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# *The Buyback Boondoggle*

ACROSS Latin America today, countries are experimenting with market-based debt reduction to ease their massive foreign debt burdens. Brazil expects to swap $8 billion of its debt for equity investments during 1988. During the first nine months of 1988, Chile swapped $1.42 billion of its bank debt for equity, and plans to repurchase more debt using reserves. Mexico, which converted roughly $2.5 billion worth of debt during 1986 and 1987, tried unsuccessfully to swap $10 billion in new senior bonds for $20 billion in bank debt in February 1988; a revised plan is said to be in the offing. Many smaller debtor countries are also attempting to restructure their foreign debts. Bolivia repurchased 46 percent of its bank debt last March, and there is now talk of Costa Rica engaging in a buyback.[1]

The danger in the new trend is that when highly indebted countries retire their deeply discounted debt, either through buybacks or "debt-equity" swaps, they may simply be using their scarce resources to subsidize their creditors. Such programs might be valuable as components of efficiency-enhancing larger deals between debtors and creditors. However, highly indebted countries do not benefit if they repurchase debt unilaterally, without receiving concessions. In some instances

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1. For more details on recent transactions, see Peter Truell, "Banks, Latin American Nations Are Fed up with Debt," *Wall Street Journal,* September 22, 1988; Peter Truell, "Chile Buy-Back of Foreign Debt at Discount Set. Plan for Using Its Reserves May Be Copied by Other Latin American Nations," *Wall Street Journal,* September 22, 1988; and Stephen Baker, Jeffrey Ryser, and Elizabeth Weiner, "Deals That Are Making a Dent in Third World Debt," *Business Week* (October 3, 1988).

countries appear to have received such inducements; in others they have not.

There are two reasons why buybacks and debt-equity swaps, which are essentially a combination of buybacks and direct foreign investment, are by themselves a boondoggle benefiting a country's creditors. The first concerns the relation between "average" and "marginal" debt. A country using the market to retire part of its debt in a buyback pays a price equal to the average value of debt. However, the reduction in the value of the country's obligations reflects the marginal value of debt, which, for both sovereign and domestic corporate debt, we argue is less than the average.

The second disadvantage of sovereign buybacks, which does not apply to domestic debt repurchases, derives from the special nature of the "collateral" underpinning sovereign debt. The relation between a debtor's reserves and its future repayments is much more tenuous for countries than for domestic borrowers. When a domestic borrower repurchases debt, it uses assets that otherwise could be seized in the event of default. Using assets that way reduces the gain to bondholders from a buyback and makes the transaction more attractive to the borrower. Because a sovereign's repurchase does not imply the same reduction of lender's collateral, the transaction tips heavily in favor of the lender, and the value of any remaining debt will rise.

Our analysis has no implication for whether the "muddling through" approach to the debt crisis is preferable to the "comprehensive" plans advocated by some economists. We argue only that for a buyback to make sense for a country, it must either receive incremental new loans and grants to cover part of the cost, or else receive some other substantial negotiating concessions from creditors.

## The Bolivian Buyback

The rationale offered for debt buybacks is simple. Debtor countries should take advantage of current fire-sale secondary market prices to retire some of their loans. The discounts available on many countries' debts are enormous, as table 1 illustrates. Several academics have argued that buybacks at market prices can be an efficient way for a debtor

**Table 1. Measures of International Debt, Fifteen Highly Indebted Countries**

| *Country* | *Total debt*[a] *(billions of U.S. dollars)* | *Percent privately held*[b] | *Secondary prices (cents per dollar)* | *Ratio of total debt to GNP* |
|---|---|---|---|---|
| Argentina | 49.4 | 86 | 29.0 | 0.66 |
| Bolivia | 4.6 | 27 | 10.0 | 1.19 |
| Brazil | 114.5 | 76 | 53.0 | 0.41 |
| Chile | 20.5 | 83 | 60.5 | 1.39 |
| Colombia | 15.1 | 49 | 67.0 | 0.47 |
| Ecuador | 9.0 | 70 | 31.0 | 0.84 |
| Ivory Coast | 9.1 | 61 | 30.0 | 1.23 |
| Mexico | 105.0 | 86 | 52.5 | 0.84 |
| Morocco | 17.3 | 32 | 50.0 | 1.27 |
| Nigeria | 27.0 | 55 | 28.5 | 0.46 |
| Peru | 16.7 | 53 | 7.0 | 0.62 |
| Philippines | 29.0 | 61 | 52.0 | 0.94 |
| Uruguay | 3.8 | 80 | 59.5 | 0.63 |
| Venezuela | 33.9 | 99 | 55.0 | 0.71 |
| Yugoslavia | 21.8 | 70 | 45.5 | 0.33 |

Sources: Secondary market bid prices are cents per dollar of government guaranteed debt, as quoted by Salomon Brothers, May 2, 1988; all other data are from World Bank, *World Debt Tables: External Debt of the Developing Countries, 1987–88,* vol. 1, *Analysis and Summary Tables* (World Bank, 1988), p. 14.

a. Total debt is end-1987, except for Bolivia, Ecuador, and Uruguay, which is end-1986.

b. Nonprivate debt consists largely of borrowings from multilateral agencies such as the International Monetary Fund and World Bank, borrowings from national export-import banks, and direct government-to-government loans.

country to allocate its resources, including aid from abroad.[2] Our view is that countries should undertake repurchases only in exchange for significant compensation from their creditors. The novel March 1988 Bolivian buyback illustrates the main issues.

2. See, for example, Paul R. Krugman, "Market-Based Debt Reduction Schemes," Working Paper 2587 (National Bureau of Economic Research, May 1988); Jeffrey Sachs and Harry Huizinga, "U.S. Commercial Banks and the Developing-Country Debt Crisis," *BPEA, 2:1987,* pp. 555–601; and John Williamson, *Voluntary Approaches to Debt Relief* (Washington, D.C.: Institute for International Economics, September 1988). Krugman argues that buybacks transfer wealth from creditors to debtors, and that creditors will benefit only if efficiency gains are large. Sachs and Huizinga (pp. 587–97) contend that Western policymakers should take positive actions to support "debt conversion schemes," including buybacks and debt-equity swaps at secondary market prices, exit bonds, and debt forgiveness. They note that, at present, contractual and regulatory problems sometimes block such transactions. A more skeptical assessment of debt-equity swaps is offered by Rudiger Dornbusch, "Our LDC Debts," in Martin Feldstein, ed., *The United States and the World Economy* (University of Chicago and NBER, 1988), pp. 161–96.

Although Bolivia is three times the combined size of East and West Germany, economically it is small and impoverished. Its GNP is less than one-quarter that of Rhode Island's. Per capita income for Bolivia's 6 million citizens is less than $700, and its foreign bank debt has recently traded at discounts of 90 percent and more. In 1987 Bolivia and its commercial bank lenders reached an innovative agreement allowing Bolivia to repurchase and extinguish debt using money donated by other governments. The agreement allowed each individual creditor to choose whether to participate.[3] An anonymous group of countries, rumored to include the Netherlands, Spain, and some wealthier Latin American nations, donated funds for a buyback. Using the benefactors' money, the Bolivians spent $34 million in March 1988 to buy back $308 million, or 46 percent, of their $670 million in foreign commercial bank debt.[4]

Was the buyback an efficient way for donors to help Bolivia? Viewed in isolation, the deal was primarily of benefit to Bolivia's creditors. It can be justified only if Bolivia undertook it in return for concessions from creditor bankers and official creditors, a possibility we will explore later.

The basic problem with repurchases is that they require heavily indebted countries to pay the average value of debt, or market price, to retire debt on the margin. The marginal value of debt is the benefit to debtors of having the face value of their debt reduced by a dollar. In the case of a country like Bolivia, where average debt is worth so little, the marginal value of debt is almost nothing. Once a country owes more than it is ever likely to repay, a small change in the face value of its obligations has little effect on rescheduling negotiations and on the amount eventually paid out.

Consider again the Bolivian buyback on the assumption that it was a

3. To be allowed to conduct the repurchase, Bolivia had to negotiate with its commercial bank lenders for an amendment to its 1981 and 1983 rescheduling agreements. (The standard contract between a developing country and its bank creditors prohibits the debtor from repurchasing its own debt at discount.) An agreement was reached with the banks' rescheduling committee on February 17, 1987, and made final that July. Creditor banks agreed to allow a one-time repurchase provided that all banks were offered the same deal and that each bank had the right to reject the repurchase offer for all or part of its debt.

4. Actually, of the $308 million in debt repurchased by the Bolivians, $268 million was sold for cash and $40 million was sold for local-currency bonds that can be used to invest in Bolivia. See Peter Truell, "Bolivia Buys Back Nearly Half Its Debt to Banks at a Fraction of the Face Value," *Wall Street Journal,* March 18, 1988, p. 16.

straight market transaction involving no special concessions. The possibility of a repurchase was first discussed shortly after the banks completed the September 1986 Mexican debt restructuring. At that time, Bolivia's private bank debt traded at 6 cents on the dollar, and the total market value of the $670 million it owed banks was $40.2 million. After the March 1988 debt repurchase, its $362 million in remaining debt was selling at 11 cents on the dollar. Total market value: $39.8 million. The $400,000 marginal debt reduction was a mere 1.2 percent of the $34 million buyback cost. This calculation, which must be qualified because of the thinness of the Bolivian debt market,[5] suggests that the repurchase did little to ease Bolivia's debt burden. Even though the face value of debt was almost halved, the total market value of debt fell only 1 percent.

If the total market value of Bolivia's debt was only $40 million before the announcement of the repurchase plan, why did it cost Bolivia $34 million to buy back less than half the face value of its debt? The most natural explanation is that creditor banks recognized that the value of their remaining claims on Bolivia would go up after the repurchase; fewer creditors would remain to divide up more or less the same stream of payments. To induce any creditor to tender its holdings, Bolivia had to offer the expected *post*-repurchase price of 11 cents. Even if selling creditors had been willing to accept the old price of 6 cents on the dollar, or $18.5 million total, the benefit to Bolivia of the marginal debt reduction would still have been only $400,000.

It is possible that something else made the price of Bolivia's debt go up between September 1986 and March 1988. For example, Bolivia ended a severe hyperinflation in early 1986, and the Bolivian economy resumed growth in 1987 after a six-year slump. But not all of Bolivia's economic news has been so good. The prices of major exports such as tin and coca leaves have dropped sharply since 1985. And Argentina first rescheduled and then defaulted on its $500 million debt to Bolivia for

5. For example, while Salomon Brothers' bid price for Bolivian debt was 6 cents on the dollar, their ask price was 8 cents. Furthermore, while some trades in Bolivian debt included arrearages, in some cases the arrearages were traded separately for a penny per dollar of debt principal. Therefore, it may be fairer to say that Bolivia's debt was worth between 6 and 9 cents in September 1986. On the other hand, a weighted portfolio of other highly indebted countries' debt earned a large negative return between September 1986 and March 1988, while our calculations implicitly assume that Bolivia's creditors would have earned a return of zero in comparable other assets. We thank Manuel Mieja, of Merrill Lynch, Bolivia's investment banker, for providing the data used in this note.

**Table 2. Secondary Market Bid Prices of Fifteen Highly Indebted Countries**
Cents per dollar

| *Country* | *August 18, 1986*[a] | *February 20, 1987*[b] | *July 13, 1987*[c] | *April 4, 1988*[d] |
|---|---|---|---|---|
| Argentina | 66.5 | 65.0 | 47.0 | 28.0 |
| Bolivia | 6.0 | 9.0 | 10.0 | 11.0 |
| Brazil | 74.0 | 69.0 | 57.0 | 49.5 |
| Chile | 66.0 | 68.0 | 68.0 | 58.0 |
| Colombia | 84.0 | 86.0 | 81.0 | 65.0 |
| Ecuador | 65.0 | 64.0 | 45.0 | 31.5 |
| Ivory Coast | 75.0 | 77.0 | 60.0 | 30.0 |
| Mexico | 57.0 | 57.0 | 54.0 | 51.0 |
| Morocco | 70.0 | 69.0 | 65.5 | 50.0 |
| Nigeria | 50.0 | 36.0 | 28.0 | 28.5 |
| Peru | 20.0 | 18.0 | 11.0 | 6.0 |
| Philippines | 66.0 | 70.5 | 68.0 | 51.0 |
| Uruguay | 63.0 | 71.0 | 70.0 | 59.5 |
| Venezuela | 74.0 | 75.0 | 69.0 | 54.2 |
| Yugoslavia | 79.0 | 78.0 | 73.0 | 46.5 |

Source: Salomon Brothers, Inc., "Indicative Prices for Less Developed Country Bank Loans," various dates. Prices are cents per dollar of government guaranteed debt.
a. September–October 1986: buyback negotiations begin.
b. February 17, 1987: executed copy of amendment to bank loans signed by Bolivia and Bank of America as coordinating agent.
c. July 1987: final agreement is signed with bank creditors.
d. March 1988: buyback is executed.

natural gas.[6] Perhaps the most compelling evidence that the rise in the price of Bolivian debt was attributable to the repurchase is presented in table 2. As the table demonstrates, the secondary market prices of the debts of *all* the other 14 heavily indebted countries fell between September 1986 and April 1988. Excluding Bolivia, secondary market debt prices fell an average (weighted by amount outstanding) of 30 percent.[7]

The drawbacks of debt repurchases without concessions are clear enough. What of any possible benefits? One commonly argued benefit is

6. See "Pauper Losses," *Economist* (August 27, 1988), p. 69.

7. John Williamson has offered an alternative explanation of our data on the Bolivian price rise. He argues that the secondary market prices for LDC debt should be interpreted as reflecting the beliefs of the most pessimistic banks and that they understate the debt's true value. The buyback caused the price of Bolivian debt to rise, he contends, because it eliminated the most pessimistic banks. See Williamson, *Voluntary Approaches to Debt Relief*, p. 21. If, for example, a country's debt is "really" worth 60 cents, but for some reason no market participant is willing to pay more than 25 cents, then it might possibly (though not necessarily) be worthwhile for the country to take advantage of this "bargain."

that a debt buyback reduces "debt overhang." Debtors anticipate that when their output rises, creditors will be able to bargain for higher repayments, up to the point of full repayment. Thus the debt burden can be a disincentive to investment. Since "debt overhang" cannot be more costly to a country than full debt repayment, as a percentage of GNP it is likely to be very small. For example, full interest servicing of Bolivia's entire $670 million debt to private creditors would have cost less than a week's income per year. Nevertheless, relative to the $34 million paid for the buyback, the debt overhang might be important.

Had the Bolivian debt sold at face value after the repurchase, one might plausibly have argued that the buyback eliminated this disincentive and thereby engendered large efficiency benefits. However, since the secondary market price rose only from 6 cents to 11 cents, and since the disincentive remains until the debt is fully paid off, it is difficult to imagine that the efficiency gains from the buyback were large.[8]

Another possibility is that the Bolivians and their benefactors could have had inside information that the value of the debt they retired at the margin was more than the $34 million they paid, even though the market valued this marginal reduction at only $400,000. Given that the market price of Bolivian debt still stands at roughly 11 cents on the dollar many months after the repurchase, one must conclude that any such inside information has not yet become public.

Viewed in isolation, the Bolivian buyback appears to have been a giveaway to creditors. However, the buyback can be fully justified if it was part of a larger deal in which Bolivia benefited on net. As Jeffrey Sachs has emphasized, "Bolivia was granted an IMF program *despite the fact of growing arrears on its commercial bank debts and despite the fact there was no settlement in sight between the banks and Bolivia.*"[9]

Bolivia's 1986 International Monetary Fund program did indeed mark the first instance in which a country received an IMF package without coming to terms with its private creditors. Bolivia similarly received significant new funding from the World Bank. The 1988 buyback may

8. Even if the debt overhang effect is large, a buyback may still not be the best use of a country's resources. It may well be better to spend the money on domestic investment. See Jeremy Bulow and Kenneth Rogoff, "Sovereign Debt Repurchases: No Cure for Overhang" (Stanford University, October 1988).

9. Jeffrey D. Sachs, "New Approaches to the Latin American Debt Crisis" (Harvard University, September 1988). Emphasis in original.

have been directly linked to the IMF and World Bank packages if, for example, Bolivia promised to spend money on a repurchase in lieu of making significant interest payments to its private creditors. Viewed in context, then, the buyback may have been a necessary concession by Bolivia for which it received more than adequate compensation from its official creditors.

Another possibility, suggested by some of Bolivia's advisers, is that while in form each bank's participation in the buyback was optional, in substance the Bolivians struck a deal in which all creditors will participate equally. These advisers contend that there is an implicit agreement that the rest of Bolivia's debt will be retired at a price very close to 11 cents. If so, the repurchase would be exempt from our criticism, which applies only to voluntary participation plans.

Our main interest here is not in whether Bolivia was adequately compensated for its buyback, although we certainly hope it was. And we most definitely do not intend to criticize the Bolivian government's overall post-1984 economic policy, which has been successful in many key dimensions. The government has tamed one of the century's worst hyperinflations. What we want to emphasize is that the many highly indebted countries now considering buybacks and debt-equity swaps must make sure they receive sufficient compensation from creditors before proceeding with any such plans.

## The Calculus of Sovereign Debt Repurchases

The distinction between the average and marginal value of debt does not in itself explain why bond repurchases can be bad for debtor countries. After all, the same average-marginal distinction applies to conventional corporate borrowers who sometimes make business decisions to reduce debt. It is the unique characteristics of sovereign debt that make buybacks of deeply discounted debt an exceptionally bad deal for a country.

Sovereign debt is not supported by collateral in the usual sense. Creditors cannot seize all of a country's productive resources in the event of a default, as they can those of a domestic corporation. What creditors can do is threaten a country with cutoffs of trade credits and with other measures that will reduce the country's gains from trade in

goods and capital markets.[10] Essentially, the creditors' collateral derives from their ability to ransom these gains from trade in exchange for repayments. As a consequence, sovereign debt repayments are related only tenuously to a country's available resources. For every dollar that a troubled debtor's income rises, creditors are able to bargain for only a fraction of a dollar in higher repayments, and that fraction is unlikely to be affected significantly by changes in the face value of debt outstanding.[11] In the current debt crisis, for example, no country has been compelled to divert more than 5 percent of its income to debt service over any extended period. By contrast, if a domestic corporation defaults on its debt, creditors will have a claim on 100 percent of its assets.

As we will show in our formal analysis, this difference crucially affects the calculus of sovereign debt buybacks. When a corporation spends resources on a buyback, it is using assets that otherwise would go to creditors in the event of default. Most of the resources that a country uses for a buyback would otherwise go for domestic consumption and investment.

## A SIMPLE MODEL OF BUYBACKS: THE EXTREME SOVEREIGN CASE

We consider the case of a small sovereign debtor whose objective is to maximize the expected value of its consumption. To make buybacks look as good as possible, we assume that the country's only marginal investment alternative is to hold reserves for consumption. Since in this case there are no efficiency costs to a buyback, the sole issue for the country is whether the buyback raises or lowers the present value of its debt repayments. Allowing for investment inefficiencies, as in a debt overhang model, only *strengthens* our case. When the country has

10. An alternative view is that LDCs make repayments on their debts to preserve their reputation for repayment, and thereby their ability to borrow again in the future. Thus it may be in an LDC's interest to pay more even if creditors have no direct ability to punish it. For a critical assessment of this view, see Jeremy Bulow and Kenneth Rogoff, "Sovereign Debt: Is to Forgive to Forget?" *American Economic Review*, vol. 79 (forthcoming, 1989).

11. For a formal bargaining-theoretic analysis of LDC debt reschedulings, see Jeremy Bulow and Kenneth Rogoff, "A Constant Recontracting Model of Sovereign Debt," *Journal of Political Economy*, vol. 97 (forthcoming, 1989).

investments that are superior to holding reserves, buybacks look less attractive.[12]

For simplicity, we begin by analyzing the case where repayments are independent of reserves.[13] The country has investments that return $\tilde{I}$, where $\tilde{I}$ is a nonnegative random variable. Bondholders have a claim of $D$ that comes due as soon as $\tilde{I}$ is realized. However, the most they can force the country to pay is $q\tilde{I}$, where $0 < q \leq 1$. The market value of the debt, $v(D)$, is then given by

$$v(D) = E[\min(D, q\tilde{I})]. \tag{1}$$

We define the probability that $q\tilde{I}$ will be less than $D$ as $F(D)$, which is the probability of default. We assume that $F(D) > 0$, so that the bonds trade at less than face value.[14]

An increase of one dollar in the face value of total debt increases the market value by the marginal value of debt, $v'(D) = 1 - F(D)$; it affects the receipts of creditors only in those cases where the country does not default. The average value of debt is $v(D)/D$, the total market value of the country's debt divided by total debt outstanding. The average value of debt reflects not only those cases in which the country pays in full, but also what creditors receive when the country pays back only in part. Therefore, the average value of debt exceeds the marginal value; for most of the highly indebted countries, the excess is likely to be great.

Suppose that the country spends $C$ dollars to repurchase part of its debt. As noted above, the country must offer a high enough price so that creditors who sell will be at least as well off as those who do not. Thus, in equilibrium $C$ dollars in cash can be exchanged for $X$ dollars in the face value of bonds, where

$$C/X = v(D - X)/(D - X). \tag{2}$$

Tendering bondholders are being repaid at a price of $C/X$ per dollar of debt exchanged. They must be indifferent between selling and being one

12. For a technical analysis of the more general case, see Bulow and Rogoff, "Sovereign Debt Repurchases: No Cure for Overhang."

13. Indeed, by maintaining a high level of reserves, a debtor country can mitigate the costs of being cut off from trade credits, and thereby improve its bargaining position. This argument is cogently stated in Stephen A. O'Connell, "A Bargaining Theory of International Reserves" (University of Pennsylvania, April 1988).

14. If the bonds are coming due in the future the analysis is identical, but all the variables must be interpreted as present values, discounted at the riskless rate.

of the remaining $D - X$ bondholders, who are left splitting a claim of $v(D - X)$.

Because the marginal value of debt is less than the average value, we have

$$v(D - X)/(D - X) > v(D)/D. \tag{3}$$

That is, repurchases push up the price of remaining debt. Because the repurchase is a purely financial transaction with no efficiency gains or losses and because the repurchase makes bondholders better off, the country must come out behind.

Although we have not taken into account the possible risk-sharing features of sovereign debt contracts, they would make the transaction still less appealing. When the face value of the debtor country's debt is reduced, the country benefits only in very good circumstances, when its output and gains from trade are high and when creditors have enough bargaining power to enforce full repayment. In bad circumstances, the country gains nothing: it pays no less than it would if the face value of its debt were higher.[15]

## BUYBACKS: THE GENERAL CASE

Until now we have assumed that the maximum repayments creditors can extract is $q\tilde{I}$, where $\tilde{I}$ is the country's investment income. Now suppose that repayments are tied to the country's total disposable income, so that if the country has $R$ dollars of income *not* devoted to risky investment, maximum repayments will be $q(R + \tilde{I})$. The variable $R$ includes both current consumption and reserves held for future consumption. Then the value of bondholders' claims is given by

$$v(D) = E\{\min[D, q(R + \tilde{I})]\}. \tag{4}$$

By spending a dollar of reserves on a debt repurchase, the country can lower the face value of its debt by $D/v(D)$, which is the inverse of the market price. A one dollar reduction in the face value of the country's debt lowers its market value by $v'(D)$. Thus a dollar spent on a debt

15. We are implicitly assuming that the country is more risk averse than its international lenders. Presumably, international investors can diversify against the country's productive uncertainty in world capital markets.

repurchase lowers future expected payments by the ratio of the marginal value of debt to the average value of debt, $Dv'(D)/v(D) < 1$. However, although the benefit of the repurchase is less than one dollar, so too is the true cost. When a country defaults, which occurs with probability $F(D)$, creditors in effect pay for a fraction $q$ of the repurchase. Since $F(D) = 1 - v'(D)$, creditors pay $q[1 - v'(D)]$; the cost to the country is thus

$$1 - q[1 - v'(D)] < 1. \tag{5}$$

Comparing the cost and benefit reveals that a small repurchase hurts a sovereign debtor if

$$1 - q[1 - v'(D)] > Dv'(D)/v(D). \tag{6}$$

For large buybacks the analysis is somewhat more complex, but expression 6, evaluated at the post-buyback values of marginal and average debt, is a sufficient condition for repurchases to be unprofitable.

If a country were like a corporation, and all its assets could be seized in the event of default, then $q$ would equal one.[16] In the corporate case, expression 6 implies that debt buybacks are *always* good for the debtor and bad for the bondholders.[17] At the other extreme, if repayments are independent of reserves, then buybacks are never profitable. This is, of course, the simple special case we analyzed above.

Clearly, buybacks can work for debtor nations only if $q$ has a sufficiently high value. We will argue in the next section that $q$ cannot possibly be large enough for any of today's debtors to make buybacks worthwhile.

16. Debt buybacks have been analyzed for the case where $q = 1$ in two interesting recent papers, both written independently of this paper. See Krugman, "Market-Based Debt Reduction Schemes," and Kenneth A. Froot, "Buybacks, Exit Bonds, and the Optimality of Debt and Liquidity Relief," Working Paper 2675 (National Bureau of Economic Research, August 1988). Both authors restrict their attention to the $q = 1$ case, which is why their conclusions regarding the desirability of sovereign debt repurchases differ sharply from ours.

17. Our finding that buybacks are always good for the country in the $q = 1$, or "corporate," case is a consequence of our assumption that the only alternative investment is holding reserves. If the country has risky investment opportunities, then buybacks can be bad for borrowers even in the corporate case.

## Quantifying $q$

Although direct estimates of $q$ are not possible, some rough bounds can be obtained by looking at how much private creditors have actually been able to get out of debtor countries since the debt crisis began. Table 3 shows, for each debtor country, the number of years between 1980 and 1986 in which net repayments to private creditors exceeded 1 percent of GNP. Net repayments include interest payments plus principal repayments minus so-called new money loans.[18] The table also gives the ratio of average net repayments to GNP and to exports for these relatively high-payment years. Thus even if one restricts attention to peak repayment years, no highly indebted country has been averaging payments of as much as 5 percent of GNP, or 23 percent of exports. These relatively low numbers indicate that the collection of commercial bank debt can be difficult even when the entire face value of private debt equals only a few months GNP. (This is especially true for less-developed debtors such as Bolivia and Peru; see table 1.)

Ideally, $q$ should measure how much repayments rise with a dollar increase in a country's net income. If the country's best alternative investment to buybacks increases GNP and repayments proportionately, then the numbers in the second column suggest an upper bound to $q$ of 0.05. The upper bound on $q$ is higher if one assumes that marginal investment increases the country's gains from trade (and therefore willingness to pay) by a much larger percentage than it increases GNP. For example, suppose repayments are proportional to exports and that the marginal investment increases exports by one dollar for every dollar increase in GNP. Then $q$ could be as high as some of the numbers in the third column—maybe 0.15 to 0.20.

Armed with estimates of $q$, secondary market prices, and the critical buyback condition, expression 6, we are now able to evaluate whether buybacks are likely to be profitable for highly indebted countries. Setting $q$ equal to 0.05, and the market price of debt $v(D)/D$ equal to 0.5,

18. New money loans are funds the banks relend to cover a portion of interest repayments. The Latin Americans refer to these as "fresh money" loans; everyone understands full well that the funds are in fact rather stale.

**Table 3. Peak Net Repayment-GNP and Net Repayment-Export Ratios, Fifteen Highly Indebted Countries, 1980–86[a]**

| Country | *Years with peak net repayments (greater than 1 percent of GNP)* (1) | *Average net repayment-GNP ratio in peak payment years* (2) | *Average net repayment-export ratio in peak payment years* (3) |
|---|---|---|---|
| Argentina | 2 | 0.029 | 0.224 |
| Bolivia | 3 | 0.040 | 0.126 |
| Brazil | 2 | 0.018 | 0.163 |
| Chile | 3 | 0.027 | 0.091 |
| Colombia | 0 | . . . | . . . |
| Ecuador | 4 | 0.033 | 0.120 |
| Ivory Coast | 4 | 0.047 | 0.104 |
| Mexico | 4 | 0.039 | 0.200 |
| Morocco | 4 | 0.025 | 0.107 |
| Nigeria | 3 | 0.020 | 0.124 |
| Peru | 2 | 0.018 | 0.084 |
| Philippines | 0 | . . . | . . . |
| Uruguay | 3 | 0.040 | 0.136 |
| Venezuela | 4 | 0.042 | 0.143 |
| Yugoslavia | 1 | 0.018 | 0.066 |
| All combined | 3 | 0.021 | 0.110 |

Source: World Bank, *World Debt Tables, 1987–1988*, vol. 2, *Country Tables* (World Bank, 1988).
a. Net repayments, or net transfers, equal principal repayments plus interest repayments, minus new loans.

expression 6 implies that buybacks can benefit the debtor only if $v'(D)$ is greater than 0.487. What does this mean? If expected repayments are 50 cents on the dollar, and the probability of full repayment $v'(D)$ is 0.487, the debtor is effectively expected to repay either in full or not at all. This seems wholly inconsistent with the consensus expectation that the debtors will repay some but not all of their borrowings. This calculation is essentially the same using any of the secondary market prices in table 1.

We are not suggesting that these low values of $q$ imply that the burden of these debts is minor. Net repayments of several percent of GNP are clearly painful for many Latin American debtors. A low value of $q$ *does* imply that these countries have better uses for their money than buybacks.

One can condemn buybacks even with much higher values of $q$.

Suppose $q$ has an unrealistically high value of 1/3: *none* of the 15 debtor countries has made payments of as much as a third of exports in any single year in this decade.[19] Then if $v(D)/D$ equals 0.5, $v'(D)$ would have to be greater than or equal to 0.4. This is still implausibly close to the all or nothing case. It is worth repeating that the case against buybacks becomes still stronger if the overhang of foreign debt reduces investment in the debtor countries.

So far we have assumed that the country's only debt is bank debt. What if borrowings from official creditors, including multilateral lending organizations and individual foreign governments and their agencies, are considered as another class of obligations? If we assume that private debt is $D$ and official debt is $G$, then expression 6 must be rewritten as

$$1 - q[1 - v'(D + G)] > v'(D + G)/P, \tag{7}$$

where $P$ is the market price of the debt to be repurchased. Note that $v'(D + G)$ is the probability of *all* debt being repaid, including both public and private.

Applying expression 7 requires reestimating $q$ to include net repayments to official creditors, a calculation that suggests a still lower value of $q$. As table 4 shows, official creditors have not received net repayments, or net transfers, on most debt owed by the highly indebted countries. On the contrary, between 1983 and 1986, official multilateral creditors lent them $1.39 for every dollar they repaid. That explains why such loans have good repayment records.

These numbers do not square with the official view that obligations to the IMF and the World Bank are senior claims. If anything, it is probably more appropriate to think of a debtor country's outstanding World Bank and IMF debts as a measure of past foreign aid from those agencies.

## Debt-Equity Swaps

Our analysis of debt repurchases can be directly applied to debt-equity swaps, which have been widely publicized and are being used on

19. See World Bank, *World Debt Tables: External Debt of Developing Countries, 1987–1988* (World Bank, 1988).

**Table 4. Capital Flows from Highly Indebted Countries, by Type of Creditor, 1983–86**
Billions of dollars, except where noted

| Item | Official | | Private |
|---|---|---|---|
| | *Multilateral* | *Bilateral* | |
| 1. Interest payments | 9,535 | 6,495 | 78,059 |
| 2. Principal repayments | 9,597 | 10,652 | 32,586 |
| 3. Total payments | 19,132 | 17,148 | 110,645 |
| 4. *Less:* New money loans | 26,374 | 15,933 | 62,800 |
| 5. Net transfers from highly indebted countries | −7,242 | 1,215 | 47,845 |
| 6. New money as percentage of total payments (4 ÷ 3) | 139 | 93 | 57 |

Source: World Bank, *World Debt Tables, First Supplement*, pp. 30–31.

a growing scale by many of the major debtors.[20] In a debt-equity swap, a country agrees to exchange local currency for bank debt, with the stipulation that the currency be used for direct foreign investment in the debtor country. Typically, a bank sells its debt in the secondary market to a foreign company that conducts the swap and acquires the physical investment plant in the debtor country.

Much of the controversy surrounding debt-equity swaps stems from concern that debtor countries are paying well above secondary market prices to repurchase debt. For example, in early 1988, Brazil was paying 73 cents worth of cruzados for each dollar face amount of debt. Since the debt has a market value of 50 cents, the country appears to be leaving 23 cents "on the table." But this concern is misplaced: the debtor has many ways to recapture the surplus. The discounts are often inflated by the use of official exchange rates. Also, important explicit restrictions are typically imposed on equity obtained through debt-equity swaps.

20. Among the countries that have initiated debt-equity swap programs are Brazil, Chile, Costa Rica, Ecuador, Mexico, the Philippines, and Venezuela. From the beginning of 1984 through September 1987, such countries converted into equity roughly $6 billion in bank debt, or 3 percent of the group's total bank debt; see Klaus P. Regling, "New Financing Approaches in the Debt Strategy," *Finance and Development* (March 1988), pp. 6–9; and Michael Blackwell and Simon Nocera, "The Impact of Debt to Equity Conversion," *Finance and Development* (June 1988). Debt-equity conversions are proceeding even faster during 1988. Roughly $20 billion of Latin America's $350 billion bank debt is undergoing debt reduction programs this year, involving primarily debt-equity swaps; see Truell, "Banks, Latin American Nations Are Fed up with Debt."

For example, the investor is usually explicitly prohibited from repatriating any earnings for an extended period, and is often required to invest in certain industries or in certain regions of the country.[21]

The real problem with debt-equity swaps is that they are *never* the best way for a debtor country to attract direct foreign investment. Any debt-equity swap can be broken into two components. First, a company buys some of a country's bank debt on the secondary market. Second, it takes the debt and trades it for physical assets in the country. This combination of transactions is exactly equivalent to the following alternative set of transactions. First, the country sells assets to the company for cash through a conventional program of direct investment. Second, the country uses the money to retire debt at its average value.[22] The second transaction is definitely unattractive for the debtor, and it does not need to undertake the second transaction to undertake the first. The outcome in both cases is the same. A debt-equity swap is simply the sum of a conventional direct foreign investment and a marginal purchase of debt at average debt prices. The second transaction is unprofitable for the country. Therefore, conventional direct foreign investment dominates debt-equity swaps.

## "DEBT FOR DO-GOOD" SWAPS

An interesting application of our debt-equity swap principle is the recent "debt for nature" and "debt for development" swaps. Conservation groups have repurchased the deeply discounted debt of countries such as Bolivia and the Philippines, and have swapped it for promises of nature preservation programs. Nigeria was able to retire some debt in return for undertaking more family planning projects. While these projects themselves are desirable, the logic of the above discussion still applies. The countries would gain more if they were paid in cash rather than in bonds of equal market value. Of course, the same logic applies to the "debt for do-bad" swap offer of the Colombian drug lords to buy back their country's debt in return for immunity from prosecution.

21. See Paul Kling, ed., "Global Debt: The Equity Solution," *Euromoney and Corporate Finance* (Supplement, January 1988).

22. Both the country and the company will pay the same secondary market price, provided that when the company is the buyer, investors anticipate that the debt will be retired by a debt-equity swap.

## BUYBACKS AND DEBT-EQUITY SWAPS AS PART OF LARGER PLANS

Whereas debtor countries should not actively seek to make debt-equity swaps, it can make sense for them to agree to such swaps in return for concessions by creditors. Some (though far from all) of the major players in the debt negotiations seem well aware of this point. For example, the debt restructuring plan proposed by President Alfonsin of Argentina specifically offers debt-equity swaps and macroeconomic restructurings as concessions to creditors. In return, the Alfonsin plan calls for reduced interest on existing loans and for new loans that will exceed the revised interest payments.[23] In its current (November 1988) debt rescheduling, "Argentine negotiators in New York are resisting the demands of their major creditor banks, which want the country to accept large provisions for debt-equity swaps . . . as part of a prospective debt settlement."[24]

John Reed, chairman of Citicorp, has been a strong supporter of debt-equity swaps as a preferred means for countries to deal with their debt problems. He has not suggested any compensating concessions from the banks, a position fully consistent with his belief that the debtor countries' long-run best interest is to pay more.[25] Similarly, Horst Schulman, managing director of the Institute of International Finance, a lobbying group representing 183 banks from 38 nations, has singled out debt-equity swaps as the "most satisfactory of these schemes to date."[26]

Some important potential benefactors of the debtor countries may also be aware of these issues. The Miyazawa plan, first proposed by Japan at the Toronto economic summit in June 1988, implicitly attempts to finesse the marginal-average problem.[27] Miyazawa would require

23. See "Debt Plan Scorecard," in *International Economy* (July–August 1988), pp. 104–05.

24. See Peter Truell, "Brazil Completes Debt Pact with Banks; Argentina Resisting Creditors' Demands," *Wall Street Journal*, November 3, 1988.

25. See Eric N. Berg, "U.S. Banks Swap Latin Debt," *New York Times*, September 11, 1986; and Peter Truell, "Citicorp's Reed Takes Firm Stance on Third-World Debt," *Wall Street Journal*, February 4, 1987.

26. See Truell, "Banks, Latin American Nations Are Fed up with Debt."

27. See "Any Interest from Debtors?" *Economist* (August 6, 1988), pp. 62–63; and

countries to submit to IMF conditionality programs and use cash from reserves and sales of foreign assets to securitize part of their loans. In return, official creditors would increase their lending and banks would be required to lower or possibly even forgive interest payments on the debt for up to five years.

The securitization essentially amounts to repurchasing some debt at par—and therefore provides a substantial benefit to creditors. However, by capping debtor countries' net outflows below recent levels, the plan circumvents the marginal-average problem by providing benefits even to countries that may not end up repaying their entire debt. Thus the plan avoids the pitfalls of voluntary buybacks that benefit creditors without requiring them to make any concessions.

## Buybacks with Senior Debt: the Mexican Repurchase

If countries could pay marginal instead of average debt value for repurchases, then, as expression 6 shows, a buyback would be at least a fair deal for a country even in the extreme case where repayments are independent of reserves. Are there any financial engineering gimmicks a country can use to pay less for repurchases? The answer would be yes, were it only possible to enrich the seniority structure of the debtor's obligations. The February 1988 Mexican repurchase illustrates the general issues.

Mexico's plan was to issue $10 billion in new bonds, and then auction off the bonds for bank debt. The bonds were to be partially collateralized by U.S. Treasury bonds, which Mexico would purchase out of its own reserves. Also, Mexico implied that the new bonds would be treated as senior to existing bank debt. Thus, Mexico's plan was really a package deal with two components. One component involved the use of Mexican reserves to buy back debts, thereby benefiting the banks. The second component involved taking seniority rights, originally held equally by all debt holders, and giving them to creditors willing to reduce the face value of their claims, with the reduction in outstanding debt benefiting

Walter S. Mossberg, "Japanese Proposal on Third World Debt Disturbs the Peace at Economic Summit," *Wall Street Journal*, June 21, 1988.

the country. Before evaluating the outcome of the Mexican deal, we first consider the theory underlying this type of exchange.

## CREATING A NEW CLASS OF SENIOR DEBT: THE ANALYTICS

Again assume that a country has a debt with face value of $D$ and market value of $v(D)$. For simplicity, assume that repayments are independent of reserves. The country wishes to exchange some cash $C$ and some new first priority bonds with face value $N$ for old bonds with a larger face value, $X$. On net, the face value of the country's debt will be reduced by $X - N$. Assuming that the country is unwilling to pay more than the marginal value of debt to extinguish its obligations, and that creditors will agree to any scheme as long as they "come out whole"—that is, no creditor is made worse off, including those that do not participate in the swap—what set of transactions is available to the country?

First, if bondholders who exchange their debt are to break even, then

$$[C + v(N)]/X = v(D)/D. \tag{8}$$

That is, the bondholders who participate in the exchange will give up $X$ bonds for cash worth $C$ and first priority bonds worth $v(N)$. The value they receive per bond must be equal to the pre-exchange bond price of $v(D)/D$.

Second, bondholders who do not exchange their debt must also break even:

$$[v(D + N - X) - v(N)]/(D - X) = v(D)/D. \tag{9}$$

The left-hand side of equation 9 represents the total value of junior bondholders' claims after the exchange, divided by the number of junior (unexchanged) bonds.

If the value of marginal debt, $v'(D)$, is strictly decreasing, then choosing any one of $C$, $N$, and $X$ uniquely determines the other two. But even if not, there is a unique relation between $C$ and the amount of debt extinguished, $X - N$, which comes from the assumption that no bondholder is made worse off:

$$C = v(D) - v(D + N - X). \tag{10}$$

Equation 10 confirms that because all bondholders are coming out

exactly even, the country is managing to pay exactly the marginal value of debt in the repurchase.

However, there is a limit to how large a repurchase can be executed in this fashion. It is easy to show in solving equations 8 and 9 that $d(X - N)/dX \geq 0$ for $X \leq D$. Thus the largest possible net reduction will occur when $X = D$; that is, when all bondholders opt to exchange.

Taking the limit of equation 9 as $X$ goes to $D$ yields

$$v'(N) = v(D)/D. \tag{11}$$

Thus the largest feasible voluntary exchange offer will reduce debt by just enough so that the *post-exchange* value of marginal debt equals the *pre-exchange* value of average debt. Larger exchanges are possible only if the country is willing to pay more than the reduction in the market value of its debt.

## THE MEXICAN EXPERIENCE

Mexico's original goal was to reduce its debt roughly $10 billion in return for an expenditure of roughly $1.8 billion in reserves (the cost of purchasing the U.S. Treasury bond collateral). However, although the plan was heralded by some experts, it was greeted skeptically by the market.[28] As table 5 shows, the Mexicans managed to reduce their debt only $1.38 billion at a cost in reserves of $480 million. The deal achieved only about a seventh of its goal in debt reduction at twice the desired price per dollar.

Why did the deal flop? The key reason appears to be that investors did not believe Mexico's promise to treat the new bonds as senior. The seniority problem is a fundamental one in sovereign debt contracts and not peculiar to the Mexican repurchase. In the case of corporate debt, senior creditors ultimately have the threat of liquidating the firm and claiming first rights to the proceeds. This protects them from being asked to make concessions in rescheduling negotiations. In the international context, senior creditors have no similar option. The most any group of creditors can threaten to do in the event of nonrepayment is to interfere with the country's trade in the international goods markets and capital markets and to lobby their home governments for further assistance.

28. For a favorable assessment of the plan, see Jeffrey D. Sachs, "Mexico Plan a Model for Other Debtors," *Wall Street Journal,* January 19, 1988.

**Table 5. The Mexican Debt Repurchase**
Billions of dollars, except where noted

| *Components of repurchase* | *Amount* |
|---|---|
| 1. Loans retired through swap | 3.67 |
| 2. *Less:* Newly issued bonds | 2.56 |
| 3. *Less:* Adjustment for increased interest rate on bonds | 0.21 |
| 4. *Add:* Portion guaranteed by U.S. securities | 0.48 |
| 5. *Equals:* Reduction in Mexican-guaranteed debt | 1.38 |
| 6. Expenditure of Mexican reserves for U.S. securities | 0.48 |
| 7. **Expenditure as fraction of debt reduction (6 ÷ 5)** | **0.35** |
| 8. Market value of retired debt[a] | 1.87 |
| 9. Market value of new Mexican-guaranteed component (8 − 4) | 1.39 |
| 10. Value of Mexican component discounted at riskless rate (LIBOR) | 2.50 |
| 11. **Price of Mexican component as fraction of riskless price (9 ÷ 10)** | **0.56** |

Source: Jeffrey D. Sachs, "Mexico Plan a Model for Other Debtors," *Wall Street Journal*, January 19, 1988.
a. Secondary market bid price of 52 cents per dollar of government guaranteed debt times $3.67 billion debt retired.

Suppose first that junior creditors are allowed to impose the same sanctions as senior creditors. Then, if senior creditors are ever being paid more than junior creditors, the junior creditors can threaten to invoke sanctions. Once the sanctions are invoked, the debtor country might just as well stop payments on the senior debt. So senior creditors would not really have any bargaining advantage over junior creditors. At the opposite extreme, suppose junior creditors have no legal or political rights to impose sanctions. Then the country will pay nothing on the junior loans and they will be worthless. While theoretically it may be possible to create a sizable quantity of senior debt without stripping junior loans of their rights entirely, such contracts have not yet become prominent in international markets.

Our calculations in table 5 indicate that the market felt that the new senior bonds were worth more, but only a little more, than Mexican bank debt. Given that so few bonds were actually issued, the bonds may well be ignored in future reschedulings and thus turn out to be a good deal for their buyers. But if such bonds ever become a significant fraction of outstanding debts, there will be great pressure from the country and the banks to push the bondholders into renegotiations. During the 1930s, virtually all sovereign debt was bond debt, but that did not stop a wave of defaults and rescheduling agreements.[29]

29. The negotiations between debtors and foreign bondholders committees in the 1930s

THE EFFICACY OF MEXICAN-STYLE DEBT PLANS

If new bonds cannot be made senior, then a plan such as the Mexican exchange becomes simply a combination of two transactions: a meaningless swap of old Mexican-guaranteed paper for identical new Mexican-guaranteed paper and an additional swap of some old Mexican paper for cash.[30] The effect for Mexico is exactly the same as if it used its reserves to make a straight debt repurchase. That is, it is something they can benefit from only if their creditors adequately compensate them for doing it.

## Conclusion

Highly indebted countries should not rush to spend their resources on debt repurchases. In a buyback, marginal debt is repurchased at average debt prices. Furthermore, because the fraction of a country's resources that can be extracted in the event of a default is relatively small, a buyback is a much less attractive transaction for a sovereign than for a domestic borrower. Buybacks can be justified only if the country negotiates substantial concessions or compensation for undertaking the repurchase. Debt-equity swaps, which are simply combinations of direct foreign investment and debt repurchases, are bad for the same reason as buybacks.

If countries could issue new classes of debt that the market would accept as senior to existing debt, then buybacks might be a reasonable use of a debtor country's scarce resources. However, as Mexico's experience shows, the market is unlikely to view such seniority promises as credible.

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were in many respects similar to today's rescheduling negotiations; see Edwin M. Borchard and W. H. Wynne, *State Insolvency and Foreign Bondholders,* volume II (Yale University Press, 1951); and Barry Eichengreen and Richard Portes, "Settling Defaults in the Era of Bond Finance," Discussion Paper 272 (Centre for Economic Policy Research, September 1988).

30. There is scope for a break-even debt reduction deal even if the new bonds can be given only limited seniority. However, using an analysis similar to that employed in deriving equation 10, one can easily show that the country cannot reduce its total debt as much with limited seniority as with absolute seniority.

Obviously, in negotiating with creditors, it is better for a debtor country to agree to buy back debt at 30 cents on the dollar than to use the same resources to pay interest, which amounts to buying back debt at face value. Countries should recognize, however, that diverting resources from consumption and investment and into debt reduction represents a concession to creditors.

Not all debt restructuring plans are bad for debtor countries. In particular, large-scale negotiations between debtors and creditors may well yield benefits to both sides. But it is inadvisable for countries to try to buy out some of their creditors unilaterally through voluntary swaps and buybacks.