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## Avenues for the reduction of LDC-debt: An institutional analysis

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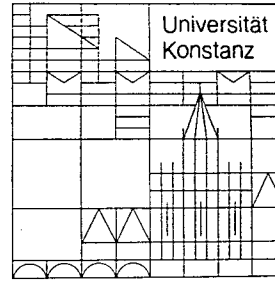
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Günter Franke

**Avenues for the Reduction  
of LDC-Debt—An Institutional Analysis**

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**AVENUES FOR THE REDUCTION OF LDC-DEBT -  
AN INSTITUTIONAL ANALYSIS**

**Günter Franke**

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## ABSTRACT

This paper compares different instruments for a debt relief, given severe debt servicing problems of some sovereign debtors. Criteria for a debt relief are discussed. First, it will be argued that a debt relief cannot be supported by the argument that it benefits both, the debtor and the creditors. Second, debt reliefs have no chance to be realized if they are a "free lunch" to the debtor. Some cost has to be borne by the debtor. Third, if the debtor is actively involved in the debt relief, then the creditors will make sure by appropriate instruments that the debtor cannot raise the wealth transfer ex post to his benefit at the creditors' expense. Fourth, debt reliefs with deterministic claim reductions are inefficient. Contingent claim reductions involve smaller wealth transfers. If these reductions are made dependent on observable commodity prices, then state verification costs can be avoided and the creditors may hedge the price risk.

## I INTRODUCTION

Support for LDC-debt relief grows. A debt relief is defined as a change of debt contracts which reduces the probability of the debtor's default. Reductions of creditors' claims against debtors are viewed as the primary instrument of debt reliefs. The proposed beneficiaries of a relief are primarily Sub-Saharan African and Latin American countries, the Philippines and Yugoslavia. The basic argument in favor of a debt relief is the expectation that the high level of debt impairs future economic growth and adjustment of these countries.

At the same time, a debt relief faces strong opposition from many private banks. The main reasons are the following.

(1) It is hard for bankers and bank owners to understand why they should give up claims without getting anything back.

(2) Reputation of banks to enforce their claims can hardly be maintained if they give up claims for nothing. This loss of reputation also endangers claims against solvent debtors. Venezuela, for example, asks for a 50 percent-debt relief although she owns substantial foreign exchange reserves, has a balanced current account and capital flight is estimated to be twice the level of its debt, owed to private foreign banks.

(3) Private banks are not willing to give up claims while the IMF and the World Bank maintain their claims.

(4) Capital flight from some Latin American countries represents a substantial fraction of their foreign debt or even exceeds it. Thus, the citizens of these countries are not generally poor.

Although many private banks oppose a debt relief, other groups in creditor countries seem to favor a debt relief. Firms which export to indebted countries or consider direct investments in those countries, expect more profitable opportunities after a debt relief. Governments of creditor countries are afraid of

political unrest in indebted countries which may be nurtured by excessive debt burdens. Thus, political pressure on banks to grant a debt relief is substantial as evidenced by the Brady-initiative.

Governments of creditor countries essentially use two devices to put pressure on banks. First, the US-administration changes US-tax laws so that current sales of debt claims become more attractive to banks as compared to future sales <sup>1)</sup>. Second, the principle of equal treatment of all bank creditors which has been sacrosanct for several years, is replaced by differential treatment (Ebenroth [1989]). This reinforces conflicts of interest among banks and thus weakens their opposition to a debt relief <sup>2)</sup>. Conflicts of interest exist especially between the large money center banks and the smaller regional banks (Sachs [1989]).

This paper has four purposes. First, criteria will be defined by which instruments of a debt relief can be evaluated. Second, conditions will be analyzed which permit bank creditors to give up claims without endangering their reputation of enforcing claims. If banks would give up claims for nothing, then other debtors would expect a debt relief for nothing, too. Some authors like Corden [1988] and Krugman [1989] argue that these problems may not exist since creditors may even benefit from a debt relief. It will be argued here that this is unlikely to happen.

The argument of Corden and Krugman can be restated as follows: The debtor earns some flow of foreign exchange which is distributed to the debtor and the creditors according to the distribution rule fixed in the debt contracts. This rule assigns

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1) This has already depressed the prices of these claims in the secondary market (FAZ [1989 b]).

2) The Mexico-Plan of 1989 offers the creditors various "options" and thus creates different groups of creditors.

most foreign exchange earnings from expanded efforts to the creditors and thus renders additional efforts unattractive for the debtor. Now change the distribution rule through a debt relief. Then the new rule assigns more earnings to the debtor which motivates the debtor to expand his efforts and, according to Corden and Krugman, also enriches the creditors, despite of the debt relief.

Hence the distribution rule is of central importance . If the contractual distribution rule were enforceable, then the argument could be relevant. But the debtor has many options to manipulate the distribution of available funds. He may simply refuse payment, but there are other, less obvious ways to keep foreign exchange in the debtor's pockets. Underinvoicing, overinvoicing and capital flight are well known examples, figures about the current account and about foreign exchange reserves can be manipulated. Thus the debtor has many options to retain foreign exchange earnings. The assumption of Corden and Krugman that, with a high level of debt, additional foreign exchange earnings are fully "taxed away" and thus demotivate the debtor, is highly questionable. Hence it is unlikely that the creditors benefit from a debt relief.

Debt reliefs which are "free lunches" to debtors, endanger the creditors' reputation to enforce claims. One route to avoid this danger is to make the debt relief contingent on "good" behavior of the debtor. "Good" behavior is defined as behavior which has already improved or is likely to improve the debtor's current account and thus his debt servicing capacity. The problem with this approach is that the well behaved debtors' need for a debt relief is reduced by good performance (as revealed by the example of Venezuela), but the debtors with "poor" behavior which are in most urgent need of a debt relief, do not get it. Therefore the debt problem can, at best, be partially resolved by this "reward strategy" of debt relief.

Another approach to preserve the creditors' reputation to enforce is a mixture of debt reliefs from private and official creditors. Such a mixture alleviates the private creditors' burden from a debt relief and can be supported by the benefits which the creditor countries derive from a debt relief of private creditors.

The third purpose of this paper is to analyze mechanisms by which wealth transfers in a debt relief can be controlled. The creditors want to limit the size of the transfer. This is fairly easy if they determine the terms of the debt relief and the debtor is not involved in the transaction. If, however, the debtor is somehow involved, then he may try to raise the wealth transfer from the creditors to himself. As an example, consider a loan repurchase by the debtor. He may divert funds from debt servicing to loan repurchase and, thereby, reap double benefits. First, by cutting back debt service, he depresses the loan price, and, thus, the debt relief which equals the par value minus the price, grows. A lower price enables him to repurchase more loans, and, thereby, raise the debt relief a second time.

This example shows that an unconstrained loan repurchase by the debtor can lead to unexpectedly high wealth transfers. Therefore the creditors will constrain repurchases by limiting the par value or the market value of repurchases, for example, or by tying the repurchase volume to the debt servicing, or by requiring a minimum secondary market price for repurchases. More generally, instruments for a debt relief which involve the cooperation of the debtor, give him the opportunity to raise the wealth transfer. Therefore, such instruments require an especially careful design.

The last purpose of the paper is to demonstrate that a contingent claim reduction is preferred to a deterministic one, given the non-default probability which is to be attained through the debt relief. With a contingent claim reduction, claims are tailored to the debtor's state-contingent foreign



exchange reserves such that they remain below these reserves. A contingent debt relief requires a smaller wealth transfer from the creditors to the debtor than a deterministic relief. In order to minimize state verification costs and moral hazard, the debtor's obligations should be made dependent on easily observable commodity prices such that the debtor's foreign exchange earnings are highly correlated with a portfolio of these prices. In addition, these commodity prices should be immune to manipulation attempts by the creditors and the debtor. Finally, if futures or options on these commodities exist, then the creditors can hedge the price risk of their claims.

The paper is organized as follows. Section II sets the normative framework for the comparison of different instruments for debt relief. Section III discusses whether a debt relief is a "free lunch" to the debtor and, if so, what could be done to make it a "costly lunch" so as to preserve the creditors' reputation to enforce claims. Section IV discusses how creditors can control the wealth transfer in a debt relief, section V compares contingent and deterministic debt reliefs. A conclusion is added.

## II CRITERIA FOR A DEBT RELIEF

### 1 The Situation

Before discussing criteria for a debt relief, the situation which the debtor and the creditors face has to be defined. The debtor is a sovereign state. His foreign exchange reserves and his projected future foreign exchange earnings are not sufficient to service his foreign exchange denominated debt. Therefore some debt payments have to be rescheduled or a debt relief has to be granted if an official declaration of default is to be avoided. There exist private and official creditors (states, the IMF, the World Bank and other development banks). Most private creditors are banks. Governments of creditor

countries and "public opinion" put pressure on private creditors not to react on debt service-payment deferrals by "harsh" sanctions. "Harsh sanctions" are sanctions beyond the denial of rescheduling debt and of medium and long-term fresh money; examples of harsh sanctions are the denial of short-term trade credit and the arrest of the debtor's commercial property located outside of his country.

The creditors face a dilemma in imposing sanctions in the case of default. Without sanctions, debtors may stop debt servicing. But sanctions create a deadweight loss, part of which has to be borne by the creditors (Hellwig [1977]). Thus creditors have an incentive to avoid sanctions. This may create time-inconsistent creditor behavior: When they write a loan contract, they threaten to impose sanctions in the case of default. But when default indeed occurs, they renounce sanctions.

In the case of a sovereign debtor, sanctions are even less attractive for creditors than in the case of a private debtor. The sovereign debtor can react on sanctions by a complete stop of debt servicing and thus reduce the market value of the debt claim to zero. The creditors have no means to recapture the foregone payments as they would in the case of a private firm by taking it over. Thus the creditors face the choice between partial debt servicing with no sanctions and a complete stop of debt servicing with sanctions. The higher the market value of partially served debt claims is, the higher is the barrier to the imposition of sanctions.

The debtor knows this and may react by an appropriate debt servicing policy. He attempts to find out the minimal debt service which prevents the creditors from imposing sanctions. Thus enforcement of claims by imposing sanctions is the exception rather than the rule.

## 2 Criteria

Discussing criteria for a debt relief necessarily involves normative statements. Therefore the following discussion follows two strands of thought which are to some extent related, first, the norms for a debt relief expressed by representatives of private banks and of official institutions, and, second, the principal-agent theory and its criteria for efficient contractual arrangements.

### 2.1 Renewed Access to Voluntary Lending

In order to secure an optimal path of economic growth, a country needs the support of the international banking community for international financial transactions. These encompass transactions related to international trade and those related to international portfolio and direct investments. Therefore one criterion for a debt relief is that it should provide renewed access to voluntary bank lending for the indebted country and the firms within this country.

This criterion has to be qualified. Immediate access to new voluntary lending after a debt relief is impossible in an arbitrage-free capital market. This can be shown as follows.

Let  $\underline{r}$  be the vector of possibly state-contingent claim reductions which is necessary to achieve a prespecified level of debtor quality if no fresh money is given by the creditors. Debtor quality can be measured by the probability that the debtor will meet his payment obligations in the next  $t$  years.

Now assume that the creditors reduce their claims not only by  $\underline{r}$ , but by  $\underline{r} + \underline{\Delta r}$  with  $\underline{\Delta r} > 0$ . Given the prespecified level of debtor quality, after the debt relief the creditors can lend the amount  $\Delta D$  of fresh money to the debtor. He uses this amount to raise his future foreign exchange earnings, the vector of state-contingent foreign exchange earnings grows by  $\underline{\Delta e}$ . If  $\Delta e_s$  is the incremental earning in state  $s$  and  $\alpha_s$  is the fraction of this amount accruing to the creditors, then the

creditors lend the amount  $\Delta D$  and receive  $\alpha_s \Delta e_s$  in state  $s$ , or, in vector notation,  $\underline{\alpha}' \underline{\Delta e}$ . Hence, extending the claim reduction by  $\underline{\Delta r}$  pays for the creditors if and only if the market value of the creditor's incremental earnings minus the fresh money exceeds the market value of the additional claims given up,

$$V(\underline{\alpha}' \underline{\Delta e}) - \Delta D > V(\underline{\Delta r})$$

$V(\underline{x})$  is the market value of  $\underline{x}$ ; this value is assumed to exist. As  $V(\underline{\Delta r}) > 0$ , this condition holds only if  $V(\underline{\alpha}' \underline{\Delta e}) > \Delta D$ . This, however, requires that, after the debt relief, the debtor offers the creditors a gift with market value  $V(\underline{\alpha}' \underline{\Delta e}) - \Delta D$ . In an arbitrage-free capital market the debtor would not do this.

Essential for this argument is that claim reduction and voluntary lending are two successive steps. First, creditors reduce their claims by  $(\underline{r} + \underline{\Delta r})$ ; second, the debtor regains access to voluntary lending and looks for fresh money. If he finds creditors who offer fresh money, then the debtor offers them claims  $\underline{\alpha}' \underline{\Delta e}$  whose market value equals the fresh money  $\Delta D$ . The preceding claim reduction is already a historic event which does not induce the debtor to offer the creditor more generous claims. Hence  $V(\underline{\alpha}' \underline{\Delta e}) = \Delta D$ . The creditors anticipate this in the first step and, therefore, refuse to reduce their claims by more than the required minimum  $\underline{r}$ . This minimum does not allow the debtor to raise new credit immediately after the debt relief.

Hence it is unrealistic to expect immediate access to voluntary lending after a debt relief. Such access can be expected only if some time has passed after the debt relief in which the debtor's quality has further improved. Therefore the criterion "renewed access to voluntary lending" has to be changed to "renewed access to voluntary lending after a debt relief and an additional improvement in the debtor's quality" <sup>3)</sup>.

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3) This is also expressed by bankers. See, for example, FAZ [1989a].

## 2.2 Poverty Compatibility

A second criterion for a debt relief is poverty compatibility. As a debt relief should raise the debtor's quality to a prespecified level, the size of the debt relief has to be gauged to the debtor's foreign exchange reserves and his projected foreign exchange earnings. The lower the reserves and earnings are, given the debt, the higher the debt relief has to be. In other words, the poorer the debtor is, the higher the debt relief has to be in order to restore a given level of debtor quality. This is the essence of poverty compatibility.

Poverty compatibility can be justified in economic terms. If there exists a high probability of default, then economic incentives for creditors, international traders and people of the indebted country are distorted so that economic growth is impaired. This is discussed in the following section. Poverty compatibility may also be the result of altruistic considerations such that the debt relief has to be gauged to the "recipient's needs".

## 2.3 Incentive Compatibility

Problems in debt servicing emanate from two sources, from the inability to pay and from the unwillingness to pay. In a static definition, a debtor is unable to pay if his foreign exchange reserves are smaller than his due payment obligations and if no other sources of foreign exchange can be tapped. A debtor is unwilling to pay if he is able to pay but does not want to. More important, however, is the intertemporal perspective. By choosing an appropriate policy, a debtor can improve his future foreign exchange earnings and thus his future ability to pay. Or he can, for example, tolerate capital flight and thus impair his future ability to pay. As the debtor's policy is determined by his willingness to pay, willingness also determines future ability to pay.

Willingness to pay depends strongly on the incentives for payment. These, in turn, depend on the sanctions which the creditors impose on the debtor in the case of default. A debt relief which comes as a "free lunch" to the debtor, indicates renunciation of sanctions and, thus, endangers the creditors' reputation to enforce their claims. Then other debtors will try to get a "free lunch", too. Therefore the creditors regard a debt relief as incentive compatible only if it preserves their reputation to enforce claims.

### 2.3.1 Preserving the Creditors' Reputation to Enforce

"Preserving their reputation to enforce" is one criterion by which the creditors evaluate a debt relief. This reputation is less likely to be endangered by a debt relief if the debtor has to pay some "price" so that the relief is not considered a "free lunch".

This principle is well known from the reorganization of a business firm. When a firm is in financial distress, then two alternatives exist. Either the creditors take over the firm or the previous owners remain owners. In the first case, the owners lose all their claims, ruling out a "free lunch". In the latter case, the creditors grant a debt relief only against some burden, imposed on the owners. Usually the owners have to infuse new equity capital so that the creditors' loss, due to the debt relief, is offset by the quality improvement of their remaining claims. Thus the debt relief is not a "free lunch" for the owners of the firm. Creditors retain their reputation.

In the case of a sovereign debtor, it is much more difficult to make the debtor pay for the debt relief. There do not exist "owners" who are ready to pay for a debt relief. Hence other mechanisms have to be used as will be discussed later.

### 2.3.2 Minimization of Wealth Transfers

The term "debt relief" indicates a wealth transfer from the creditors to the debtor. If a wealth transfer is necessary to restore the debtor's quality, then the creditors prefer a wealth transfer as low as possible. Two arguments explain why the creditors use this criterion in evaluating a debt relief. First, creditors maximize their own wealth and thus minimize wealth transfers to others. Second, the lower the wealth transfer, the less endangered is the creditors' reputation to enforce claims.

### 2.3.3 Incremental Revenue Sharing

The two preceding criteria are derived from the creditors' incentives to grant a debt relief. "Incremental revenue sharing" is a criterion derived from the debtor's incentives.

A debtor is not motivated to expand efforts for earning foreign exchange if the creditors get all the incremental foreign exchange. The strongest motivation is expected if the debtor gets all the incremental foreign exchange. As debt contracts are viable only if the debtor promises to service these contracts, the debtor has to promise to share his foreign exchange earnings with his creditors. Hence the debtor and the creditors have to agree on a distribution rule in the debt contract. A contractual distribution rule should

- (a) assign the creditors a possibly contingent claim such that the default probability does not exceed a prespecified level, and
- (b) maximize the incremental foreign exchange which the debtor earns from an expansion of his efforts.

This is referred to by the criterion "incremental revenue sharing".

The significance of the contractual distribution rule is, however, less important in the case of a sovereign debtor than in

the case of a private debtor. The sovereign debtor has much more opportunities to violate the contractual distribution rule since the creditors cannot control his policy and legal constraints on his policy are generally weak. The problems of enforcing claims against sovereign debtors apply fully to the contractual distribution rule.

#### 2.4 Minimization of Transaction Costs

Finally, minimization of transaction costs is a criterion when choosing between different avenues for a debt relief. These transaction costs do not include agency costs generated by distortions of incentives. These costs include costs of bargaining between the debtor and the creditors and costs of bargaining between creditors, costs of trading debt claims, costs of surveilling the debtor's behavior and other state verification costs. The two latter costs are important when the debtor faces strong debt servicing problems. Given imperfect information, the debtor may contend that his foreign exchange reserves are not sufficient to pay his obligations. As the creditors cannot take over the indebted country as they would in the case of a bankrupt private firm, it is difficult for them to find out whether the debtor's foreign exchange reserves are actually as low as contended. Still they have to check the debtor's contentions, thus some costly state verification procedure is unavoidable.

The criteria for a debt relief presented above are partly in conflict with each other. Poverty compatibility, for example, requires a high debt relief for very poor debtors which endangers the creditors' reputation to enforce their claims. The reputation issue will be discussed in more detail in the next section.



### III DEBT RELIEF AND THE CREDITORS' REPUTATION

#### 1 Do Creditors Gain from a Debt Relief?

The criteria for a debt relief serve as a guideline for the evaluation of different instruments for a debt relief. Creditors are especially concerned about their reputation to enforce claims when they give up claims. This reputational problem could be largely avoided if a debt relief benefits not only the debtor, but also the creditors. Corden [1988] and Krugman [1989] have argued that this mutual benefit of a debt relief will occur under certain conditions. Following their reasoning, the creditors give up some claims in a debt relief and, at the same time, anticipate an increase in the value of future debt servicing payments which more than outweighs the claims given up. Such a debt relief would represent a gift to the creditors. Thus it would not endanger the creditors' reputation to enforce claims. The creditors could argue that they could enforce their claims, but prefer a debt relief as a Pareto-superior move. The real issue then is whether a debt relief is likely to be mutually beneficial, and, if it is, whether a debtor is ready to grant the creditors a gift.

The basic argument for the mutual benefit can be summarized as follows. The loan contracts and the rescheduling agreements implicitly define a distribution rule which determines how the debtor's net foreign exchange earnings and reserves should be distributed to the debtor and the creditors. In the case of debt servicing problems, the distribution rule renders an expansion of the debtor's efforts to earn more foreign exchange unattractive. Most of the incremental earnings are distributed to the creditors, hence the remaining earnings do not compensate the debtor for his additional efforts.

A debt relief, however, changes the distribution rule such that the creditors get less. This motivates the debtor to expand his efforts to earn foreign exchange. Part of this goes to the creditors. Under certain conditions, this may outweigh their loss due to the debt relief. Hence the change in the

distribution rule implied by the debt relief and the corresponding expansion of the debtor's efforts may be mutually beneficial <sup>4)</sup>.

Corden and Krugman have given examples of a mutually beneficial debt relief <sup>5)</sup>. Nunnenkamp [1989] has criticized these examples by demonstrating the questionability of the underlying assumptions. Here the particular assumptions underlying these examples will not be criticized.<sup>6)</sup> Instead, the crucial assumption underlying the general model as outlined above is that the debtor always meets his debt service obligations up to his capacity. Hence he observes the contractual distribution rule as far as possible. This assumption is highly doubtful in the case of sovereign debtors.

The realized distribution may strongly diverge from the contractual distribution rule. The sovereign debtor has considerable scope for visible and invisible changes of the distribution. This is different from the case of an indebted private firm where cash in- and outflows are restricted by enforceable legal or contractual constraints. Restrictions on the behavior

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4) The debtor's efforts may also include investments. After a debt relief, people in the indebted country may be ready to consume less today and invest more. The returns from the additional investments may be sufficient to improve the welfare of the people living in the indebted country and of the creditors.

5) The mutual benefit argument appears convincing if the debtor is so poor that the market value of debt approaches zero. Then the creditors lose almost nothing in a debt relief, but may gain in the future. See also Helpman [1989].

6) Corden [1988, 621] himself points out that there may also exist a disincentive effect of a debt relief. If the indebted country wishes to maintain a certain amount of consumption, then, ceteris paribus, a debt relief raises future consumption and, thus, current investment can be reduced.

of sovereign debtors are not enforceable, the sovereign debtor has ample opportunities to influence in- and outflows of foreign exchange and to manipulate official figures. He can, for example, understate export revenues and overstate import expenditures. In addition, he can deplete the central bank's foreign exchange reserves by allowing firms to retain foreign exchange revenues, by allowing exporting firms to underinvoice and importing firms to overinvoice, by allowing people to buy foreign exchange at favorable terms and invest or consume it in foreign countries. Finally, the debtor can simply refuse to pay his due obligations even if he has sufficient foreign exchange.

Thus the debtor has many opportunities to manipulate the distribution rule. Therefore he is able to reap the benefits from expanded efforts with and without a debt relief. A debt relief is not pivotal for effort expansion.

A second criticism of the "mutual benefit" argument concerns the timing of the debt relief and of the benefits accruing to the creditors. Suppose the debt relief is granted at date 0. Then the alleged benefits will accrue to the creditors, at best, some years later. Thus the debt relief is a concession which may be followed by a reward sometimes in the future.

This time delay reflects the transmission mechanism of the debt relief from the indebted country to its citizens. They have to be motivated to expand efforts. This can be done, for example, by tax cuts <sup>7)</sup>. These cuts take some time. Suppose they raise investments. Then it takes more years before these investments earn additional foreign exchange. Hence it takes some years before a debt relief may generate additional foreign exchange income. As this income is hard to predict, a debt relief is easily perceived as a concession of creditors. Hence the mutual benefit argument for debt reliefs is not cre-

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7) See Reisen [1987] for a discussion of the transfer problem.

dible. Other arguments are needed if the creditors' reputation to enforce is to be preserved in a debt relief.

## 2 Conditional Debt Reliefs

Another route to avoid reputation damages is to make a debt relief contingent on the behavior or the performance of the indebted country. If, for example, the debtor changes his policy (following the recommendations of the IMF) so that his economic performance improves, then the creditors can reward this policy change by a debt relief. The policy change can be interpreted as a benefit to the creditors which then is rewarded through a debt relief. Therefore the debt relief may be considered a "costly lunch" to the debtor.

The evaluation of conditional debt reliefs involves, at least, one serious problem. Although conditional debt reliefs are less inconsistent with incentive compatibility than unconditional reliefs, they are in stronger conflict with poverty compatibility. Indebted countries which perform poorly, do not get a debt relief and, therefore, are likely to deteriorate in quality even further. Indebted countries which have improved, get a debt relief although they need it less. Thus, conditional debt reliefs help those countries whose need of a relief has been weakened, but do not help the very poor countries which really need them.

## 3 Mixing Debt Reliefs from Official and Private Creditors

Is the reputation problem of private creditors eased by debt reliefs from official creditors? The composition of official and private creditors depends largely on the indebted country. Creditors of Sub-Saharan countries are primarily official, creditors of the fifteen Baker-countries are primarily private. Some creditor states have already granted debt reliefs to the very poor Sub-Saharan countries, but refused any debt reliefs to the Baker-countries.

The private banks which are urged, especially by the U.S. government, to grant debt reliefs to the Baker-countries, argue that they would be more inclined to do so if also the official creditors would do so. Even if the official creditors would do it, this would not preserve the private creditors' reputation to enforce. But this reputation is less impaired if official creditors also grant a debt relief. The reason is that private creditors have two ways to enforce their claims, one being pressurizing the debtor to pay, and the other one being pressurizing official creditors to give up claims. Then more foreign exchange is available to service private creditors' claims (Dooley [1988]). Thus pressure on official creditors to grant a debt relief serves as a partial substitute for enforcing claims by pressure on the indebted country.

Often a debt relief by official creditors is viewed as an indirect bailout of private creditors which cuts back their incentives to screen loan applicants carefully in the future. But there exists also an externality-argument in favor of a debt relief by official creditors (Aizenmann/Borensztein [1989]). A debt relief benefits not only the debtor, but also the creditor countries whereas private creditors granting a debt relief get little if any benefit. This externality can be internalized by subsidizing private creditors' debt reliefs through official creditors' debt reliefs.

Summarizing, a debt relief endangers the creditors' reputation to enforce if the debt relief is a "free lunch" to the debtor. Conditional debt reliefs are less inconsistent with incentive compatibility than unconditional reliefs, but they are in stronger conflict with poverty compatibility. Private creditors' attempts to induce official creditors to give up claims help to preserve their reputation although in an indirect manner.

#### IV CONTROLLING WEALTH TRANSFERS IN DEBT RELIEFS

The preceding discussion has shown that debt reliefs involve some wealth transfer from the creditors or some third party to the debtor. If this is true, then the creditors or the third party have a strong interest in controlling the size of the wealth transfer. They want to minimize the wealth transfer necessary to restore a given debtor quality. Controlling the wealth transfer may be difficult if the debtor himself is involved in transactions to achieve the debt relief. If, for example, the IMF grants the debtor a facility for repurchasing his loans on the secondary market, then he benefits the more from the repurchase the lower the secondary market price is. Therefore the creditors will lose more. This section analyzes the instruments for a debt relief in terms of the creditors' ability to control the size of the wealth transfer.

The instruments for a debt relief may be classified with respect to the degree the debtor is involved in the corresponding transaction.

(1) The creditors declare to give up a deterministic or contingent fraction of their claims. The debtor is not involved so that he cannot influence the wealth transfer.

(2) An international agency purchases a certain fraction of the outstanding loans and gives up part of the purchased claims. Again, the debtor is not involved. He may, however, influence the secondary market price at which the agency purchases the loans. This implies a redistribution of wealth between the selling creditors and the agency.

The debtor benefits from a lower secondary market price if the agency relates the claims to be given up inversely to the secondary market price. Such an agency policy would be poverty compatible.

(3) The debtor repurchases loans against his own currency at the official exchange rate minus a discount.<sup>8)</sup> Then the debt relief depends on the discount. As this discount has to be agreed on by the debtor and the seller of the loan, the debtor cannot raise the wealth transfer without the seller's consent. Again, the debtor benefits from a lower secondary market price if this induces the seller to accept a higher discount.

(4) The debtor repurchases loans against foreign exchange at the secondary market price. As the debt relief equals the par value minus the secondary market price, the debtor is strongly interested in a low price.

These loan repurchases are supported by poverty compatibility. The secondary market price is an indicator of the debtor's poverty. Hence repurchases at secondary market prices imply a higher debt relief for poorer debtors.

This argument needs to be qualified, however. The secondary market price depends on various other factors than poverty. First, the market is still rather illiquid. Estimates of the total volume for 1988 range between 10 and 40 billion US-\$ (IFR [1989]). This implies that secondary market-prices of the loans are quite noisy, i.e. they can be influenced fairly strongly by the temporary supply and demand shifts which have nothing to do with the debtor's quality or other long-term factors affecting pricing<sup>9)</sup>.

Second, the secondary market price reflects the expectations of traders on future debt servicing. Debt servicing, however, depends on poverty and on the willingness to pay. Hence a rich

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8) The most important examples are debt equity swaps and debt for nature swaps.

9) This is evidenced also by the recent price drop which followed the increased supply of loans by US creditor banks (FAZ [1989b]).

debtor may choose not to pay or to pay little only so that the price of his loans in the secondary market is rather low.

Therefore secondary market prices are not an unbiased indicator of poverty. The debtor's opportunities to depress these prices make these prices a questionable basis for a debt relief <sup>10)</sup>. To what extent the debtor can benefit from price manipulations, depends on the type of transaction by which the debt relief is achieved.

Consider the following three types of transactions:

- (1) The debtor is allowed to repurchase his loans without any constraints imposed by the creditors.
- (2) The debtor is allowed to repurchase his loans with an upper limit on the market value of repurchased loans.
- (3) The debtor is allowed to repurchase his loans only if the loan price reaches or exceeds a specified minimum price.

Ad (1): If the debtor is allowed to repurchase his loans in the secondary market without any constraints, then he faces the choice between debt servicing and loan repurchase. Debt servicing implies repurchase of claims at par value, loan repurchase implies repurchase at the lower market value. Hence the debtor clearly prefers the loan repurchase. There exists an important secondary effect of these repurchases: As the debtor stops debt servicing, the market value of the loans drops further, thus making loan repurchases even more attractive. The market value of the loans is then determined by the expected amounts of foreign exchange, invested in future loan repurchases by the debtor. By reducing these amounts, the debtor can effectively depress the loan price and thereby raise

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10) Buy backs of bonds by debtors in default have been frequent between the two World Wars (Eichengreen/Portes [1989, 33]). There is no strong evidence for price manipulation by debtors or for strong price effects of buy backs.



the wealth transfer. Therefore the creditors will not allow the debtor to repurchase claims without any constraints.

Ad (2): The creditors can restrict the market value of repurchased loans. Such a constraint serves the interest of the creditors if it induces the debtor to maintain some debt service. In other words, the creditors expect the debtor to continue debt servicing although at a perhaps reduced level. Apart from the difficulties to monitor the market value of repurchased loans, the debtor still has a strong incentive to reduce debt servicing so that the loan price goes down. Then the implied wealth transfer grows for two reasons. First, the difference between the par value and the market price grows. Second, the market value constraint permits the debtor to repurchase more loans. The second effect could be removed if the repurchase volume were constrained by par value, not by market value. Still, creditors will prefer more stringent controls on wealth transfer.

Ad (3): There are various ways for additional restrictions. One possible restriction is to make the expenditure on loan repurchases dependent on the expenditure for debt servicing. The debtor is, for example, allowed to spend up to  $x$  percent of his debt servicing expenditure for loan repurchases. This restriction alleviates downward pressure on loan prices and motivates the debtor to continue debt servicing. Such restrictions have been used between the two World Wars (Eichenbaum/Portes [1989, 35]).

Another possible restriction is to specify a minimum market price such that the debtor can repurchase loans only if the market price is not below the specified minimum. The market price would reach this minimum price or exceed it if debt servicing reaches a certain level. A minimum price-restriction is stronger than the  $x$ -percent-rule since the minimum price restriction puts an absolute lower bound on the debt servicing expenditure while the  $x$ -percent-rule does not. Therefore the creditors would be better off with the minimum price rule.

Summarizing, the more the debtor is involved in debt relief transactions, the more he can influence the wealth transfer. Hence the creditors will demand the more controls, the more leverage the debtor has on wealth transfer.

## V CONTINGENT VERSUS DETERMINISTIC DEBT RELIEF

The wealth transfer in a debt relief can be reduced substantially by a contingent debt relief as compared to a deterministic relief. Therefore a deterministic relief is inefficient. This will be demonstrated in the following.

One of the factors contributing to the debt crisis has been the high volatility of commodity prices. Oil, for example, is a major export commodity for Mexico, Nigeria and Venezuela. A fall of the oil price affects the current account of these countries substantially. Similarly, Argentina's current account depends strongly on agricultural prices. As the heavily indebted countries have issued mostly variable interest rate loans, interest rate risk is another dimension of risk. Therefore the question how to reduce these risks, has been addressed at many occasions (Bailey [1983], Folkerts-Landau [1989], Franke [1989], Mathieson et al [1989]).

So far indebted countries have made little attempts to hedge these risks. Chile has changed part of its 6-month LIBOR debt into 12-month LIBOR debt and has hedged some interest rate risk by selling interest futures (Mathieson et al [1989, 15]). The IMF has extended its contingency financing facilities to bridge temporary price-dependent current account deficits. But these facilities do not provide hedging, they only support the debtor's liquidity. The new Mexico package, however, contains some risk sharing element as it obliges Mexico to pay the creditors 30 percent of the excess oil exports revenue from oil prices above 14 US-\$ per barrel.

Risk sharing is not only an important issue for the design of debt contracts, but equally important for the design of debt relief schemes. Deterministic debt reliefs reduce the creditors' claims by deterministic amounts. Apart from the new Mexico package which combines a deterministic debt relief with an oil option, so far all debt relief schemes have been deterministic. This is true also for loan repurchases; the debt relief equals the par value minus the market value of the repurchased loans. Contingent debt reliefs reduce claims by state-contingent amounts which depend on easily observable figures such as export commodity prices or interest rates.

A debt relief is called efficient if it minimizes the wealth transfer from creditors to the debtor, needed to achieve a given probability of the debtor's non-default for a given future time span. The debtor does not default in a state of nature if he is able to pay his due obligations.

#### 1. Efficient Debt Relief in a Perfect Market

A simple example illustrates the inefficiency of a deterministic debt relief. Consider a perfect market with three payment dates 0, 1 and 2, date 0-payments are settled already. The following, simplified tree of states depicts the potential states of nature. The upper number on a node denotes the creditors' claims, the lower number the foreign exchange available for debt service. For ease of exposition, assume that all states at one date have the same probability, i.e. states 1 and 2 have probability .5 and states 3 to 6 have probability .25.

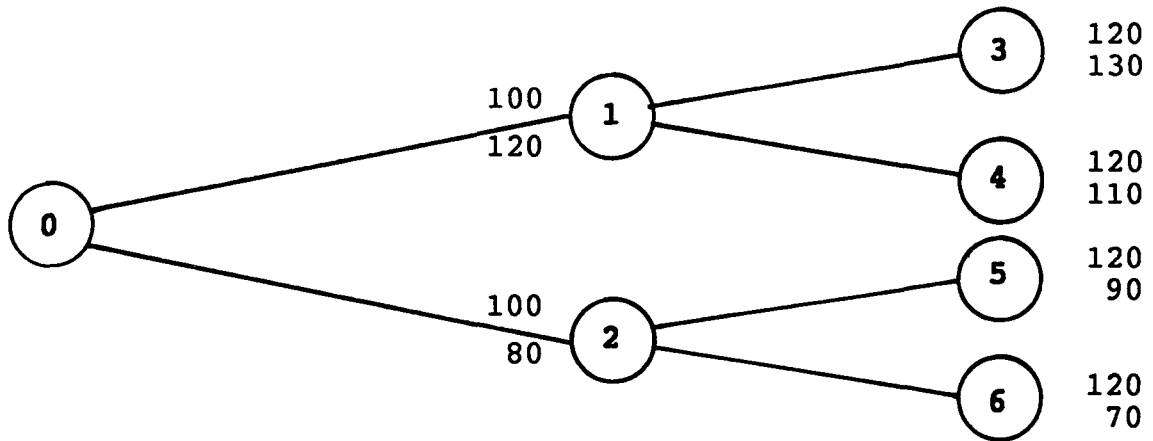


Figure 1: Tree of states of nature. The upper number denotes the creditors' claims, the lower number the foreign exchange, available for debt service.

The debtor will not be able to fully service debt in states 2, 5 and 6. Debt service poses no problems in states 1 and 3, and in state 4 if the debtor reserves part of the state 1 - surplus of 20 for debt servicing in state 4.

Now consider a deterministic debt relief. Assume that the relief does not change the foreign exchange available for debt service and that, in a state of surplus, the debtor does not reserve the surplus for future debt servicing. If the objective of the relief is to reduce the probability of default to 25 percent, then the claims at date 1 have to be reduced to 80 and the claims at date 2 have to be reduced to 90. This creates a substantial wealth transfer from the creditors to the debtor. For simplicity, consider the expected present value of these transfers, assuming a discount rate of 10 percent. The debt service payments are reduced by

20 = 100 - 80	in state 1, 11)
0	in state 2,
30 = 120 - 90	in state 3,
20 = 110 - 90	in state 4,
0	in states 5 and 6.

The expected present value of the debt relief is

$$\frac{0.5 \cdot 20}{1.1} + \frac{0.25 \cdot 30 + 0.25 \cdot 20}{1.1^2} = 19.42.$$

Hence the deterministic debt relief imposes a loss of 19.42 on the creditors and enriches the debtor by the same amount.

Now consider a contingent debt relief. First, ignore any state verification costs and enforcing problems. Then a state-contingent debt relief which reduces the wealth transfer to zero, reduces claims by

0	in state 1,
20	in state 2,
0	in state 3,
10	in state 4,
30	in state 5,
50	in state 6.

This debt relief reduces the probability of default to zero and the wealth transfer to zero since the state-contingent debt service payments are not changed. Hence this contingent debt relief is efficient.

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11) In state 1, the debtor pays 100 without a debt relief and 80 if the creditor reduces his claims to 80. In state 2, the creditor can only pay 80, regardless of the debt relief.

## 2 Efficient Debt Relief in an Imperfect Market

So far it has been assumed that every state of nature can be costlessly identified and an appropriate state-contingent debt relief can be agreed on. In reality, it may be very difficult to identify a state of nature since asymmetric information gives the debtor ample opportunities to misrepresent his foreign exchange reserves.

Townsend [1979] and Gale/Hellwig [1985] have investigated the optimal design of loan contracts assuming positive state verification costs. They show that a deterministic claim is optimal which is served before the debtor gets the residual foreign exchange. This contract is optimal since it minimizes the expected state verification costs. State verification is necessary if the claim is state-contingent and has to be identified or/and if the debtor does not fully pay the due claims.

This result no longer holds if the claim is state-contingent, but the size of the claim depends on easily observable variables so that the costs of identifying the claim approach zero. Similarly, the debt relief may be made state-dependent and tied to some easily observable state variables. Since trade surpluses may be difficult to observe, debt relief should not depend thereon. In addition, dependence on trade surplus could create moral hazard of the debtor. Therefore it appears to be better to make the debt relief dependent on easily observable prices such as prices of export and import commodities which have a substantial impact on the debtor's current account. In the case of Mexico which earns about 40 percent of its export revenues from oil, the oil price would be a relevant state variable. As oil is traded on various commodity exchanges, the oil price is easily observable.

A more general approach for a contingent debt relief would be a hedging approach based on portfolio considerations. The debtor earns a random surplus  $\tilde{S}$  from international trade which defines his foreign exchange earnings. If his loan obligations

are highly correlated with his earnings, and, the expected value of the obligations is lower than that of his earnings, then the debtor will be able to pay his obligations with high probability.

In order to keep state verification costs at a low level, choose a portfolio of commodities with an easily observable market value which is highly correlated with the debtor's earnings. Define his loan obligation to be linearly dependent on the market value of that portfolio. Then state verification poses no problems.

Formally, commodities and financial assets with easily observable market prices are indexed by  $h$  ( $h = 1, \dots, H$ ). Let  $y_h$  denote the fraction of initial wealth to be invested in asset  $h$  so that  $\sum_{h=1}^H y_h = 1$ . Then if  $\tilde{\pi}_h$  is the random price of asset  $h$  one period later, the portfolio's market value at that date is

$$\tilde{V} = \sum_{h=1}^H \tilde{\pi}_h y_h.$$

Choose that portfolio ( $y_1, \dots, y_H$ ) which maximizes the correlation between  $\tilde{V}$  and the debtor's foreign exchange earnings,  $\tilde{S}$ . A linear regression of  $\tilde{S}$  on the value of this portfolio,  $\tilde{S} = a + b \tilde{V} + \tilde{\epsilon}$ , shows a regression slope of  $b$ . This slope is used to define the debtor's obligations  $\tilde{D}$

$$\tilde{D} = \hat{a} + b\tilde{V}$$

with  $\hat{a}$  being agreed on by the debtor and the creditors. Hence  $\tilde{D} = (\hat{a} - a) + \tilde{S} - \tilde{\epsilon}$  follows so that, on average, an increase in foreign exchange earnings is matched by an equally large increase in debt.

If the original loan contract obliged the debtor to pay  $D^\circ$ , then the stochastic debt relief is

$$D^\circ - \tilde{D} = D^\circ - \hat{a} - b\tilde{V}.$$

If  $\hat{a} + bE(\tilde{V}) = D^0$ , then the expected debt relief is zero. Hence the debtor has to pay more in some states and less in other states. Wealth transfer through debt relief would be close to zero. Given severe debt servicing problems, the debtor will require a positive expected debt relief. Still,  $D > D^0$  is possible in some states. Thus the debt relief is costly in some states, and, thereby, helps the creditors to preserve their reputation to enforce.

As the obligation  $\tilde{D}$  is highly correlated with the debtor's earnings  $\tilde{S}$ , the debtor will be able to pay his obligations with high probability if the parameter  $\hat{a}$  is smaller than  $a$ . The higher the correlation between  $\tilde{D}$  and  $\tilde{S}$  is, the lower can be the expected debt relief to attain a given probability of non-default, and hence the wealth transfer.

The choice of the "hedge commodities"  $h = 1, \dots, H$  depends on the following considerations:

- (a) The price  $\tilde{\pi}_h$  should be easily observable and be immune to manipulation attempts by creditors and the debtor. Then state verification costs are low and moral hazard problems do not exist. Manipulation attempts will not be successful if the spot markets of the hedge commodities are sufficiently liquid.
- (b) The creditors may want to hedge the risk of stochastic claims. As the claims are a linear function of  $\tilde{V}$ , the creditors can hedge the underlying price risks by selling the portfolio. Short positions can be taken if futures or options on the underlying assets are traded. Therefore the creditors may prefer hedge commodities for which liquid futures or option markets exist.<sup>12)</sup> Although commodity futures and options are traded at various exchanges, some of these markets display low liquidity. As hedging creates transaction costs for banks, they will demand compensation for these costs.

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12) For a review of primary commodity markets see IMF [1989].



Mathieson et al [1989, 9-11] discuss hedging concepts which rely on hedging by the debtor himself. As they point out, there are at least two problems of debtor hedging. First, the design of hedging strategies requires skilled personnel which may not be available in indebted countries. Second, indebted countries may be viewed as low quality-contracting parties in futures and option contracts even though they satisfy the normal margin requirements of futures and options exchanges. Creditor banks have an advantage over debtors in both respects. Thus there is no reason why all hedging should be done by the debtor. Hedge sharing where the debtor and the creditors engage in hedging operations, would be preferable.

Three remarks have to be added

- (1) The composition of the portfolio with market value  $\tilde{V}$  may have to be changed over time in order to retain a high correlation between  $\tilde{V}$  and the debtor's foreign exchange earnings.
- (2) The contingent debt relief strongly reduces the probability of default. Hence a debtor expanding his efforts will earn most of the incremental foreign exchange himself. Thus the contingent debt relief reinforces the debtor's incentives through improved incremental revenue sharing.
- (3) Creditors have to impose sanctions in the case of default. As the claims are much closer to the debtor's capacity to pay, given a contingent debt relief, the sanctions which are necessary to motivate the debtor to pay are much smaller than without a debt relief.

Summarizing, contingent debt reliefs require lower wealth transfers than deterministic ones. Therefore the creditors will prefer contingent debt reliefs. State verification costs can be kept at a low level if the debt relief depends on easily observable variables. Moreover, the creditors can hedge the price risk created by contingent claims if the debt relief depends on the prices of assets for which also liquid futures or option markets exist.

## VI CONCLUSIONS

The purpose of this paper is to compare different instruments for a debt relief, given severe debt servicing problems. Instead of summarizing the results of the paper once more, some speculation on the chances that a debt relief might be granted by private creditors will be appended. As described in the introduction, many private bankers are opposed to a debt relief. They do not want to transfer wealth to debtors for nothing and endanger their reputation to enforce claims. Hence it appears unrealistic to expect any debt relief which appears as a "free lunch" to debtors. Some cost has to be borne by the debtors. One route to accomplish this is to grant a state-contingent debt relief such that the debtor pays less in some states and more in some other states.

In addition, it appears unrealistic to expect any debt relief by private creditors which is not "sweetened" by official creditors' actions or supported by political pressure. Interestingly, a third approach might be that some creditors engage in debt restructuring activities with debtors and get, in turn, some preferential treatment at the expense of the other creditors. Some creditors might, for example, grant a debt relief together with some fresh money and get priority in future debt servicing. Although the other creditors are protected against such expropriations to some extent by the *pari passu* clause, it might be difficult for them to resist such changes. Thus, debt reliefs may become a wealth transfer game among creditors. If this happens, it may deter creditors from future voluntary lending to sovereign debtors and, thereby, eventually harm these debtors.

Regardless of how the debt problem may be solved, the struggle for a solution is an instructive example for the difficulties of *ex post*-adjustments of contracts. Contracts which cannot be enforced and can only be adjusted through voluntary redistributions of wealth, pose conflicts of adjustment which cannot be overcome by purely economic considerations. Debt contracts are no exception.

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