitude of the debtor and creditor countries' gains from bilateral trade. Bulow and Rogoff (1989a) has considered risk-neutral objective function for the debtor country:

\[ V = C_{t-h}/(1+\mu), \quad (C>0) \]  

(4.24)

where \( C \) = domestic consumption of an imported good,
\( \mu \) = discount rate \((\mu > r)\),
\( h \) = length of each period from one negotiation to another.

In each period it produces \( y_h \) units of an export good, and no investment takes place. Domestic consumption of imported good is:

\[ C_t = PT_t \]  

(4.25)

where \( T_t \) = exports in time \( t \),
\( P \) = units of imported good for one unit of export.

While negotiating with its creditors it can store its export good with the technology:

\[ S_{t-h} = (1-\tau_h)S_t + y_h - T_t, \quad (h < 1) \]  

(4.26)

where \( S_t \) = amount of export good at the start of \( t \),
\( \tau_h \) = depreciation rate
\( y_h \) = production at \( t \).
Bargaining power of the debtor country is depicted by (4.26). Creditors' lending limit is determined by the maximum amount lenders can make debtor pay in the process of bargaining. If rescheduling negotiations are completely one-sided, lenders can extract repayments in each period up to the full value of the country's output. In this case the country's borrowing ceiling is (in the limit as \( h \to 0 \))

\[
R = \frac{P_y}{r}
\]  

(4.27)

The objective function of creditor country is specified as the discounted sum of current and future consumer's surplus i.e.

\[
\alpha \sum [(ZP_{t+i} - B_{t+i})/(1+rh)^i]
\]  

(4.28)

where \( T = \) imports from debtor,

\( B = \) creditor country's sidepayments to banks and creditors,

\( ZP = \) creditor country's gain in consumer surplus per unit of imports.

An agreement is reached when all the three parties consent. At \( t \), total surplus or gain = creditor country's gain from trade\( (ZPv_t) + \) debtor's gain from trade\( (Pv_t) = Pv_t(1+Z) \), where \( v_t \) is total amount of debtor's production for current trade. The alternating offers take shape as follows:

(i) Banks offer themselves \( 100q\% \) of \( PV_t(1+Z) \), to their government \( 100w\% \) of \( PV_t(1+Z) \), and debtors receive \( 100(1-q-w)\% \) of \( PV_t(1+z) \).

(ii) Debtor offers to banks \( 100q'\% \) of \( PV_t(1+Z) \), to creditor government \( 100w'\% \) of \( PV_t(1+z) \), and to themselves \( 100(1-q'-w')\% \) of \( PV_t(1+z) \).
(iii) Creditor government offers to banks 100q"% of PVt(1+z), to themselves 100w"% of PVt(1+Z) and to debtor 100(1-q"-w")% of PVt(1+Z).

Negotiation takes place in each period to settle the distribution for any perfect equilibrium to hold for all s ≥ 0,

\[
(1-q_s-w_s) = \frac{[1-q'_{s+1} - w'_{s+1}]}{(1+\delta h)}
\]

\[
w_s = \min \left[ \frac{w'_{s+1}}{(1+rh)}, \frac{z}{(1+z)} \right]
\]

\[
q'_{s+1} = \frac{q''_{s+2}}{(1+rh)}
\]

\[
w'_{s+1} = \min \left[ \frac{w'_{s+2}}{(1+rh)}, \frac{z}{(1+z)} \right]
\]

\[
(1-q''_{s+2} - w''_{s+2}) = \frac{[1-q'_{s+3} - w'_{s+3}]}{(1+\delta h)}
\]

\[
q''_{s+2} = \frac{q_{s+3}}{(1+rh)}
\]

These equations tell us that when it is any party's turn to make an offer, they will craft the offer such that both the other players are just indifferent between accepting the offer and waiting until the next period. Formally (4.29) constitute a system of first order difference equations where the system is saddle point stable. The unique equilibrium in the limit of continuous bargaining as \( h \to 0 \) is:

\[
q = q' = q'' = \left[ \frac{\delta}{(2\delta + r)} \right]
\]

\[
w = w' = w'' = \left[ \frac{\delta}{(2\delta + r)} \right]
\]

\[
1-q-w = 1-q'-w' = 1-q''-w'' = \left[ \frac{r}{(2\delta + r)} \right]
\]

If creditor country's gain from trade is greater than its share then if it makes positive sidepayments, both the other players get larger pay off than if it makes no sidepayment. This is a no conflict situation. If, on the other hand, creditor country's gain from trade is less than his share it will be credible for it to make no commitment of sidepayments. Rather,
the possibility is there that it will extract payments from debtor to allow it bilateral trade. If the creditor country's sidepayments are anticipated at the time of borrowing, the debtor country will be able to obtain a larger loan. The size of the loan, $R$, depends on the present discounted value of the banks' share in any agreement. In case of perfectly unanticipated sidepayments, the benefits accrue entirely to the debtor country. As lenders are competitive and thus earn zero expected profits on the loan, the borrowing country can take out a larger loan with the creditor country effectively making the additional sidepayments.

4.4 : A Critical Review of the Models :

The theoretical insight into the debt crisis and its management by the optimum borrowing models, however, is subject to serious limitations. We offer below a few observations, based on our discussion of the optimum borrowing models in the preceding section:

1. In the models of borrowing, the social welfare function of the borrowing country is uniformly subject to diminishing marginal utility. In specific notation, the form of the function is:

$$V = \sum_{i=0}^{\alpha} \frac{U(C_i)}{(1+\delta)^i}, \quad (U' > 0, \ U'' < 0)$$

where $V$ is the social Welfare function which is derived from the utility function $U(C_i)$ which depends on consumption ($C$)
at time i. The strict second order condition \((U'' < 0)\) may not, however, hold good under poverty and, especially, with redistribution of income consequent upon additional capital inflows. Given the state of poverty and the severe degree of inequality, utility may not diminish at the margin since additional consumption may increase the level of utility over and above the bare minimum subsistence level. If income redistribution takes place as a consequence of an external inflow of capital, then strict second order condition may hold good in the post redistribution period only.

2. Unlike what is postulated in these models, loan supply may not even be subject to fierce competition among the creditors. In fact, the history of international banking in seventies shows that banks operated in groups in the international credit market. The advent of syndicated lending in seventies is an indirect proof of it. Banks are profit maximizing agents and they face a credit market which is fragmented between North and South. So, their behaviour can best be described as one of a discriminating monopolist in a disjoint market for international credit. In reality the flow of private credit to the developing countries has ceased to exist after 1982. New inflows that took place after 1982 were mostly defensive and involuntary in character. The creditors with large developing country exposures were forced to undertake this defensive lending

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on a non-voluntary basis. So, spontaneity of credit flows has been replaced by forced collusive lending. A market ceases to exist when it loses its voluntary involvement of its agents, a development which is true in the case of post debt crisis international credit market.

3. In terms of the global macroeconomic foundations, the supply of finance to the South crucially depends on the investment savings balance and the fiscal and monetary policy mix in the North. The supply of finance to South crucially depends on the demand for external funds in the North, as has been argued in a recent version of loan-push doctrine.\(^{33}\) The issue of interdependence between North and South has been completely ignored in the OBMs. We find that loan supply in these models is guided by the consideration of risk involved in lending to an individual borrowing country only. That international environment too plays a significant role in determining supply of credit to a developing country has not been taken care of by the OBMs.

4. Most important of all, the OBMs have ignored the most pressing concern associated with international capital flows to the third world nations in recent times. This relates to the problem of the net transfer of financial resources from the third world to the creditors. The countries which were the capital importing nations in seventies started exporting capital to the developed world during the period following the debt crisis. It has its own adverse implication in terms

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\(^{33}\) See chapter 2, Section 2.3.
The reverse flow is consequent upon the fall in new credit flows after 1982 to the third world and rise in the region's debt service payments. It appears that the OBMs have skipped this vital issue while giving more stress on default possibility. In reality, except few moratoriums no default has actually taken place and with the timely action of the third party agents (IMF, OECD governments etc.) international financial system has been able to avoid a potential collapse. Capital outflows from the indebted developing countries continued while at the same time new credit lines were cut. The debtor countries are finding it very difficult to mop up external savings from other sources as the present international environment does not allow them to do so, and also, creditworthiness of the entire South continues to fall in the eyes of the lenders (both official and private). The OBMs, in fact, failed to throw light upon this critical problem facing the developing world in the post crisis period.

This brings us to an end of the critical review of optimum borrowing models. We have here broadly indicated our critical observations regarding these models. A more definitive attempt will be made in the remaining chapters to arrive at an assessment of the third world debt management strategies in eighties.

See Chapter 3.
4.5: Summary:

The discussion in this chapter is summarised as follows:

(i) OBMs, unlike the debt-cum-growth models of sixties, are microtheoretic in nature and, basically address the question of aversion of immediate risks of default when the debt crisis broke out.

(ii) Private creditors were reluctant to extend new money or to grant debt relief to highly indebted countries. This warranted third party intervention.

(iii) It is shown in the OBMs the necessity of domestic adjustment in the debtor economy for voluntary flows of private capital. Also, it is indicated that Pareto improving situation to both debtors and creditors may follow if some debt relief is conferred to the debtors.

(iv) Debt reduction measures are expected to increase market prices of existing debt. However, the outcome of such measures is not certain on a debtor. It depends upon the initial condition prevailing in the debtor economy prior to any debt restructuring negotiation between debtor and creditors.

(v) OBMs analysed debt problem of eighties from creditors' perspectives. The basic objective was to bail out creditor banks and save the international financial system from an impending collapse.

(vi) Debtors' perspectives are missing in these models. Debt servicing problem of many severely indebted countries involves net transfer of financial resources from these
countries, jeopardising their developmental efforts. OBMs have totally ignored this pressing problem of the developing world.