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Author(s): Jeremy Bulow and Kenneth Rogoff

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# Sovereign Debt: Is to Forgive to Forget?

By JEREMY BULOW AND KENNETH ROGOFF\*

*We show that, under fairly general conditions, lending to small countries must be supported by the direct sanctions available to creditors, and cannot be supported by a country's "reputation for repayment." This distinction is critically important for understanding the true underlying structure of sovereign lending contracts, and comparing policy alternatives for dealing with the developing country debt problem.*

The period from 1973 to 1982 saw a startling increase in the volume of international loans to less-developed countries. A central issue in analyzing LDC loan contracts is whether, and by what mechanism, these contracts can be enforced.<sup>1</sup> Whereas domestic loans are generally supported by substantial collateral, the assets that can be appropriated in the event of a sovereign's default are generally negligible. For this reason one must look beyond collateral to find incentives for repayment.

An influential body of research holds that a small country can enjoy at least some access to world capital markets by maintaining a reputation for repaying its loans.<sup>2</sup> According to this approach, a country makes repayments on its foreign debt in order to preserve reputational "collateral" needed for

future borrowing. The obvious appeal of pure reputation theories is that they seem robust to institutional detail. One does not have to speculate on the legal rights of creditors within their own countries' courts, or on the ability of creditors to induce their governments to take retaliatory actions.

But we have come to query reputation-for-repayment theories, not to praise them. Our analysis establishes rather general conditions under which small countries *cannot* establish a reputation for repayment. If these conditions are met empirically, then loans to LDCs are possible only if creditors have either political rights which enable them to threaten the debtor's interests outside its borrowing relationships, or legal rights. Legal rights might include the ability to impede a country's trade, or to seize its financial assets abroad (which is the real reason why a defaulter suffers reduced access to capital markets). Admittedly, there are many uncertainties surrounding the actual damage which a lender can inflict on an LDC; it is a gray area of Western law.<sup>3</sup> But if one wants to understand LDC loan contracts, then these costs must be studied further.

## I. The Model

Our paradigm is of a small country that faces competitive, risk-neutral foreign investors. (It is straightforward to extend our

\*Graduate School of Business, Stanford University, Stanford, CA 94305 and Economics Department, University of Wisconsin, Madison, Wisconsin 53706. This work has been supported by grants from the National Science Foundation under grant no. SES-87-20800 and the Alfred P. Sloan Foundation.

<sup>1</sup>Theories that ignore contract enforcement problems suggest that there should be far greater integration of world capital markets than currently occurs. For a survey of the empirical evidence on international capital mobility, see Maurice Obstfeld (1986).

<sup>2</sup>Examples include Jonathan Eaton, Mark Gersovitz, and Joseph Stiglitz (1986); Herschel Grossman and John Van Huyck (1988); Rodolfo Manuelli (1986); and Harold Cole and William English (1987). Eaton and Gersovitz (1981) present a model in which the threat of capital market autarky provides debtors with an incentive to make repayments. However, they do not emphasize a distinction between a cutoff caused by the legal rights of outstanding debt, and a cutoff caused by a loss of reputation for repayment.

<sup>3</sup>For a discussion of the legal evidence on this point, and an assessment of its probable empirical significance, see Jeremy Bulow and Kenneth Rogoff (1989), or Lewis Alexander (1987).

analysis to the case of risk-averse foreign lenders.) The country is small in the sense that it cannot affect the world interest rate  $r$ .<sup>4</sup> It is inhabited by a single, infinitely lived representative agent. There is one good, which the agent both produces and consumes. Since the proof of our theorem is based on an arbitrage argument, it is not necessary to place any restrictions on the agent's utility function other than that she prefers having more of the good to having less.

The country's production function is given by

$$(1) \quad Y_t = f(\vec{\theta}_t, \vec{I}_{t-1}),$$

where  $Y$  denotes output, and  $t$  subscripts denote time.  $\vec{\theta}_t \equiv (\theta_t, \theta_{t-1}, \theta_{t-2}, \dots)$ ; the  $\theta_t$ 's are exogenous, serially independent disturbance terms.  $\vec{I}_{t-1} \equiv (I_{t-1}, I_{t-2}, I_{t-3}, \dots)$ , where  $I_t$  is investment in period  $t$ . Net exports in period  $t$ ,  $X_t$ , are given by

$$(2) \quad X_t = Y_t - I_t - C_t,$$

$C, I \geq 0$ ;  $Y > 0$ ;  $C + I \leq Y^*$ , where  $C$  is the country's consumption and  $Y^*$  is world output.

The sequence of events within any given period  $t$  is as follows: First, a shock  $\theta_t$  occurs which affects output in the current period and possibly in future periods. After observing the shock, the country decides how to divide  $Y_t$  between  $I_t$ ,  $C_t$ , and  $X_t$ . Net exports can be used either to make payments on various loans, or to increase asset holdings abroad.  $\theta_t$  and  $I_t$  can be observed by everyone; there is no private information about aggregate variables.

To prove our theorem, it is not necessary to elaborate on the benefits of having access to world capital markets. It may aid the

reader's intuition, however, to briefly discuss these advantages. Through short-term borrowing and lending, a country can avoid having to match the exact timing of import expenditures and export receipts. Having access to long-term loans allows a country to maintain consumption levels in the short term while taking advantage of high-yielding domestic investment opportunities. Finally, by taking advantage of world capital markets, a country can better insure itself against many types of risk, such as uncertainty over its terms of trade.

We define the market value of a hypothetical claim to the country's entire future net income as:

$$(3) \quad W_t(\vec{\theta}_t) = E_t \sum_{s=t}^{\infty} y_s / (1+r)^{s-t},$$

where  $y = Y - I$ . We will assume that  $y \geq 0$  always, an assumption which slightly simplifies our proofs.<sup>5</sup> Note that  $W_t$  is defined with reference to a particular (possibly reputational) equilibrium path and that expectations,  $E_t$ , are taken with reference to that equilibrium.<sup>6</sup> We assume that  $W_0 < \infty$ , which implies that for any finite  $t$ ,  $W_t < \infty$  with probability one. In other words, we are assuming that if the country were a firm, its market value would be finite.

## II. Types Of Lending Contracts

In a pure reputation-for-repayment ("reputation") contract, a country's foreign creditors have no effective legal recourse in the event of default. They cannot interfere with the country's trade; they cannot even seize any financial assets it may hold abroad. The worst fate that can befall a country which defaults on a reputation contract is that

<sup>4</sup>The small country assumption, necessary for our results, seems appropriate for describing the LDCs' roles in world capital markets. For example, in 1986 Mexico, Argentina, Venezuela, Colombia, and Chile had combined GNPs within 1 percent of the total for the Benelux countries. The combined GNPs of the "Baker Fifteen" group of highly indebted countries is less than the gross income of greater Tokyo.

<sup>5</sup>Though the case where  $y < 0$  does not seem relevant empirically, it is possible in theory. However, the net income of the entire world,  $y^* \equiv Y^* - I^*$  must always be nonnegative. The assumption  $y \geq 0$  can be dispensed with in the proof of Theorems 1 and 2 by replacing  $y$  with  $y^*$  and  $W$  with  $W^*$ .

<sup>6</sup>Along any equilibrium path,  $I$  is a function of  $\theta$ , so  $Y$  and  $W$  may be written as functions of  $\theta$  alone.

it will never again be allowed to write reputation contracts. However, the defaulting country cannot be cut off from international capital markets entirely. Though it may no longer be able to borrow for domestic investment, it can still buy consumption-insurance contracts by paying cash in advance. A "cash-in-advance" contract is just a conventional insurance contract under which a country makes a payment up front in return for a state-contingent, nonnegative future payment. Implicitly, we are assuming that there are foreign investors who can make commitments. These commitments are enforced by the legal system in investors' countries. Thus a small country can hold foreign assets such as bank accounts, treasury bills, stocks, and other state-contingent assets.<sup>7</sup> Of course, it can also stockpile reserves of precious metals and foreign currency.

#### A. Reputation Contracts

Suppose the country were allowed to have a reputation contract which, in essence, is an implicit contract. For our purposes, it is not necessary to ask what set of off-the-equilibrium-path beliefs might support the contract, nor is it important to ask whether the contract is optimal in any sense. All one needs to know is that any reputation contract must implicitly specify a state-contingent payment  $P_t(\vec{\theta}_t)$  for all possible realizations of  $\vec{\theta}_t$ , and for all  $t$ .<sup>8</sup>

Note that for an implicit contract to be equilibrium, it must be in the country's interest to honor the contract in every possible state of nature. In particular, the country must never have an incentive to default on its reputation contract and switch completely over to cash-in-advance contracts.

<sup>7</sup>Notable efforts to study international lending in a general equilibrium framework include Manuelli (1986) and Cole and English (1987).

<sup>8</sup>This specification does not preclude randomized strategies. One can view  $\vec{\theta}_t$  as a vector, one of whose elements has no effect on fundamentals such as output. If the foreign investor can make legal commitments, then the implicit contract and the explicit legal contract will coincide whenever  $P \leq 0$ . In states of nature where  $P \geq 0$ , any explicit legal contract is meaningless, by assumption.

Otherwise, the contract is not the true implicit contract.

Given the implicit contract, one can write the world market value of the country's reputation debt at time  $t$ ,  $D_t$ , as the expected present-discounted value of its future repayments:

$$(4) \quad D_t(\vec{\theta}_t) \equiv E_t \left\{ \sum_{s=t}^{\infty} P_s / (1+r)^{s-t} \right\}.$$

Clearly,  $D_t$  can never exceed  $W_t$ , the market value of a claim to the country's entire future output stream. Thus within any reputational equilibrium there must exist some  $k'$ ,  $0 \leq k' \leq 1$ , such that with probability one  $\forall t$ ,

$$(5) \quad D_t(\vec{\theta}_t) \leq k' W_t(\vec{\theta}_t), \quad \forall \vec{\theta}_t.$$

Let  $k$  be the smallest  $k'$  such that condition (5) holds.

#### B. Cash-in-Advance Contracts

In a cash-in-advance contract, the country pays the amount  $A_t$  at the end of period  $t$  in exchange for a contract which pays  $G_{t+1}(\vec{\theta}_{t+1})$  in period  $t+1$ . A cash-in-advance contract can always be indexed to all the same variables as the implicit reputation contract. Even if the country has forfeited its reputation for honoring contracts, a foreign investor should always be willing to accept a cash-in-advance contract as long as it satisfies two requirements:<sup>9</sup>

$$(6) \quad E_t \left[ G_{t+1}(\vec{\theta}_{t+1}) \right] = (1+r)A_t,$$

$$(7) \quad G_{t+1}(\vec{\theta}_{t+1}) \geq 0, \quad \forall \vec{\theta}_{t+1}.$$

Condition (6) states that the contract must offer the risk-neutral foreign investor the

<sup>9</sup>Here we are only defining one-period cash-in-advance contracts. In principle, the country could make a payment in  $t-1$  in exchange for (strictly positive) state-contingent payments in  $t, t+1, t+2$ , etc. For our purposes, however, multiperiod cash-in-advance contracts are superfluous.

market rate of return. Condition (7) says there can be no state of nature in which the country is called upon to make positive payments in period  $t+1$ . Obviously, one must also have  $A_t \geq 0$ , but this condition holds whenever (6) and (7) hold. If one thinks of the initial payment  $A_t$  as being collateral, then condition (7) can be interpreted as saying that the country's collateral must be sufficient to cover its losses on the contract even in the worst possible state of nature.

### III. Nonexistence of Supportable Reputation Contracts

#### A. Reputation Contracts in the Absence of Direct Punishments

We are now ready to state the central theorem of this paper:

**THEOREM 1:** *In any sequential equilibrium,  $D_t \leq 0 \forall t$ .*

**PROOF:**

Suppose  $D_s \geq k(W_s - y_s)$ . Then the country can cease payment on its reputation contract and initiate the following sequence of cash-in-advance contracts:

For all  $t \geq s$ , invest  $A_t$  in return for a payment of  $G_{t+1}$  in the ensuing period where:

$$(8) \quad A_s(\vec{\theta}_s) = P_s(\vec{\theta}_s) + k(W_s - y_s) - D_s,$$

$$(9) \quad A_t(\vec{\theta}_t) = G_t(\vec{\theta}_t) + P_t(\vec{\theta}_t) - ky_t, \quad \forall t > s,$$

$$(10) \quad G_t(\vec{\theta}_t) = kW_t(\vec{\theta}_t) - D_t(\vec{\theta}_t), \quad \forall t > s.$$

Since  $D_t \leq kW_t$ , inspection of (10) indicates that condition (7) is satisfied. We note from (3) that

$$(11) \quad E_t(W_{t+1}) = (1+r)(W_t - y_t)$$

and from (4) that

$$(12) \quad E_t(D_{t+1}) = (1+r)(D_t - P_t).$$

Straightforward substitution of (11) and (12) into (8), (9), and (10) yields immediate con-

firmation of (6). Thus, the sequence of cash-in-advance contracts is feasible. Furthermore, the country must pay only  $A_s \leq P_s$  in period  $s$  and  $P_t - ky_t \leq P_t$  for  $t > s$ , with equality holding only when  $k=0$ . Thus  $k$  must equal zero and by (5),  $D_t \leq 0 \forall t$ .

That is, any (implicit) reputation contract *must* include at least some state of nature in which the country will default. The country will be able to use whatever repayment is demanded in that state of nature, an amount which may be very small relative to outstanding debt, as initial collateral for a series of cash-in-advance contracts. These contracts will allow the country to have strictly higher consumption in each future period than it would get under the reputation contract. This implies that the proposed implicit contract cannot be the true implicit contract. A reputation contract can only be equilibrium if we assume that the country cannot hold foreign assets that are indexed to the same variables as the reputation contract.

#### B. Reputation Contracts When Lenders Have Direct Means for Punishing Default

In the preceding analysis, we assumed that holders of reputation contracts have no way to directly punish the country if it repudiates. Here we show that if there are some direct costs which lenders can impose on a country in the event of default, then loans can be sustained, but only on the basis of these costs.

Suppose that lenders have the ability to impose a random penalty of  $\pi_t(\vec{\theta}_t, \eta_t)$  if a borrower stands in default in period  $t$ , where  $\eta$  is independent of  $\theta$  and  $y_t > \pi_t \geq 0$ . The penalty causes the country's period- $t$  output to be reduced by  $\pi_t$ . Define

$$(13) \quad \Pi_t \equiv E_t \sum_{s=t}^{\infty} \pi_s / (1+r)^{s-t}.$$

Since  $D_t$  can never exceed  $W_t$ , then there must exist some  $q', 0 \leq q' \leq 1$ , such that with probability one,

$$(14) \quad D_t - \Pi_t \leq q'(W_t - \Pi_t), \quad \forall \vec{\theta}_t, \quad \forall t.$$

Let  $q$  be the minimum  $q'$  such that condition (14) holds.  $D_t - \Pi_t$  can be thought of as the amount of debt not supportable by direct sanctions, that is, reputation debt. We can then generalize Theorem 1 as follows:

**THEOREM 2:** *In any sequential equilibrium,  $D_t - \Pi_t \leq 0 \forall t$ .*

**PROOF:**

In the proof of Theorem 1, replace  $D_t$ ,  $W_t$ ,  $P_t$ ,  $y_t$ , and  $k$  with  $D_t - \Pi_t$ ,  $W_t - \Pi_t$ ,  $P_t - \pi_t$ ,  $y_t - \pi_t$  and  $q$ , respectively.

Actually, the bound given by Theorem 2 may be too high, since countries can typically bargain with their creditors.<sup>10</sup>

#### IV. Limitations And Extensions

Here we emphasize some limitations on the scope of our result.

##### A. Reputation Outside the Scope of the Lending Relationship

What if repudiation damages a country's general image beyond just its reputation for repaying its loans? One might, for example, envision some countries as playing a tariff supergame, in which either raising tariffs or defaulting on foreign debt triggers a costly trade war. Such a mechanism could conceivably support a positive level of lending.<sup>11</sup> However, Theorem 2 directly applies to this case. The maximum amount the country is allowed to borrow must be governed strictly by the costs of a trade war. We do not claim that reputation plays no role in international relations, only that a good reputation for repaying foreign loans does not enhance a small country's ability to borrow abroad.

<sup>10</sup>See Bulow and Rogoff (1989) for a bargaining-theoretic interpretation of rescheduling agreements. Because lenders do not benefit directly by impeding a country's access to world insurance markets or by interfering with its trade, they cannot in general prevent the debtor from bargaining over repayments.

<sup>11</sup>Some of the broader incentives for repayment are discussed by Martin Feldstein, Herve Decarmoy, Koei Narusawa, and Paul Krugman (1987, p. 41).

##### B. Noncompetitive Lenders

As long as the country faces competitive foreign investors, then any service provided by the current lender (for example, insurance) can equally well be provided by a new investor. It is possible, of course, that in practice there may be some efficiency gain in having the country continue to deal with its current lenders. However, the upper bound on any "reputation" debt is still only the real cost to the country of switching its business to a new set of financial institutions.

##### C. Verifiability Problems in Contracting

We have assumed that the country can hold assets abroad which are indexed to the same observable exogenous shocks,  $\theta$ , as in a reputation contract. An alternative assumption is that  $\theta$  is "observable but not verifiable." That is, the borrower, the lender, and all potential lenders observe  $\theta$ . However, either because it is costly to verify  $\theta$  in court, or due to costs of contracting, the country is precluded from ever holding foreign assets which are indexed to the shock. It seems doubtful that this story can be used to explain reputation contracts of any significant size, although this is ultimately an empirical question.

It is hard to see what kind of shock would be observable to a huge pool of potential (competitive) lenders, but cannot be put into contracts.<sup>12</sup> True, one can make casual arguments as to why there might be limits on the kind of cash-in-advance contracts a country can write. But it is important to recognize that these same arguments also imply some limits on reputation contracts. In any event, it is not clear how well real-world LDC debt contracts are implicitly indexed to country-specific disturbances. Shocks to LDCs' terms of trade and to world interest rates clearly played a major role in precipitating the bank debt reschedulings of the past decade and also the bond defaults of the 1930s. Both

<sup>12</sup>The concept of observable but not verifiable shocks makes more sense in the context of a bilateral monopoly relationship.

these kinds of shocks can be hedged in world markets. However, Mexico did appear to receive some help after its major earthquake in the mid-1980s. Empirical research on this issue would be valuable.

#### D. *Difficulties in Observing the Country's Actions*

Theorem 1 does not apply directly to the case where lenders cannot directly monitor the country's actions.<sup>13</sup> Suppose, for example, that investors observe output,  $Y(\theta, I)$ , but they do not see  $I$  or  $\theta$ . In this case, it is possible to characterize any reputational equilibrium as an implicit contract, in which the country's payments are given by  $P_t(\vec{Y}_t)$ . As before, the country always has the option of switching over to cash-in-advance contracts, which can also be indexed to  $\vec{Y}$ . However, the terms of the post-repudiation cash-in-advance contracts will depend on investors' beliefs about the country's past investments. If a default at time  $s$  leads investors to reassess their beliefs about the country's capital stock, this may hurt the terms insurers offer on cash-in-advance contracts.

If this counterexample seems strained, it is because sequential equilibrium places no restrictions on investors' off-the-equilibrium path beliefs; see David Kreps and Robert Wilson (1982). By applying a refinement of sequential equilibrium, it may be possible to extend our result to the private information case. This question, however, can only be resolved after further research.

One should probably avoid attaching too much weight to private information about productivity disturbances. We suspect that in the typical LDC, the country's leaders do not know vastly more about aggregate productivity shocks than do the country's major lenders. Also, as we have argued above,  $\theta$  may be highly correlated with external variables, and therefore the component which can potentially be private information may be minor.

<sup>13</sup>Kenneth Kletzer (1984) considers some implications of private information for LDC contracts. For a more recent example, see Andrew Atkeson (1988).

#### E. *The Country's Preferences Are Unobservable*

Suppose that the country's income is constant but that it experiences unobservable shocks to its marginal utility of income, along the lines of Edward Green (1987).<sup>14</sup> If the country could have a reputation for repayment, it could use international capital markets to provide a line of credit as a buffer against bad shocks. However, the credit line must have a ceiling, otherwise the country could run up a debt exceeding the present value of all its future income.<sup>15</sup> But if the ceiling is ever reached, the debtor will gain by repudiating its debts and thereafter placing its funds in fixed-interest rate assets abroad. This argument easily generalizes to the case where there are observable as well as unobservable shocks.

Alternatively, suppose (à la David Kreps and Robert Wilson, 1982), that investors believe that there is a small chance that the country will always repay its debts out of a sense of moral obligation. A "selfish" debtor might then temporarily pose as an "altruist," but will still always repudiate once  $D/W$  reaches its maximum value. We conjecture that a small probability of altruism can explain at most a very small amount of lending.

#### F. *Restrictions on the Use of Foreign-Currency Reserves*

In some models, it is assumed that foreign investment goods can only be purchased with new foreign loans and cannot be purchased out of the country's own hard-currency reserves or hard-currency export earnings.<sup>16</sup> Thus a country can gain by repaying a lender  $P$  dollars from its foreign currency reserves in exchange for  $P - \epsilon$  dollars worth of new loans. We believe that the conventional as-

<sup>14</sup>In Green's closed-economy model, the debt contract can be enforced via direct punishments so the problem discussed here does not arise.

<sup>15</sup>Using similar logic, Roger Gordon and Varian (1988) make an analogous point in the intergenerational risk-sharing literature.

<sup>16</sup>See, for example, Eaton and Gersovitz (1983), Cole and English (1987), or Grossman and Van Huyck (1988).

sumption, that what a country can buy depends only on how much money it has available to spend, is the correct one.

### V. Conclusions

When a small country repudiates its debt, the legal rights of existing creditors will deter potential new lenders.<sup>17</sup> However, those legal rights are necessary if the country is to obtain any loans at all. Small countries will not meet loan obligations to maintain a reputation for repaying because, under fairly general conditions, it is impossible for them to have such a reputation.

This conclusion does depend on a sovereign's ability to reproduce any risk-sharing advantages of loan contracts by holding a portfolio of foreign assets. Factors such as private information may limit the country's ability to insure against its economic performance. But one must realize that these same factors will limit implicit reputation contracts as well. Therefore our no-reputation contracts theorem appears robust to many considerations, including the incorporation of unobserved preference shocks. Note that even implicit reputation contracts can only be indexed to shocks which are easily observed, since small countries face a very large number of potential lenders, all of whom must be able to recognize any violation of the contract.

Of course, what our theorem really does is clarify the conditions required for an LDC to have a reputation for repayment. We have argued that these conditions are not plausible in practice, but empirical work is needed in this area.

The issue of whether direct sanctions or reputational factors underpin sovereign debt contracts is especially important in evaluating policy alternatives for dealing with the Third-World debt problem.<sup>18</sup> One issue, for

example, is whether various debt forgiveness schemes might adversely affect LDCs' future access to world capital markets, by hurting their reputations for repayment.<sup>19</sup> We would argue that if, through bargaining, an LDC can induce its lenders to forgive a portion of its debts it should do so. Debts which are forgiven will be forgotten.

<sup>19</sup>Fred Bergsten, William Cline, and John Williamson (1985) analyze a wide variety of schemes for resolving the LDC debt problem. They discuss how different schemes might affect LDCs' reputation for repayment and thereby their future access to world capital markets. Also, John Reed, the chairman of Citicorp, argues that "it's in the debtor countries' own interest to pay more. That way they'll...be able to borrow more freely again within a short time." See "Citicorp's Reed Takes Firm Stance on Third-World Debt; Chairman Aims to Stem Commercial Banks' Trend Toward Concessions" by Peter Truell (*Wall Street Journal*, February 4, 1987, p. 6.)

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<sup>17</sup>LDC bank loans are typically financed by multinational lending consortiums with banks from all the LDC's major industrial trading partners. This arrangement maximizes creditors' global legal rights.

<sup>18</sup>For analyses of policy alternatives on Third-World debt, see Bulow and Rogoff (1988), Elhanan Helpman (1987), and Kenneth Froot (1988).



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