International Insurance for Developing Country Debt: A Natural Successor to the Brady Plan?

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Abstract

The Brady Plan has failed to significantly improve the debt crisis for any country. In the context of a model of developing country debt, a plan for international insurance for LDC debt is derived and shown to be pareto superior to the existing situation, as well as to the Brady Plan. The Brady Plan's failure is analyzed in the context of the model of this paper, and it is shown that complete insurance is superior to, but consistent in spirit with, the Brady Plan.
I. Introduction

When the Brady Plan was announced in early 1989, with its call for forgiveness of some LDC debt by banks in exchange for insurance on a portion of the remaining debt, reactions in the international community were mixed. A shift in policy was clearly needed. The process of "muddling through," which had been the operative procedure for much of the 1980's, had succeeded in protecting the banks and preventing serious dislocations in the international financial system. However, it had done little or nothing for the debtor countries -- growth stagnated as export revenues were used to make payments on the debt rather than to finance development.

The Baker Plan, in the mid 1980's, attempted to address this problem; under this plan, substantial new loans would be made, primarily by private banks, to debtor countries who would use these funds to finance market-oriented growth strategies. The hope was that countries would grow out of the debt problem. However, the banks were unwilling to fund this plan. The loans were not forthcoming, and little came of the Baker Plan.

Thus, in early 1989, virtually all observers were in agreement that a shift in policy towards LDC debt was necessary. The Brady Plan was clearly a major shift in policy from the Reagan administration's adamant refusal to consider debt forgiveness as a part of any LDC debt strategy. Yet the Brady Plan was attacked from two sides.

Many felt that the Brady Plan's focus on debt relief was desirable. However, the magnitude of relief envisioned under the
plan -- 20% of medium- and long-term bank debt -- was simply not enough to make a meaningful difference. Debtor countries needed a much greater reduction in their debt burden if they were to resume growth (e.g. Sachs, 1989).

On the other hand, some criticized the idea of debt forgiveness. They argued that LDCs would pay a high price paid for debt forgiveness. Having once been urged (coerced?) by the United States government into forgiving past LDC debt, banks would be unwilling to make any new LDC loans; LDC access to credit would dry up for many years (e.g. Feldstein, 1989).

Both of these criticisms appear to be valid. Now that the details of the Mexico agreement under the Brady Plan are becoming clear, the validity of the first criticism is obvious. Mexico was the first Brady Plan beneficiary for obvious reasons. Almost all observers agreed Mexico was in need of debt relief, and everyone agreed that Mexico was deserving; they have consistently done everything the IMF has asked of them in an attempt to resolve the debt problem. They have played the game at least as well as any other country, and were thus deserving of a reward.

So what did Mexico get from the Brady Plan? Approximately a $1.4 billion reduction in their annual debt service bill, resulting largely from a conversion of $23.8 billion of their medium- and long-term bank debt to fixed rate loans bearing a 6.25% interest rate. Their total debt is virtually unchanged, since a $7 billion write down in principal was largely offset by the need for Mexico to borrow $5.7 billion to set up a $7 billion insurance pool.
If the "most deserving" country gets this little, the Brady Plan offers little hope for any debtor country. Mexico would have benefited more from a simple reduction of U.S. interest rates of about one and a half percentage points.

Why did Mexico get so little? Because the banks were offered little in return. All they received was the establishment of a $7 billion pool of funds, set up to "insure" payments on Mexico's $100 billion debt. In some sense, the truly interesting question is not "Why did Mexico get so little?" but "Why did the banks give so much for so little?"

The validity of the second criticism -- that credit flows will dry up -- can never truly be proven, since to do so one must compare future credit flows under the Brady Plan to what they would have been without the Brady Plan. Yet it seems hard to deny the logic of the claim. Debt forgiveness is a perfect example of the time-inconsistency problem so common in macroeconomics.

One-time debt relief, never to be repeated, would improve the credit-worthiness of debtor countries and thus increase credit flows. Yet the same could be said any time the countries have accumulated debt. The claim that debt relief will be a one time occurrence is not believable. Forgiving debt once makes it more likely debt will be forgiven again, and yet again, at least in the minds of the bankers. This will reduce future credit flows.

Indeed, the Mexican agreement seems already to be providing some support for this criticism. Mexico is having difficulty
funding its approximately $4 billion current account deficit. This is leading to increased emphasis in subsequent Brady Plan negotiations on enticing new loans from banks, at the expense of emphasis on reductions in existing debt. (Wall Street Journal, February 9, 1990).

Despite these problems, the Brady Plan points us in the right direction. A plan can be derived, consistent with the spirit of the Brady Plan, that addresses the above criticisms and that substantially improves the functioning of the LDC debt market, both now and in the future. That plan is one of complete international insurance for lenders to developing countries.

In Section II, I describe an international insurance system for developing country debt, and demonstrate the pareto superiority of a market in which all debt is insured over a market with uninsured debt. In Section III, I describe how this insurance could be introduced into a world in which substantial uninsured debt is outstanding. In Section IV, I discuss the similarities – reduction of existing debt in exchange for insurance on the remaining debt -- and differences -- complete insurance leading to truly meaningful debt reduction, and concern for the future functioning of this market -- between this insurance plan and the Brady Plan. Using the model developed in the paper, I show that the outcome of the Mexican negotiations should have been expected, and I show how international insurance would be superior to the Brady Plan. Section V concludes.
II. The Insurance Plan

The market for developing country debt is a complex market; however, for the purposes of this paper we can identify a few key features: Countries borrow to finance both current consumption and investment. The primary lenders are profit maximizing private banks who have alternative sources of loan demand, including risk free United States Treasury obligations. Loans to developing countries are, in general, unenforceable. A sovereign country pays the loan back if and only if it is in its interest to do so. Lenders cannot effectively use any courts to enforce loan repayment; they can, however, impose penalties on defaulting borrowers. The borrowing country will repay if repayment obligations are less than any penalties it would incur from defaulting.¹

I capture these essential features of the market for developing country debt in the following simple model consisting of borrowers and lenders. In period 1, the decision maker for the borrowing country solves the following problem:

Maximize \( E(U(C_1,C_2,W_f)) \)

Subject to:
\[
\begin{align*}
C_1 & \leq W_0 + Y + L - I^1 \\
C_2 & \leq F(I^* + W_0) - I^2 - \min(RL, P_2) \\
W_f & \leq W_0 + I^2
\end{align*}
\]

¹Unenforceability is a problem with all cross-country loans. Incentives are such that developed countries typically find it in their interest to pay any loan obligations.
where $C_i$ is consumption in the $i$th period, $Y$ is output in period 1, $L$ is the amount borrowed, $I^i$ is period $i$ "investment" (net investment plus exports minus imports), $R$ is the gross rate of interest charged on loans, $P_2$ is the penalty for default, $W_0$ is wealth carried over from period 0 and $W_f$ is wealth carried into the future. Both the utility function $U(\cdot)$ and the production function $F(\cdot)$ are assumed to have positive first and negative second derivatives with respect to all arguments.

$P_2$ is the realization of a random variable $p$, with density function $g(p)$ defined on the closed interval $[0,P]$. In reality, potential penalties consist of such things as denial of access to future loans, as well as seizure of assets abroad which could result in a elimination of trading possibilities. The cost these penalties impose on the borrowing country depend, in part, on current and anticipated future income. While it would thus be more realistic to model income as random, with penalties a function of income, Wakeman-Linn (forthcoming) demonstrates that modelling the penalty as random simplifies the analysis without changing the results.

In addition to these externally imposed penalties, $P_2$ may also depend on the moral and ethical attitude regarding debt obligations within the country. Some individuals, and some countries, may have an aversion to defaulting on obligations even when narrow self interest would indicate that is the optimal action. Clearly, the borrower will default on loan obligations any time $RL > P_2$.

A few features of the problem as described here are worth
noting. First, the borrower is assumed to have no loan obligations coming due in period 1. Conclusions of this section, regarding the pareto superiority of the market with insurance, are not altered by the introduction of pre-existing debt, provided we are comparing a world with both new and old debt uninsured to a world with both new and old debt insured. The next section explores the implications of insuring new debt when existing debt is uninsured.

The second noteworthy feature of this model is that the decision-maker plans explicitly for two periods, while his plans for all subsequent periods can be summarized by the wealth to be carried into the future. To see the reason for modelling the problem in this way, consider the alternatives. We could model a decision maker whose time horizon is infinite. This would be unrealistic, particularly given the rapid turnover of governments in many developing countries. Assuming the decision maker chooses a plan which is optimal only if the entire infinite stream of decisions is undertaken is to assume the decision maker acts irrationally. (Assuming an infinite horizon with a high discount rate does not resolve this problem).

Alternatively, we could assume a finite decision making horizon of n periods, beyond which the decision maker has no interest. This is again unrealistic, since it would predict the country will use up all the its resources in a finite time. Even a totally self-oriented leader, who had no concern for his country, would not do this, since he would ultimately be putting his authority, and even his safety, at great risk.
By modelling the problem as we do, we allow for the political realities of a limited time in office, as well as allowing for concern for the future. Note this concern for the future, as reflected in the utility derived from \( W_f \), can be either genuine concern for the future well being of the country or concern about the decision maker's own chances of staying in power.

The lender's problem is more easily described. We need not describe the full problem of the lender, but merely the decision regarding the interest rate to charge on loans to the borrowing country.\(^2\) Since the lender has alternative loan options, including making perfectly safe loans at a rate \( R^s \), the lender will lend to the borrowing country provided

\[
P \int g(p) dp \geq R^s
\]

\[p=RL\]

that is, provided the expected return at least equals the risk free return.\(^3\) \( R^s \) would exceed the rate on U.S. Treasury obligations by an amount which reflects the value of non-interest benefits received by banks holding Treasury obligations. These obligations provide banks with increased liquidity, as well as serving as

\(^2\)This specification rules out credit rationing. In a more general model, in which the lender offers interest rate and loan pairs to the borrower, endogenous credit rationing may result (see Stiglitz and Weiss, 1981 or Wakeman-Linn, 1988). None of the conclusions important to this model would, however, be changed.

\(^3\)This specification assumes that, in the case of default, lenders receive nothing. This assumption, while simplifying the math, in no way alters any conclusions.
security for Treasury deposits and repurchase agreements).

The solution to this model is straightforward. Letting \( U_i' \) denote the derivative of the borrower's utility function with respect to the \( i \)th argument, the solution is represented by the following equations:

1. \( \frac{U_1'}{\int U_2' g(p) dp} = R \quad \text{p=RL} \)

2. \( \frac{U_1'}{\int U_2' g(p) dp} = F' \quad \text{p=0} \)

3. \( \frac{U_2'}{U_3'} = 1. \)

These are familiar marginal conditions: Condition 1 states that the marginal utility of first period consumption should equal the marginal utility of second period consumption times the expected cost of loans. Condition 2 requires marginal utility of first period consumption to equal marginal utility of second period consumption times the marginal productivity of capital. Finally, condition 3 requires marginal utility of second period consumption to equal the marginal utility of future wealth.

Note that 1 and 2 imply \( F' < R \), or the marginal productivity of investment is less than the interest rate on loans. (This is not inconsistent with the marginal productivity of investment in the developing country being greater than in developed countries,
since unenforceability drives the rate on LDC loans up).

It is easy to demonstrate (see Wakeman-Linn, forthcoming) that this equilibrium is pareto inferior to an equilibrium with enforceable contracts. Specifically, this equilibrium involves higher loan interest rates and lower loan quantities, investment levels, growth rates, and borrower utility.

Now consider the effects of introducing insurance for lenders into this model. Specifically, consider an international agency (a branch of the IMF, World Bank, or an equivalent institution) offering to insure all debt for a given developing country, for a premium. In the case of default, the lender will receive payment from the insurance agency, and the debt obligation of the country is transferred to the insurance agency.

To avoid adverse selection and free rider problems, the agency will refuse to insure any debt of a country unless all debt is insured. This requirement would be made binding by lending country bank regulators, such as the United States Federal Reserve, prohibiting banks from making uninsured loans to developing countries. Such a requirement would clearly be in the interest of the regulators, since it would reduce risk-taking with funds which are insured by the regulatory agencies. Thus any developing country wishing to borrow from private banks would have to have all debt insured. (Subordination clauses would preclude a borrower from defaulting on insured debt and then borrowing elsewhere). To enforce the requirement that banks cannot make uninsured loans to developing countries, a clear criteria for distinguishing which
countries' qualify as "developing" would be necessary. Given that the problem being addressed here is one of unenforceability, a criteria which was based on the value of a country's assets held in other countries which have a history of enforcing international debt obligations seems reasonable.

A private version of such insurance is impossible since, as will be shown below, the viability of this insurance scheme will depend in part on an implicit guarantee from either the developed countries or multilateral agencies.

The premium for this insurance would be based on three factors: an assessment of the risk involved in loans to the country, which would incorporate both political and economic risk, the country's prior experience with the insurance agency, and possibly the lender's prior experience with the insurance agency. Default would lead to an increase in future premiums for loans to the debtor, as well as for any loans made by the creditor. Default, even partial or temporary default, would lead to higher premiums on all new debt. This would increase the penalty for default and thus, along with other factors discussed below, would reduce the probability of default and therefore the risk premium charged on the loans.4

The insurance agency would, in essence, act like an international public utility. It would provide a service -- lender

4Where past or anticipated future payment difficulties were perceived to be due to factors beyond the country's control, such as drought, bilateral or multilateral donor agencies may choose to pay part of the premium.
insurance on developing country debt -- for a price -- the premium. Its goal would be to improve the functioning of the market for developing country debt. While there are certainly other legitimate concerns pertaining to developing countries, the insurance agency would not address these concerns. Rather than try to do everything and accomplish nothing, this agency will have narrowly defined objectives.

The procedure would be as follows. A borrowing country and a lender would approach the insurance agency for insurance. The agency would determine the appropriate premium, taking into account outstanding debt owed by the country, the country's economic prospects and its past payment history. While presumably the lender and the country would negotiate over who pays the premium, since insured debt is risk free to the lender, the lender would have to receive a return equal to the risk free rate. Thus, regardless of whether the borrower or lender "pays" the premium, the effective cost to the borrower will be the risk free rate plus the premium.

If lenders attempted to use market power to extract higher payments than this, the insurance agency could intervene by refusing to insure the loan if the effective cost to the borrower exceeds the risk free rate plus the premium. This would be in the agency's interest, since higher loan costs increase default risk.

Without loss of generality, assume the premium is added to the interest rate the borrower pays. Thus the borrower's problem, with insurance, is
Maximize $E(U(C_1, C_2, W_f))$

$L, I_1^*, I_2^*$

Subject to: $C_1 \leq W^0 + Y + L - I_1^*$

$\text{RsL}$

$C_2 \leq F(I_1^* + W^0) - I_2^* - \min(R^g(1 + \int G(p)dp)L, P_2)$

$p=0$

$W_f \leq W_0 + I_2^*$

where $G(p)$ is the new density function for $p$, the penalty incurred by a defaulting borrower. The following condition holds for all $x < P$:

$\int_{0}^{x} g(p)dp > \int_{0}^{x} G(p)dp.$

$p=0 \quad p=0$

Thus, the probability of default for any loan obligation $RL < P$ is lower as a result of the insurance. This is a result of increased, or more certain, penalties imposed on defaulters.\footnote{I intentionally leave open the question of whether future debt may be insured while the country is in default for past debt. The insurance agency may, under appropriate circumstances, choose to write off past debt. Note that this is one advantage of the introduction of insurance: an increased ability to declare a country internationally bankrupt, thus eliminating outstanding debts. That option, which exists for most debtors in developed countries, is unavailable for the developing country debtors. A country which defaults on outstanding debt has no way of eliminating that liability. In this framework, the insurance agency could choose that option, if it was deemed appropriate.}

Any of four alternative assumptions, which are equivalent in terms of their impact on the market and which we could reasonably make, would accomplish what condition 4. above accomplishes: a
reduction in the risk premium paid for any given loan. First, it is reasonable to assume that the insurance agency would impose more certain penalties. Lenders have proven to be remarkably unwilling to impose penalties on defaulting countries (see Wakeman-Linn, forthcoming). One reason has been their reluctance to officially declare a country in default, because of the implications that would have on their income statement. (Bank accounting regulations allow banks to continue accruing interest payments as income for a period of time, even when the interest payments have not been made, provided the borrower is not declared in default). The insurance agency would be less susceptible to such short run accounting concerns, and would thus be more likely to impose penalties.

Second, the insurance agency will be able to charge greater penalties for default than lenders. It can charge any penalties that lenders can charge, and it also has the option of raising future premiums above future assessed risk, as a result of default. In effect, they will be charging above-equilibrium premiums in the future -- something that competition would preclude lenders from doing.6

In addition, third parties may choose to pay part of the premium. Finally, the insurance agency may attain greater

6Since banks currently have the option of cutting off all access to future loans, how can I argue that the possibility of imposing a higher premium for future loans is a greater penalty? As noted above, banks are reluctant to impose penalties on defaulting countries; in many cases, the additional premium would be a greater penalty than the banks would actually impose.
diversification of risks in this market than private lenders are able to, or the insurance agency may be less risk averse than private lenders.\(^7\) As indicated above, any of these outcomes would accomplish what condition 4 accomplishes.

For any given loan quantity \(L\), the ratio of the effective interest rate paid with insurance to that paid without insurance

\[
\frac{R^sL}{P}
\]

can be shown to be \((1 + \int G(p)dp)(\int g(p)dp)\). If \(R^s = R\) and \(G(\ )\) was identical to \(g(\ )\), this would be of the form \((1+\gamma)(1-\gamma)\), which is less than 1. The fact that \(R^s < R\), and the assumption on \(G(\ )\) and \(g(\ )\) in condition 4 above, reduces the ratio further. So, for any given loan quantity, the equilibrium effective rate of interest is smaller in the presence of insurance than without insurance.

The equilibrium condition for the optimal loan quantity is thus

\[
P = \frac{R^sL}{1}.
\]

1.a. \(U'_1/(\int U'_2G(p)dp) = R^s(1 + \int G(p)dp)\).

Since this requires equating the ratio of marginal utilities of first and second period consumption to the now-lower effective cost of loans, the \(L\) which solves condition 1 is less than that which solves 1.a. Thus \(L\) increases as a result of the insurance.

\(^7\)Banks have proven to be remarkably risk-averse in this market, passing any risk they can to the debtor; this includes interest rate risk as well as exchange rate risk.
What about the effective interest rate? I showed above that for any given $L$, the effective interest rate was lower due to the insurance. However, the effective rate is increasing in $L$; can we say anything about the relative sizes of the equilibrium rates with and without insurance? Holding $I'$ constant, an increase in $L$ reduces $U_1'$ and increases $U_2'$; thus, by condition 1.a. the effective interest rate is reduced. What happens to investment? The reduction in the effective interest rate increases investment.8

The introduction of insurance increases loans and investment, and thus growth, while reducing interest rates. Borrowers are demonstrably better off while lenders are no worse off. The equilibrium with insurance is pareto superior to the equilibrium without insurance.9

III. Transition to Full Insurance

III.a. Feasibility in Theory

I have shown that a market with fully insured debt is pareto superior to a market with uninsured debt. However, to make any meaningful statements about improving the existing situation, I must say something about how we could move from a market with uninsured debt to a market with fully insured debt.

8The increase in investment cannot reverse the conclusion that the effective interest rate falls, since the increase in investment is a result of the fall in the effective interest rate.

9This analysis has ignored renegotiation; creditors and debtors would be permitted to renegotiate the terms of any existing loan. However, any increase in debt burden, or any other change in terms that increased risk, would require an additional premium.
This comes down to a question of how existing debt could be insured. I will present one method of insuring existing debt and then prove it is feasible, in the sense of providing non-negative expected returns to the insurer. The method for insuring existing debt is as follows: The insurer will require premiums from both the lenders and the borrowers. The premiums "paid" by the lenders will be immediately returned to them as payment on the debt, and the outstanding debt will be reduced correspondingly; this would amount to debt forgiveness. The premiums paid by the debtor will fund the insurance pool on the remaining loans.

The insurer will insure the debt of a country only if it insures all the debt; thus free riders cannot exist. Lenders will participate if participating in the insurance plan makes them no worse off; the same is true of the countries. To show this plan is feasible, then, requires showing that the sum of the maximum premium (write-off) that the lenders would be willing to pay, plus the maximum premium countries would be willing to pay, is sufficient to cover the expected costs of insurance.

The procedure for proving this to be the case is as follows: I will first derive the maximum "premium," or write-down, lenders would be willing to pay for full insurance on the remaining debt. I will then derive the maximum premium countries would pay for the debt reduction implied by this write-down. Finally, I will show that the sum will be sufficient to cover the expected costs of insuring the loans.

Lenders would be willing to write down the debt to a level $L^*$,
in exchange for full insurance on L*, provided that RL* is at least equal to the expected return to lenders without insurance. Specifically, they will write down the debt to a level L* = E(L), where E(L) solves
\[
P E(L) = \int_{p=RL}^{p} g(p) dp.
\]
This is a straightforward result: risk neutral lenders would be willing to trade the existing, uncertain debt obligation for a certain debt obligation equal to the expected value of the existing uncertain debt.

How large a premium is the debtor country willing to pay to get this debt reduction? Currently the country expects to pay
\[
RL P \int_{p=0}^{p=RL} pg(p) dp + \int_{p=RL}^{p} RLg(p) dp,
\]
or the penalty times the probability of default, plus the loan obligation times the probability of repayment. With debt reduction, the maximum the country would pay in any state is RE(L). Default will still occur whenever RE(L) > p. Thus the expected payment by the country would be reduced to\(^{10}\)

\(^{10}\)To demonstrate that the feasibility of this plan does not depend on any arbitrary change in the g( ) function (that is, on any arbitrary reduction in default probabilities), I have assumed the distribution of p's is unchanged. Incorporating the declining default probabilities, discussed in the previous section, would strengthen the conclusion of this section.
or the penalty times the new, lower probability of default plus the new probability of repayment times the lower debt obligation.

The value of this debt reduction to the country, and thus the maximum premium they would be willing to pay, is the difference in expected payments, is

\[
P \int_{RL}^{0} (R(L-E(L)))g(p)dp + \int_{RE(L)}^{P} (p-R(EL))g(p)dp,
\]

where the first term is the decline in payments in nondefault states, while the second term is the savings to the country in those states in which they would default without debt reduction, but do not default when there has been debt reduction.

There are several things to note about this method of calculating the maximum premium the country would be willing to pay. First, this analysis focusses strictly on the decline in expected repayments; it ignores complications arising from differences in marginal utility in the states of the world in which payment is being reduced, relative to marginal utility in the period in which the premium is paid. However, if countries borrow to pay the premium, the decline in expected repayments and the payment of the premium occur in precisely the same states of the world. Thus the maximum they would be willing to pay is precisely equal to the decline in expected debt repayments. I will return
to the possibility of borrowing to pay the premium below.

Second, the analysis focusses only on the value of the decline in outstanding debt obligations; it ignores the value to the country of the expanded credit availability, as well as the decline in interest rates on any future loans. Thus this analysis substantially underestimates the value of insurance to the country, and therefore the maximum they would be willing to pay.

It remains to show that this plan is feasible, in the sense that premiums will at least equal the expected cost of insuring the debt. The cost of insuring the debt equals $RE(L)$ times the probability of default.\(^{11}\) It is necessary to show that this is less than the premium the country will pay. The cost minus the premium is equal to

\[
RE(L) \quad P \quad RL
\]

\[
\int_{RL}^{RE(L)} g(p)dp - \int_{RL-E(L)}^{RE(L)} g(p)dp - \int_{RE(L)}^{p} g(p)dp.
\]

This is the new probability of default times the new debt obligation, minus the old probability of payment times the decline in the debt obligation, minus the increase in the probability of payment times the savings to the country in those periods in which they no longer default. Provided this total is $< 0$, the insurance is feasible.

The new debt obligation is equal to the old debt obligation

\^[11]I continue to maintain the assumption that neither the bank nor the insurer gets anything in the case of default. Relaxing this assumption would strengthen my argument, since it would reduce the cost to the insurer.
times the old probability of repayment, while the fall in the debt obligation is equal to the old debt obligation times the probability of default. Mathematically,

\[ \int_{0}^{\text{RE}(L)} g(p) dp = (\int_{0}^{\text{RE}(L)} g(p) dp) (\int_{0}^{\text{RE}(L)} L g(p) dp) \]

while

\[ \int_{\text{RE}(L)}^{\text{RL}} g(p) dp = (\int_{\text{RE}(L)}^{\text{RL}} g(p) dp) (\int_{\text{RE}(L)}^{\text{RL}} L g(p) dp) \]

Thus the cost of insurance, minus the premium, can be rewritten as

\[ (\int_{0}^{\text{RE}(L)} g(p) dp) (\int_{\text{RE}(L)}^{\text{RL}} L g(p) dp) - (\int_{\text{RE}(L)}^{\text{RL}} g(p) dp) \]

This is negative.

Thus the maximum premium the country would be willing to pay exceeds the expected cost of providing the insurance. By charging just a fair premium, with the difference being divided in some manner between the lenders and the country, the insurance can make all parties better off. The logic behind this result is straightforward. The insurance agency must charge a premium at least sufficient to cover the value of new expected losses. Countries receive a direct reduction of debt equal to old expected losses. Since old expected losses must be greater than new expected losses (since debt obligations have fallen and the number of states of the world in which default is optimal has declined),
countries are clearly willing to pay a sufficient premium.

The case for insurance is even stronger than this argument implies, for the developed countries would also benefit from the reduction in debt burdens and default probabilities for the developing countries. They would benefit financially in two ways: developing countries would be able to afford more of their products, thus expanding export opportunities for the developed countries, and the financial system in the developed countries would be less exposed to risk. Thus it would seem reasonable to extract some of the necessary premium from the developed countries, further increasing the gain for the debtor country and the lenders.

III.b. Feasibility in Practice

Three further issues need to be considered before we can conclude that an insurance plan of the type I have described is viable: What happens if actual (as opposed to expected) losses exceed the premiums? Where are indebted developing countries going to get the money to pay the premiums to start this program? Can we estimate default probabilities accurately enough for a plan of this type to work? I will consider each of these issues in turn.

The prospect of actual losses exceeding premiums collected is one that faces any insurance plan. For life insurance companies, diversification makes the probability of such an outcome approximately zero. It is doubtful whether the agency insuring international debt could achieve such diversification. If such diversification is not achievable, then there would have to be a
guarantee of funds from some other source for the insurance to be credible. That other source would have to be the developed country governments or multilateral agencies.

This would be similar to the system of bank deposit insurance that now exists in most developed countries, with one important exception. The U.S. Federal Deposit Insurance Corporation, for example, insures all deposits for a fixed premium, independent of risk. The insurer of developing country debt would charge a premium which reflected risk, and in fact could deny insurance for an excessively risky loan. The problems with deposit insurance in the United States could have been avoided, or at least lessened, if premiums depended upon risk (Benston, 1983). Note that, with unenforceable country loans, this risk depends only marginally on the use of the loan proceeds.

The second problem is a logistical one: Where are the debtor countries, already strapped for cash, going to get the money necessary to pay these premiums? The answer is simple: they will borrow it. Since all debt is now insured, loans to developing countries are free of risk, and lenders would be willing to lend to them. However, we must carefully assess whether borrowing the premium alters our conclusion regarding the viability of insurance.

Much of the above analysis on the viability of introducing international insurance hinges on the observation that an introduction of such insurance would reduce debt burdens for developing countries. Since the premium will be less than the decline in existing outstanding debt, and since the interest rate
on new debt would be the risk free rate, rather than the current risky rate,\(^\text{12}\) total debt obligations would still decline even if the debtor country borrowed the full premium.

Finally, we turn to a question of feasibility that has not yet been addressed. To this point, I have been assuming that default probability for any given volume of debt obligations was known, both by lenders and by the debtor countries themselves. In reality, it is not clear anyone knows future default probabilities. Without this information, determining expected losses, and therefore an appropriate premium, is impossible.

Ignoring politics for a moment, this would not have to be a serious problem. I have already noted that the insurance would have to be backed with a commitment of necessary funds by the developed countries, in the event of a default exceeding the resources of the insurance agency. Uncertainty regarding the appropriate premium would simply increase the probability that the insurance agency would, at some point, have to call on these funds.

Politics introduces a problem. If the default probability cannot be accurately and objectively calculated, politics will likely enter into the calculation of default probabilities. Each country will want a low estimated default probability, and therefore low insurance premium, since, at least on future debt, that premium must effectively be born by the debtor.

\(^{12}\)Actually, the effective rate would be the risk free rate plus the insurance premium; however, it was shown above that this is less than the current risky rate.
This is admittedly a difficult problem, but it is not an insurmountable one. While a full treatment of the risk-assessment issue is beyond the scope of this paper, I will sketch out how this problem could be resolved.

Country risk-assessment is, at best, an inexact operation. However, the experience of the 1980's has given us a wealth of insight and information as to those factors which do influence repayment prospects. For this insurance plan to work, and not get bogged down in partisan bickering over the appropriate default probability to apply to a particular country, all the experience we have must be used to derive a formula for assessing (or at least bounding) country risk. Factors such as the country's debt service/export ratio, debt/export ratio, the diversity of its exports (both across products and across product types -- i.e. primary, manufactured, etc), prior payment history, political stability, and others must be incorporated into risk assessment as objectively as possible. Some work (e.g. Fedder and Just, 1977) has already been done in this area. An objective method for risk assessment, applied to all countries, would minimize the role of politics in risk determination.

Both as a check of the adequacy of the risk assessment formula, and as a way to minimize the role of politics, the insurance agency should be required to acquire reinsurance for a portion of any insured debt. If politics, or any other factor, has introduced substantial objective errors in risk assessment, market-determined reinsurance premiums will reveal that fact.
Further, nothing in this analysis requires this institution to begin by immediately incorporating all existing debt of all developing countries. The transition can, and should, be conducted one country at a time. By starting with what might be considered easier countries, ability for effective risk assessment can be acquired with experience and checked by reinsurance.

This is clearly not a complete treatment of the risk-assessment issue; such a treatment must be the subject of future research. But since that appears to be the only barrier to the feasibility of implementing a plan which would benefit all those concerned with the market for developing country debt, a substantial research effort, which builds on work already done and incorporates the experiences of the 1980's, seems warranted.

IV. Complete Insurance: The Logical Successor to the Brady Plan?

The similarities between the plan I have described and the Brady Plan are obvious: Both call for a write-down of outstanding LDC debt by creditor banks, both encourage banks to do so by offering them some insurance on the remaining debt, and both approach the issue on a country-by-country basis. What, then, makes this plan of complete international insurance for developing country debt superior to the Brady Plan? The fact that this plan corrects the two serious flaws in the Brady Plan discussed above.

The first criticism of the Brady Plan is that it provides too little debt relief to the debtor countries. To see why this is so, and how the insurance plan described above would be superior, let
us incorporate the Brady Plan into the above model.

In calculating what lenders would be willing to "pay," in terms of debt write-offs, for complete insurance on the remaining debt, I said above they would write down the debt to a level $L^*$ which solves

$$RL^* = RL \int g(p) dp.$$  

If the insurance is partial, rather than complete, they will choose $L^*$ to solve

$$RL^*g(p) dp + \alpha RL^*g(p) dp = RL \int g(p) dp,$$

where $\alpha$ is the fraction of the debt obligation that is insured.\(^\text{13}\) If $\alpha = 0$, $L^*$ would equal $L$; there would be no debt write off. If $\alpha = 1$, as in the insurance plan described above, $L^* = E(L)$. In the case of Mexico under the Brady Plan, $\alpha$ is about .07, or 7\% of total Mexican debt. Thus, the fact that the reduction in Mexico's debt burden under the Brady Plan is so small should not be surprising. Banks were offered little, so they gave little. Under full insurance, banks would be offered a lot, so they would be willing to give a lot.

The superiority of full insurance over the Brady Plan as

\(^{13}\text{This specification assumes all reduction in debt burdens comes in the form of principal reduction, rather than interest rate reduction. In the model of this paper, the two are equivalent.}\)
regards the second criticism -- the future functioning of this market, is clear. As I indicated above, even if the Brady Plan succeeds in easing the existing debt problem, the cost is likely to include a serious reduction in the effective functioning of this credit market in the future. Banks will simply be unable to justify new loans to countries where they have been forced to write off loans in the past, since they must perceive a significant probability they will be forced to do so in the future. The debt write-off eases the countries' problems now, but does nothing to change the incentives they face in this market, or the prospects for future debt reductions.

With complete insurance, not only is the present crisis addressed, but the market will function better in the future. While banks will still have had to write down debt once, they will know, because of the insurance, that they will never have to do so in the future. As far as the banks are concerned, the debt will have become fully enforceable.

The Brady Plan is simply a recognition of reality: something must be done to ease the debt burdens of developing countries, if there is to be any hope for meaningful economic growth for many of them. Unfortunately, the Brady Plan offers too little now, and its long term costs for market participants is too high. Complete international insurance for developing country debt addresses the same reality more completely, and it offers the prospect of an improved market in the future.

This plan represents an improvement over both the current
situation and the Brady Plan in one other important way. Currently, financial markets can suffer from serious spillover effects. Mexico's debt problems in 1982 caused credit to dry up for many debtors who had no foreseeable debt service problems. With insurance, no spillover of financial difficulties from one country to others would occur. This would add great stability to the international financial markets.

V. Conclusion

The purpose of this paper is twofold. First, I have demonstrated that a system of international insurance for developing country debt, which involves a pareto improvement over the existing system, can be devised, and that such a system is theoretically feasible.

The paper touches upon the technical feasibility of such a plan as well. Issues involving the transition to fully insured debt and the source of the premium funds for developing countries have been addressed in some detail. One important issue, however, requires further study. This is the issue of determining appropriate premiums.

The issue of premium determination involves several questions. First, on a purely objective level, it is necessary to calculate a formula that accurately estimates default probability. The role of politics, and how that role could be minimized, in setting premiums must also be analyzed in greater depth than is done here. And finally, the appropriate relation between past payment history
and premiums, to provide sufficient payment incentive, must be considered. These questions are left for future work. However, research into these questions need not start at square one. Important insights are likely to come from the literature on risk-related premiums for deposit insurance (e.g. Merton, 1977), as well as the earlier literature on the question of country default risk (e.g. Fedder and Just, 1977).

Second, in addition to arguing for the desirability of such an insurance scheme, I hope with this paper to stimulate debate about ways to improve the functioning of this market. In the concern for the immediate crisis too little attention, at least at the level of policy formation, has been paid to the inefficiencies inherent in the market as it exists, and how to reduce those inefficiencies. This paper proposes one plan to do just that; if it stimulates other plans, it will have accomplished my objective.

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The Brady Plan has failed to significantly improve the debt crisis for any country. In the context of a model of developing country debt, a plan for international insurance for LDC debt is derived and shown to be pareto superior to the existing situation, as well as to the Brady Plan. The Brady Plan's failure is analyzed in the context of the model of this paper, and it is shown that complete insurance is superior to, but consistent in spirit with, the Brady Plan.
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