JEREMY BULOW
Stanford University

KENNETH ROGOFF
University of California at Berkeley

AFONSO S. BEVILAQUA
University of California at Berkeley

Official Creditor Seniority and Burden-Sharing in the Former Soviet Bloc

THE COLLAPSE of the Soviet empire has created an unprecedented opportunity for political and economic reform in Eastern Europe and the former Soviet Union (FSU). In response, the Group of Seven industrialized democracies (G-7) has asked the two main international financial institutions (IFIs)—the World Bank and the International Monetary Fund (IMF)—to assume a leadership role in providing loans to the region. (Private capital flows are expected to be relatively small.) Current estimates suggest that the IFIs may be responsible for close to half of overall planned aid to the FSU. Recently, the IMF announced plans to lend $25 billion to $30 billion to the FSU over the next four years; the World Bank is expected to pitch in an additional $12 billion to $15 billion.[1]

With the great technical expertise of their staffs, the IFIs should play

1. Steven Greenhouse, "$44 Billion Needed to Aid Ex-Soviets in 1992, IMF Says," *New York Times*, April 16, 1992, p. 1.

a major role in developing structural reform programs in the countries of the former Soviet bloc. However, that role is a separate issue from the form in which aid to the region should be provided. Would nonconcessional IFI loans be best—or would conditional grants be better?

Perhaps the most straightforward rationale for relying so heavily on IFI loans is that the IFIs are generally thought of as being senior to other creditors, at least in the traditional sense that debtors give preference to IFIs in allocating debt repayments. Because IFI loans are likely to be substantially repaid, the loans cost the donors relatively little and at the same time provide a good way for the donor countries to leverage their aid. That is, IFI loans may provide a great deal of money now at little cost in present value to donors. An added benefit of using IFI loans as a conduit for aid is that they appear to provide a simple mechanism for equitably dividing costs among donor nations; an industrialized country's IMF and World Bank quotas are closely related to its share of world output, and its quotas in turn provide the basis for its share of assistance.

A considerable part of our paper is devoted to asking whether official loans, especially IFI loans, truly are senior debt and, if so, in what sense. This is a central issue in our burden-sharing calculations and our question about whether IFI loans are the best way to leverage aid to Russia and other former Soviet bloc countries. Moreover, the seniority question has broader implications for the general structure of development assistance.

We begin by showing that the burden-sharing implications of IFI loans to the FSU are likely to bear little resemblance to countries' quotas in the World Bank and the IMF. In particular, Germany is likely to bear a far greater burden, compared to the United States, than the two nations' IFI quota shares would suggest. Germany's problem is that it holds a far greater stake in the existing $70 billion debt of the FSU.

Let us assume a conventional "me-first" model of seniority in which the relative seniority of different creditors does not affect expected repayments. Then the total cost of each dollar in new loans to the FSU is equal to one minus the marginal value of debt. (The marginal value of debt is the increase in total expected repayments to creditors when a country's debt rises by one dollar.) Our empirical analysis indicates that creditors as a whole would lose on the order of 90 cents for each dollar of new IFI loans they extend to the republic of Russia.

In the event that IFI debt truly is senior, Germany, which holds 43 percent of existing FSU debt, would bear a disproportionately huge share of this cost—even though its IMF quota is only one-third that of the United States. The cost to the United States, which holds very little debt of the FSU, would be negligible.

In fact, we doubt that IFI loans are senior in the conventional sense; both our theoretical bargaining analysis and our empirical work suggest that official loans are better thought of as receiving equal priority with private loans. Even in this case, a new IMF loan would still cost Germany far more than the United States as a percentage of GDP: in absolute terms, the costs would be about equal. Only if the aid package were structured so that a large fraction of any receipts were used to pay old debts would the United States bear the brunt of new loans. In that case, Germany's benefit might exceed its contribution.

The second part of the paper explores the general issue of the seniority of debt held by official creditors (the IFIs and governments). We start by examining the net repayment records of official and private creditors in severely indebted middle-income countries during the debt crisis. We find that private creditors have been much more successful in extracting cash than official creditors—except for the IMF, which does equally well. However, this evidence is not decisive because there is no direct measure of the loss official creditors are expected to take on their increased exposure.

We develop a more direct test of whether official creditors as a group are senior (in the conventional "me-first" sense) by estimating the effect of the share of debt held by official creditors on the price of private debt. Because official creditors sometimes voluntarily extend extra loans to problem debtors, we use an instrumental variables estimation technique. We construct an instrument for the share of official debt, based on the relative currency appreciation of a country's official and private debts. One cannot reject the hypothesis that official creditors as a group receive equal priority with private creditors.

But even if official creditors as a group are not senior, it is clear that the IFIs must be preferred creditors in some sense. After all, in recent years the IMF has managed to extract significant net repayments from even the most depressed parts of the world—including $4 billion from Sub-Saharan Africa from 1985 to 1990—when many of these countries paid little or nothing to private creditors. We contend, however, that

even if the IFIs always get repaid (in an accounting sense), this does not necessarily imply that they are senior in a sense that would be costly to private creditors and debtor countries. Rather, any ability IFIs have to extract repayments ahead of private creditors may come almost entirely at the expense of bilateral government creditors.

To illustrate this idea, we develop a simple bargaining model of sovereign debt in which negotiations occur among debtor countries and multilateral, bilateral, and private creditors. The multilateral institutions have "me-first" seniority; thus any agreement that gives the other creditors money must involve full repayment of the multilaterals. However, the bilateral leaders share interests with the multilaterals because the same industrialized-country political leaders who control the bilaterals have enormous sway over multilateral policy. Our bargaining model implies that while the multilaterals may indeed be repaid first, most of the funds effectively come out of the pockets of the bilaterals, rather than the debtor country or private creditors. In the extreme case in which the interests of the multilaterals and the bilaterals are perfectly aligned, multilateral seniority is irrelevant.

We show that our model appears to apply quite closely to the situation of many aid recipients. In a very significant number of cases, the IFIs have been repaid not by borrowers, but by other official creditors. The implication is that private creditors have little to fear from IFI seniority.

Finally, we touch on the issue of whether the IFIs might be filling in missing international loan markets because they possess a superior enforcement technology that enables them to extract credible commitments for debt repayments that other creditors cannot. Put another way, this theory implies that the marginal value of official debt can be higher than the marginal value of private debt. Our empirical tests of conventional "me-first" seniority cannot adequately address this question. We argue, however, that the global evolution of world capital markets over the past twenty years makes the missing market hypothesis much weaker than it was in the years following the Bretton Woods agreements that launched the IMF and the World Bank. Both the theoretical arguments and the empirical evidence presented here lead us to doubt whether official creditors as a group have the will to exploit any superior enforcement technology they may possess in global bargaining. However, that is a question worthy of further study.

Table 1. External Long-Term Debt of Eastern European Countries, Year-End 1990
Millions of U.S. dollars, except where noted

Country	Debt to private creditors	Total debt	Total debt per capita (U.S. dollars per capita)
Bulgaria	9,452	9,564	1,060
CSFR[a]	5,001	5,346	340
FSU[b]	36,900	56,800	200
Hungary	15,331	18,046	1,700
Poland	11,527	39,282	1,030
Romania	0	19	0
Yugoslavia	10,108	17,352	730

Source: World Bank (1991a, vol. 2) and World Bank (1990).
a. Czech and Slovak Federal Republic
b. Debt of the former Soviet Union is an average of three estimates from the World Bank *Quarterly Review*, December 1991. Private debt of the FSU is unguaranteed commercial bank debt plus suppliers' credits.

The Marginal Value of Debt and the Cost of New Loans

A number of the Eastern European countries have inherited a legacy of external debt from the communist era, as table 1 illustrates. Bulgaria, Hungary, and Poland had debts in excess of one thousand dollars per capita in 1990. But even the republics of the FSU, with a relatively modest debt burden of $200 per person, face severe problems servicing their external debts. As of February 1992, prices for Russian debt to private creditors had fallen below 40 cents on the dollar. Economic and political turmoil in the FSU, as well as disputes over allocating the old Soviet debts among the republics, are making it difficult for the newly emerging republics to gain access to private external capital.

Thus it appears unlikely that all the old Soviet debts will be repaid in full. Why should this matter in analyzing the consequences of new IFI loans, if they will be paid ahead of other creditors? The reason is clear: the total burden to creditors from a new package of loans depends not on the average value or seniority of the new loans, but rather on the marginal value of debt.[2]

A simple example illustrates the marginal debt concept. Consider a debtor that owes $50 billion but that can repay only $20 billion; its debt

2. The fundamental distinction between the marginal and average value of sovereign debt, and the differences from the case of corporate debt, are emphasized in Bulow and Rogoff (1988, 1989). The classic example is the 1988 Bolivian buyback, discussed in Bulow and Rogoff (1988).

should sell on the secondary market at 40 percent of face value (20/50). The country finds a new creditor (donor) willing to lend it $1 billion to buy wheat. The new creditor suffers an immediate loss of roughly $600 million because it has traded $1 billion for a new claim worth only about $400 million. But other creditors also suffer a loss because the country can still repay only $20 billion, regardless of whether the face value of its debt is $50 billion or $51 billion. Thus the $400 million in repayments that the new creditor expects to receive must effectively come out of the pockets of the old creditors; their holdings will drop in value from $20 billion to $19.6 billion. In this special case, the value of marginal debt to creditors as a whole is zero. However, the point that existing creditors suffer a capital loss is quite general.

To illustrate this point mathematically, suppose that the amount of a debtor's income available for repayment is a random variable θ with probability density function $f(\theta)$. A country will partially default if $\theta < D$, where D is the face value of the country's total external debt. Let p be the average value of a country's debt. Then the total market value of a country's debt, pD, is given by

$$(1) \quad pD = \int_0^D \theta f(\theta)d\theta + D \int_D^\infty f(\theta)d\theta = \int_0^D \theta f(\theta)d\theta + D(1 - F(D)),$$

where $\int_0^D \theta f(\theta)d\theta$ captures the expected repayments to creditors in defaulting states and $D(1 - F(D))$ is the face value of the debt times the probability the debt will be repaid in full. The marginal value of debt, m, is the change in the total market value of debt when D rises by a dollar; $m \equiv d(pD)/dD$. Taking the derivative of both sides of equation 1 with respect to D, we find that $m = (1 - F(D))$.

The key point is that creditors benefit from an extra dollar of debt only if the country is able and willing to repay more than D. Thus, to creditors as a group, the net cost of an extra dollar in loans is $(1 - m)$. Note that this result is independent of the seniority of the additional debt. If new IFI loans were sufficiently senior that they are certain to be repaid in full, then existing creditors would lose the entire $(1 - m)$. If new IFI loans were of equal priority to the average existing loan, then the IFIs would suffer an immediate loss of $(1 - p)$ and the old creditors would lose $(p - m)$. Either way, the total loss would still be $(1 - m)$.

In the case where all existing debt is of equal priority, secondary market prices should equal the average value of debt, p. However $(1 - p)$

Table 2. Marginal Value of Debt, Selected Eastern European Countries, February 1992
Cents per dollar of debt

Country	Debt price	Marginal value of debt	
		Specification 1	*Specification 2*
Bulgaria	18	15	-3
Hungary	70	39	41
Poland	18	11	-3
Russia	40	21	6
Yugoslavia	30	27	1

Source: Authors' calculations using debt prices from Salomon Brothers, "Emerging Markets Debt Weekly" (February 28, 1991), for Bulgaria, Poland, Russia, and Yugoslavia, and *Euroweek* (February 6, 1992) for Hungary. The marginal value of debt is calculated with the following equations:
Specification 1: $m = p(1 + \beta_1(D/X))$, and
Specification 2: $m = p(1 + \beta_2) + \beta_2 p^2$,
where $\beta_1 = -0.1$ as estimated in table 5, and $\beta_2 = -1.4$, as estimated by Claessens and others (1990). See text for more information. Debt-export ratio for Russia is EC estimate for Soviet Union from World Bank (1991a, vol. 1, p. 95). Other debt-export ratios are from World Bank (1991a, vol. 2). All debt-export ratios were multiplied by the ratio of total exports to non-CMEA exports. These ratios for all countries except Yugoslavia are from *Country Reports: Central and East Europe 1991*, published jointly by Statistisches Bundesamt and *Eurostat*, latest year available; Yugoslavia ratio is from IMF, *Direction of Trade Annual 1991*.

will always understate the aggregate aid burden of new loans. The result that $(1 - p) \leq (1 - m)$ follows immediately after dividing both sides of equation 1 by D:

$$(2) \qquad p = 1/D \int_0^D \theta f(\theta) d\theta + m \geq m.$$

A marginal dollar of debt is worth something to creditors as a whole only in the event that the country repays in full. But the average value of debt p includes the value of any payments made in the event of partial default.

These simple calculations, of course, assume that debt repayments, θ, are independent of the face value of debt, so that the creditors' gain from marginal debt is the country's loss. However, a rise in debt may cause inefficiencies by discouraging domestic investment. In this case, the marginal cost to a country of higher debt may be less than the gain to creditors. We will return to this issue later.

How does one go about measuring the marginal values of debt for the countries of the former Soviet bloc? One can obtain some indication of average debt values by looking at secondary market prices for former Soviet bloc debt to private creditors (keeping in mind that the market for most of these debts is not terribly liquid). The first column in table 2 lists some recent indicative prices for debt for countries in the former Soviet bloc. Very substantial differences occur among the various Eastern bloc

countries; Bulgaria and Poland's debts trade for about 18 cents on the dollar, whereas Russia's and Hungary's debts trade for 40 and 70 cents on the dollar. These prices suggest that a dollar in new official loans to Hungary would have an aid component of at least 30 cents; a dollar in new loans to Bulgaria would have an aid component of at least 82 cents.[3] Average debt discounts, of course, only provide a lower bound to the total aid component of new loans; to obtain estimates that include the capital loss to existing creditors, one needs to know the value of marginal debt.

Unfortunately, marginal debt values can not be observed directly. One approach to estimating marginal debt values is to look at the empirical relationship between secondary market prices and debt to estimate the function $p(D)$, and then to derive the marginal value of debt by the relationship $m \equiv \mathrm{d}(pD)/\mathrm{d}D$. Alongside the secondary market prices in table 2, we offer two alternative estimates of marginal debt for former Soviet bloc countries. The first estimate is based on secondary market regression results (presented later on) for specifications of the form

$$(3) \qquad \ln(p) = \alpha + \beta_1(D/X) + \text{exogenous variables.}$$

From equation 3, one can calculate the marginal value of debt as

$$(4) \qquad\qquad m = p(1 + \beta_1(D/X)),$$

where D/X is the country's debt-export ratio. Our estimate of β_1 is -0.1 (from table 5). The corresponding values of m are presented in the second column of table 2.

The third column in table 2 is based on results in specifications presented by Stijn Claessens and coauthors and Daniel Cohen:[4]

$$(5) \qquad \ln(p/(1 - p)) = \alpha + \beta_2 \ln(D/X) + \text{exogenous variables.}$$

Using equation 5 to solve for the marginal value of debt, one obtains

$$(6) \qquad\qquad m = p(1 + \beta_2) - \beta_2 p^2.$$

Claessens and others estimated $\beta_2 = -1.4$; Cohen arrives at a similar estimate (-1.5).

---

3. The price for Hungarian debt may be somewhat understated because Hungary has retained some access to credit markets. However, as of April 21, 1992, Hungary was assigned only a BB+ rating by Standard and Poor's, roughly the same as India.

4. Claessens and others (1990); Cohen (1991).

Thus the secondary market prices, shown in the first column of table 2, provide an upper bound on the value of new loans to Eastern European countries. The second and third columns provide a range of estimates for the actual cost—the marginal value of debt. Note that some of the numbers in the third column are actually negative. This is a theoretical possibility if the country is on the wrong side of the famed "debt Laffer curve." (This is the case where the overhang of foreign debt so impedes the country's incentives to invest that creditors would actually enjoy higher expected repayments if they unilaterally forgave part of the debt. As a practical matter, this seems unlikely for any of countries shown in the table.[5]) In any event, the low marginal values of debt in table 2 imply that the total burden of new loans to most Eastern European countries will be close to the burden of outright grants, regardless of whether the new lenders are senior or not.

Calculating the Burden-Sharing of Aid to Russia

Marginal and average debt values play a central role in determining the cost and distribution of new aid to the countries of the former Soviet bloc. The fundamental issue is that a donor country's true contribution to an aid package is not simply its direct contribution, but also the capital loss its suffers on existing debt holdings.

As a base case, we will assume that all debt receives equal priority in repayment. Then the approximate cost C_j to country j of an aid package consisting of L in loans and G in grants, but conditional on debt repayments R, is given by

(7) $C_j = q_j L(1 - p) + s_j L(p - m) + q_j G - s_j R(1 - m),$

where q_j is the fraction of new loans and grants that donor j provides and s_j is the proportion of existing debt held by j. The first term on the right-

5. A necessary but not sufficient condition for a debt Laffer curve to exist is for the overhang of foreign debt to impede the debtor country's incentive to invest. If this is the case, then the marginal benefit to the debtor of receiving new loans is less than the marginal cost to donors. Some of the aid is dissipated by increased inefficiency in domestic investment. If debt overhang disincentives are indeed a problem, then new loans are probably a less efficient way to provide aid than grants would be. Warner (1992) presents some empirical estimates on the importance of debt overhang. Bulow and Rogoff (1991b) discuss the significance of debt overhang for the marginal value of debt and debt repurchases.

hand side of equation 7, $q_j L (1 - p)$, represents the immediate loss from making loans worth less than par. The second term, $s_j L (p - m)$, represents the capital loss suffered by existing creditors when total debt rises. The third term is country j's share of the grants. Finally, debt repayments provide the creditor with the sum $s_j R$. However, a debt repayment of R will reduce the total value of remaining debt by mR, so the last term on the right-hand side of equation 7 is $- s_j R (1 - m)$.

To implement equation 7 and thereby calculate the distribution of burdens associated with any given aid package for each donor j, it is necessary to estimate p, m, the share of new debt or grants donor j provides, q_j, and j's shares of existing debt, s_j. Although data on the distribution of debt are not available for all the Eastern European countries, they are available for the republics of the FSU, so we will focus on the case of Russia.

As of the end of 1990, the G-7 countries held 78.7 percent of Russian debt.[6] Recall from table 2 that p for Russia is about 0.40. Our estimates for m for Russia range from 0.06 to 0.21. In the calculations below, we will use an intermediate estimate[7] of $m = 0.10$.

In table 3, we use equation 7 to estimate the relative burden three hypothetical aid packages to Russia would place on the G-7 countries. The first package is a \$1 billion IMF loan. (In this calculation, we assume that this loan is comparable to having each industrialized country member of the IMF make a loan in proportion to its IMF quota.[8]) As the third col-

Table 3. Burden-Sharing in Russia under Alternative Financing Arrangements
Cost in millions of U.S. dollars, except where noted

Country	Share of new loans and grants (percent)	Share of existing debt (percent)	$1 billion loan	$1 billion grant	Loan plus grant plus debt repayment[a]
Germany	9.7	42.8	187	97	− 101
United States	31.2	1.0	194	312	493
Japan	9.7	8.8	85	97	102
United Kingdom	8.7	6.6	72	87	100
France	8.7	10.9	86	87	74
Italy	5.4	8.6	58	54	35
Canada	5.1	0.0	31	51	81

Source: Authors' calculations. See text for more information. The following assumptions were used: the price of Russian debt is 40 cents; the marginal value of debt is 10 cents; new loans and grants made by all industrialized countries are in proportion to the IMF quota under the Ninth Review; new and old debt have equal priority in repayment. Share of new loans and grants from *Finance and Development*, December 1991, p. 29, and *International Financial Statistics, 1991 Annual*. Share of existing debt held is from World Bank (1991a, vol. 1, p. 92).
   a. The $1 billion in loans plus $1 billion in grants plus debt repayment arrangements assume repayment proportional to existing debt.

umn of table 3 shows, even though the United States has an IMF quota that is three times as large as Germany's, the two countries bear almost identical burdens from an IMF loan. The United States loses $187 million directly (60 percent of its $312 million share of the loan) and loses another $7 million from capital losses on its existing holdings of Russian debt. Germany loses only $58 million directly (from its loan share of $97 million) but suffers $129 million in capital losses.[9]

The second aid package is for $1 billion in grants. For symmetry, we again assume that these grants are made in proportion to the industrialized countries' IMF quotas. In this case, because there are no capital losses on existing debt, each country's economic burden is simply proportional to the amount of aid it directly supplies.[10] (Since the G-7 coun-

---

9. If the IMF's claims have a higher status than equal priority, then the U.S. burden decreases and the German burden increases. However, regardless of whether the IMF is senior or junior, the total cost to all creditors, new and old combined, remains at $(1 - m)$ times the amount of the new loan.

10. The table assumes that if a country receives a no-strings-attached grant, its creditors will not be able to extract any of the money. However, as we show in Bulow and Rogoff (1988), the fraction q that creditors can take is quite small in most countries—not more than 0.05.

tries account for 78.5 percent of all industrialized-country IMF quotas, their share of the $1 billion in grants is $785 million.)

Finally, we consider a package that combines $1 billion in aid and $1 billion in grants, but comes with the conditionality that the Russians must use half the proceeds for payments to existing debt holders. In this case, the United States, which holds almost no Russian debt, bears 49 percent of the total burden. The Germans, as holders of about 43 percent of the existing debt, benefit greatly from the debt repayment provision and come out about $100 million ahead.

The preceding analysis can be applied to some of the alternative aid packages that have been proposed for Russia. For example, on April 1, 1992, German Chancellor Helmut Kohl and U.S. President George Bush announced a $24 billion aid package. While the exact details are still being negotiated, it is clear that the vast bulk of the total—more than 90 percent—is in bilateral loans (such as loans from the Export Import Bank and the Overseas Private Investment Corporation) and multilateral loans. (The preliminary total includes roughly $6 billion in loans from the IMF, the World Bank, and the European Bank for Reconstruction and Development,[11] $6 billion in loans for a currency-stabilization fund to be provided through the IMF's General Arrangements to Borrow facility, and $12 billion in bilateral loans and technical assistance.[12])

Given that the Bush-Kohl package consists largely of loans, the burden shares correspond closely to the third (loan) column in table 3.[13] Applying equation 7, we find that although the United States would be providing substantially more of the loans and grants in the package than any other country, the net cost to the United States of roughly $4.5 bil-

---

11. At present, it appears that Russia will receive an IMF quota of 2.99 percent. See Steven Erlanger, "$12 Billion Is Planned for Ex-Soviets," *New York Times*, April 12, 1992, p. 10.

12. "Kohl Welcomes Russia Aid, Urges All to Pay," Reuters News Service, April 2, 1992. The primary component of the U.S. contribution to this aid package will be $4.85 billion in Commodity Credit Corporation loans, $3.75 billion of which had already been disbursed when President Bush gave his speech.

13. Because General Arrangements to Borrow (GAB) quotas differ from IMF quotas, if the U.S. plan of having the stabilization fund financed in proportion to GAB shares is adapted, the United States would contribute only 25 percent of the stabilization fund and Germany would contribute 14 percent.

lion would almost exactly match Germany's.[14] Germany, of course, would fare much better if the aid package were conditioned on repaying existing debts, as in the last column of table 3.

An important assumption underlying our calculations of burden-sharing is that all new official debt will receive equal priority with the countries' existing debts to both official and private creditors. This assumption justifies our use of secondary market prices for debt to private creditors when we estimate the average and marginal cost of aid. If official debt were senior to debt from private creditors, our estimates of the cost to G-7 governments of new loans to Eastern European countries would be much lower; junior private creditors would bear a disproportionate share of the cost. This is the sense in which IFI loans, if they truly are senior, allow the G-7 governments to "lever" their aid.

In fact, considerable controversy exists over the issue of seniority in international lending. Many official creditors, especially the multilateral aid agencies, argue that country debtors treat them as preferred creditors. This is the premise underlying the argument that large IMF and World Bank capital increases only impose a small cost on donor governments. We examine the plausibility of our equal priority assumption in the next section.

Testing the "Me-First" Seniority of Official Debt

It is commonly assumed that debt owed to official creditors is senior to debt owed private creditors in international loans markets, at least in the sense that official creditors are paid first. Superficially, the data seem to support this assumption. During the past 15 years, more countries have formally defaulted on private debts than on official debts. However, this fact is deceptive because in many cases, official creditors have been considerably more willing than private creditors to roll over their debts to problem-debtor countries. To explore the issue of seniority more thoroughly, we begin by asking how official and private creditors fared in bankrupt middle-income countries during the debt crisis.

---

14. For purposes of calculation, we assume that the technical assistance (grant) component of the package is negligible; for the United States, the planned technical assistance component is $620 million.

The Net Transfer Record of IFIs versus Private Creditors in the Debt Crisis

We will focus on the countries included in the World Bank's list of severely indebted middle-income countries (SIMICs).[15] The SIMICs include the relatively large problem-debtor countries; their debts constitute a sizable fraction of the total problem loans whose debts sell at steep discounts on world secondary markets. Any creditor serious about getting repaid would work hard to do so in the SIMICs.[16] In table 4, we examine net transfer payments (principal plus interest repayments minus new loans) to various groups of creditors as percent of debt owed by the SIMICs from 1984–91. The top half of the table presents categories of official creditors and the bottom half displays transfer rates of return for private creditors.

The basic message of table 4 is that private creditors have extracted considerably higher net repayments than have official creditors (except for the IMF in the sub-period 1986–91). Since 1984, private "guaranteed" debt (privately held external debt guaranteed by the debtor-country government) has paid an average of about 5.5 percent in cash, while private nonguaranteed debt (privately held external debt not guaranteed by the debtor country government) has paid an average of 11.9 percent, including sizable principle repayments.[17] The average cash payment on all privately held debt was 6.4 percent.

The IMF did only slightly worse than private creditors. After providing large sums to the problem-debtor countries after the debt crisis began in 1982, the Fund extracted an average return of 5.7 percent of debt outstanding from 1986–91. The World Bank, on the other hand, has

---

15. The World Bank's most recent list of severely indebted middle-income countries includes Algeria, Argentina, Bolivia, Brazil, Bulgaria, Republic of Congo, Cote d'Ivoire, Ecuador, Mexico, Morocco, Nicaragua, Peru, Poland, Syria, and Venezuela. The list in the *World Debt Tables* changes regularly; see World Bank (1991a). Chile and Colombia, for example, are now listed as moderately indebted.

16. It is for just such distressed borrowers that private lenders design *pari passu* clauses, meant to prevent some other creditor from getting repaid a disproportionate fraction of its claim in cash.

17. In many cases, government guarantees made it more difficult for creditors to press for repayment in the developing country's legal system and more difficult for the debtor to obtain foreign exchange needed for repayment.

Table 4. Creditor Repayment Rates for Severely Indebted Middle-Income Countries, 1984–91

Percent per year

Year	Official creditors					Private creditors		
	IMF	World Bank[a]	IMF plus World Bank[a]	Total official[b]	Total official including grants	Sovereign guaranteed	Non-guaranteed	Total private
1984	-32.8	-11.5	-21.1	-5.7	-7.3	4.3	12.2	6.1
1985	-2.9	-2.7	-2.8	-2.8	-4.4	6.7	11.7	7.6
1986	6.5	-4.9	0.1	-2.2	-3.3	6.1	11.2	7.0
1987	8.2	-0.4	3.0	-0.6	-1.5	4.3	12.8	5.5
1988	10.3	1.8	5.0	1.3	0.6	5.4	20.5	7.2
1989	4.7	2.5	3.3	0.9	0.2	6.2	14.4	6.9
1990	-3.7	-4.9	-4.4	-0.9	-2.8	4.9	4.8	4.9
1991[c]	8.1	...	...	1.1	-0.3	6.0	7.5	6.1

Source: World Bank (1991a, vol. 1, pp. 154–55). The repayment rate is net payments to creditors as a percent of debt outstanding, where net payments are generally the negative of net transfers. The exception is for "official including grants," where the net payments are the negative of net transfers, minus grants. Debt outstanding is measured as debt outstanding at year end plus net payments during the year.

a. The International Development Agency (IDA) is excluded in calculating debt to the World Bank remaining at the end of the year.
b. Official creditors are multilateral and bilateral creditors as defined by the World Bank.
c. Figures for 1991 are estimates.

209

never withdrawn more than 2.5 percent in any year since 1983 from the SIMICs, despite its often-cited repayments from Brazil.

In table 4, we also net out side payments among multilaterals and other aid agencies by looking at net transfers to all official creditors. As a group, official creditors kept pouring money into the SIMICs through 1987, more than five years after private creditors began pulling out wholesale. From 1988–91, official creditors began withdrawing very modest amounts—an average of 0.6 percent per year. But if grants are included in the tabulation, the industrialized countries are still transferring funds to the SIMICs. Based on this evidence, it would be hard to argue that official creditors as a group have "me-first" seniority relative to private lenders.

Testing for the Seniority of Official Debt Using Secondary Market Prices

It would seem unconventional for a traditional senior lender to increase its share of debt in a bankrupt country. However, the increase in the share of official debt in the debt crisis countries does not prove that official debtors will ultimately receive a lower return than private lenders. Without an estimate of the capital loss on new official loans and loans that were rolled over, there is no way to evaluate expectations about what percent of remaining official debt ultimately will be repaid. The capital loss cannot be measured directly because no market for official debt exists. Nevertheless, one may be able to extract some information about the relative seniority of private and official debt by looking at secondary market prices for developing country debt to private creditors.

We examine such evidence in table 5. For the period 1986–90, we look at annual data on secondary market prices for government-guaranteed external debt to commercial banks in 19 middle-income countries. Except for our inclusion of the share of official nonconcessional debt in total long-term debt, the specification is fairly standard.[18] The ordinary least squares (OLS) coefficient on the country's debt-export ratio is neg-

18. See, for example, Ozler and Huizinga (1992), Fernandez and Ozler (1991), Dooley and Stone (1992), and Cohen (1991). Bulow and Rogoff (1991b) have explored more disaggregated specifications separating the World Bank, IMF, and bilateral creditors from private creditors. That paper also finds no evidence of official debt seniority.

Table 5. Regressions Explaining the Market Price of Developing Country Debt, Ordinary Least Squares and Instrumental Variables Estimates, 1986–90

Independent variable	Ordinary least squares		Instrumental variables[f]
	Levels	*Differences*	*Differences*
Constant	5.38	− 0.104	− 0.033
	(10.91)	(1.60)	(0.36)
Debt-export ratio[a]	− 0.063	− 0.089	− 0.093
	(2.78)	(1.61)	(1.68)
Share of official debt[b]	0.0003	0.005	− 0.017
	(0.06)	(0.34)	(0.73)
Inflation[c]	− 0.00016	0.00007	0.00005
	(1.61)	(0.84)	(0.72)
LIBOR[d]	− 0.149	− 0.166	− 0.182
	(2.66)	(3.15)	(3.27)
Arrears[e]	− 0.066	− 0.041	− 0.053
	(6.69)	(2.41)	(2.62)
Summary statistic			
Number of observations	85	65	65
Adjusted R^2	0.63	0.25	...
Standard error	0.41	0.30	0.31

Source: Authors' calculations. The numbers in parentheses are *t* statistics. Data for 1986–90 are for the following countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Cote d'Ivoire, Ecuador, Mexico, Nigeria, Panama, Peru, the Philippines, Poland, Uruguay, Venezuela, and Yugoslavia. Data for Algeria, Hungary, and Turkey are also included for available years. The dependent variable, the end-of-year secondary market price of debt, is the log of the average bid and offer prices (from Salomon Brothers, "Indicative Prices for Less-Developed Country Bank Loans," December 2, 1986, December 14, 1987, December 8, 1988, December 7, 1989, and December 18, 1990, for all cases, except 1989 for Hungary and Turkey, and 1990 for Algeria and Hungary. For these cases, prices are from *Euroweek*, December 14, 1989 and December 13, 1990).

a. Debt-export ratio is the ratio of year-end long-term debt outstanding and disbursed to total merchandise exports in the same year. (Debt figures from World Bank (1991a); 1991 exports from World Bank (1991b), and 1990 exports from *International Financial Statistics*.)

b. Share of official debt is the year-end percent of long-term debt held by official creditors, excluding concessional debt (from World Bank (1991a, vol. 2)).

c. Inflation is the rate of change in the consumer price index (1991 value from World Bank (1991b) and 1990 value from *International Financial Statistics*).

d. LIBOR is the annual average of the six-month London interbank offered rate (from *International Financial Statistics*).

e. Arrears is the year-end percent of long-term debt in arrears (from World Bank (1991a)).

f. The instrumental variables regressions use as an instrument the change in the official debt share caused by exchange rate effects. See text for more information.

ative and highly significant, as are the coefficients on the London interbank offered rate (LIBOR) and the country's accumulation of interest arrears.

The OLS coefficient on the ratio of nonconcessional official debt to total long-term nonconcessional debt is small and statistically insignificant.[19] If official debt were senior, one would expect a negative coeffi-

19. It should be noted that the significance levels on the coefficients may be overstated if there is serial correlation across years for each country; this observation only strengthens the conclusion that the coefficient on the share of official debt is not significant.

cient. Assuming a conventional model of seniority, the more senior debt there is relative to junior debt, the lower the return to junior debtors in the event of default.

To account for possible serial correlation across years for each country, table 5 also reports OLS estimates for the same regression run in first differences; the coefficients are quite similar to the regressions that use the levels of the variables. Although the results are not reported in the table, we experimented with separately including the shares of IMF, World Bank (IBRD), and other official nonconcessional debt shares; none of these variables is significant. Overall, we cannot reject the hypothesis that the coefficient is zero; that is, that official and private debt receive equal priority.

One might expect the OLS coefficient on the share of official debt to be biased downward if official creditors are more willing than private creditors to make loans to debt-distressed countries; we already have mentioned that official creditors assumed a larger share of problem-country debt during the debt crisis. To correct for this downward bias, table 5 also reports instrumental variables (IV) regressions for the first-difference regression.[20] As an instrument, we used the change in the fraction of a country's debt owed to official creditors that was caused purely by changes in the exchange rates of the differing currencies making up its private and official debts. Specifically, we calculated the exchange rate effect on a country's debt as

$$(8) \qquad E_t = D_t - D_{t-1} + PR_t - L_t + F_t + A_t - A_{t-1},$$

where D_t is the country's debt at the end of period t, L is the amount of new loans, PR denotes principal repayments, F is the amount of debt forgiven or debt reduction (from buybacks or other debt conversion schemes), and A_t is interest arrears on long-term debt.[21] We applied the same procedure separately to official and to private debt. The instrument is then the realized ratio of official-to-total debt in t, less what the

20. In place of secondary market prices, we also explored using the country debt risk rating survey published by *Institutional Investor*, which has data for a somewhat larger sample of countries. The coefficient on official debt share is negative for the OLS regression, but becomes positive for the instrumental variables regression.

21. Interest arrears are not included in the World Bank (1991a) measure of long-term debt. Only data on total interest arrears are available in the World Bank (1991a) data set; we assumed that all interest arrears are on private debt.

ratio would have been had E_t been zero for both private and official creditors. This instrument thus purges the official debt share change of any spurious relation with the debt price change that might be caused by an official creditor reaction function.

The results for the IV estimation are reported in the last column of table 5. The coefficient on the official debt share is now negative and somewhat larger in absolute value than the previous estimates, but it remains insignificantly different than zero.[22]

Another potential problem with the secondary market regressions is that sample selection bias can occur; countries that are in economic distress are much more likely to trade their debt on secondary markets. To deal with this issue, we adopt the sample selection approach of Sule Ozler and Harry Huizinga.[23] Table 6 presents the results of the sample selection model; the results for the associated secondary market regressions are similar to those in table 5. The results for the probit part of the sample selection model (the equation in which the dependent variable is 1 for countries whose debt trades and 0 for countries whose debt does not trade) provide further support for the view that the share of official debt is not a significant determinant of whether a country's debt trades at discount.

Overall, the statistical evidence on secondary market prices does not provide evidence that the official creditors as a group are senior in the "me-first" sense.

The Relationship between Multilateral and Bilateral Creditors

Although the preceding statistical evidence casts doubt on the conventional view that official debt is senior, casual empiricism still suggests that there must be some sense in which the IMF and World Bank have priority. Even though the World Bank did not extract net transfers from the SIMICs at the same rate as private creditors during the debt

22. We used the estimated IV equation coefficient on the debt–export ratio in table 5 to estimate *m* in our earlier aid and burden-sharing calculations in tables 2 and 3. The coefficient on the official debt share change is similarly insignificant when its own lagged value is used as an instrument, and when all the other variables in the regression except LIBOR are instrumented out using once-lagged values.

23. Ozler and Huizinga (1992).

Table 6. Sample Selection Model Explaining the Occurrence of Trading and the Price of Debt in the Secondary Market, Maximum Likelihood Estimates

Independent variable	Trading equation[a]	Price equation[b]
Constant	−5.81	5.22
	(2.36)	(8.72)
Debt-export ratio[c]	1.12	−0.05
	(4.85)	(1.65)
Share of official debt[d]	0.008	−0.0002
	(0.51)	(0.04)
Inflation[e]	0.024	−0.0001
	(3.58)	(0.35)
LIBOR[f]	0.30	−0.147
	(1.24)	(2.54)
Arrears[g]	. . .	−0.066
		(6.42)
Summary statistic		
Rho		0.80
		(9.28)
Number of observations		134
Number of positive observations		85
Log likelihood		−78.25

Source: Authors' calculations. The numbers in parentheses are *t* statistics. Data for 1986–90 for the following countries: debt traded in secondary market—Algeria, Argentina, Brazil, Chile, Colombia, Costa Rica, Cote d'Ivoire, Ecuador, Hungary, Mexico, Nigeria, Panama, Peru, the Philippines, Poland, Uruguay, Venezuela, and Yugoslavia; debt not traded in secondary market and with country credit rating over 40 (according to *Institutional Investor*)— China, Fiji, India, Indonesia, Korea, Malaysia, Portugal, and Thailand.
  a. The dependent variable in the trading equation is 1 if trading was observed in the secondary market, and 0 otherwise.
  b. The dependent variable is the log of the secondary market price; see table 5 for sources.
  c-g. See table 5 for description of independent variables.

crisis, it has suffered defaults in only ten highly distressed countries— Guatemala, Guyana, Honduras, Liberia, Nicaragua, Panama, Peru, Sierra Leone, Syria, and Zambia—none of whom paid much money to their private creditors, either.

In this section, we argue that it is a mistake to think of the World Bank and IMF as totally separate actors from bilateral creditors; after all, the industrialized countries have a very large say over the IFIs' decisions. The question arises: do the IFIs' excellent repayment records simply come at the expense of other official creditors? To properly analyze this issue, it is necessary to develop a rudimentary model of the bargaining concerning debt repayments.

Who Pays for IFI Repayments? A Bargaining Model

Before we begin analyzing debt bargaining, it is helpful to analyze a model in which there is no debt and there are no international financial institutions. For example, suppose that France and Germany bargain bilaterally about whether to continue open trade through the European Community.

Let S equal the total surplus available to the bargainers. Let $U_k(S_k)$ equal the utility of bargainer k if the bargainer receives S_k of the total available surplus. With two bargainers, $S_1 + S_2 = S$ in an efficient contract.

Then, normalizing the utility of each bargainer to zero when no bargain is struck, the Nash bargaining solution is that efficiency is achieved and that

$$(9) \qquad U_1'(S_1)/U_1(S_1) = U_2'(S_2)/U_2(S_2).$$

For example, if both bargainers' utility is linear in S, then the surplus will be split fifty-fifty. But what if the implementation of the efficient solution leads to one side's receiving more than half the surplus (if there are no side payments)? For example, what if free trade between France and Germany is optimal, but that such trade would give Germany a surplus of \$2 billion more than France? Then bargaining theory would predict a transfer from Germany to France. In Europe, such a transfer may be made through an agricultural support fund. In the Third World, analogous transfers may be paid through development agencies. An example that is similar and, perhaps, much more to the point, is the North American Free Trade Agreement. If efficient implementation involves giving Mexico a disproportionate share of the benefits, transfers to the United States may take place in the form of repayments on Mexican debt to U.S. creditors.

We now develop a one-shot bargaining model in which a debtor may already have some loans outstanding from multilateral, bilateral, and private creditors. Any loans left outstanding at the end of the game are written off.[24]

24. Our model here is strictly a static one. For dynamic analyses of debt bargaining, see Bulow and Rogoff (1989), Fernandez and Rosenthal (1990), Fernandez-Arias (1990), and O'Connell (1989).

Let M be the surplus allocated to the multilateral creditors; B, the surplus allocated to the bilateral creditors; P, the surplus allocated to private lenders; and C, the surplus allocated to the debtor country. Then in any efficient bargain,

(10) $$M + B + P + C = S.$$

We further assume that the multilaterals, private lenders, and debtor countries care only about the amounts allocated to them, so their utilities are $U_M(M)$, $U_P(P)$, and $U_C(C)$, respectively. We also assume that the bilateral creditors have interests that are completely identical to those of the donor countries that finance them. Thus they care about both themselves and the multilaterals—because they are liable for any shortfall in the multilaterals' accounts, or for a more altruistic reason. Accordingly, we write the utility function of the bilateral as $U_B(B + \alpha M)$.[25] If any of the four parties do not subscribe to an agreement, then the surplus is zero and each bargaining party receives a utility of zero.

To model multilateral seniority, we assume that the multilaterals are capable of making a take-it-or-leave-it offer to the other bargainers, who then negotiate a surplus split among the three of them (subject to the constraint of giving the multilaterals what they want).[26] In that case, the multilaterals will choose an outcome that gives them as much surplus as possible, subject to the legal rights of the other parties.

Now consider a situation in which a multilateral has made loans of amount R and has decided that its current objective in the country is simply to withdraw its funds and be repaid as much as possible. What will be the outcome of Nash bargaining among the remaining participants?

Assuming that the debts owed to bilaterals and to private creditors

25. Our analysis is meant to be sufficiently broad to allow for the multilaterals and bilaterals to contribute aid to the debtor if the aid project will selfishly benefit the donor. For example, the Germans may finance a project to pay the salaries of Russian soldiers in eastern Germany if keeping those soldiers happy also raises the utility of Germany. Even if a donor selfishly benefits, it is also possible that the donor, as an official creditor, may wish to be repaid all or at least part of its outstanding debt.

26. However, the creditors are limited as to how much they can demand by their legal rights. For example, the debtor's surplus can never fall below what it would be if it covered all of its outstanding obligations and did not receive any aid projects. The commercial banks, whose utility is only dependent on how much they are repaid, cannot receive more than they are owed or less than zero.

are both sufficiently large, the outcome will be the simultaneous solution of equation 10, and

(11) $$M = R,$$

so that

(12) $$U_P'(P)/U_P(P) = U_C'(C)/U_C(C) = U_B'(B + \alpha R)/U_B(B + \alpha R).$$

In the case where the bilateral and multilaterals are independent, $\alpha = 0$. Then an increase in R of one dollar decreases the surpluses of all other bargainers. For example, if each has a utility function that is linear, then if the multilaterals are capable of demanding an R that is one dollar higher, each of the other three bargainers loses one-third of a dollar.

But what if $\alpha = 1$, as would be the case if the industrialized lending countries fully incorporated the value of the multilaterals into their utility functions? Then the entire burden of the increase in R would fall on the bilaterals; neither the debtor nor the private creditors would be hurt by the increase in this senior obligation.[27] Thus even if the IFIs were paid off first, it is not necessarily the case that a rise in the IMF-World Bank share of total nonconcessional debt would adversely affect secondary market prices for private debt.

Note that while we have used our model to analyze the distribution of repayments to bilateral and private creditors (given IFI seniority), the model could equally well be interpreted as representing the conflict between two bilaterals, each of which is responsible for a different fraction of IFI financing. Effectively, each industrialized country would have to pay for its own share of IFI repayments through its own bilateral agencies. The implication would be that the United States would be required to bear some of the burden created by new IFI loans to Russia, even though the IFIs are certain to be repaid and the United States has almost no other loans outstanding. Thus the bargaining analysis here provides a rationale for our treatment of IMF loans as equal priority in the burden-sharing calculations presented earlier in table 3 above.

27. Note that a higher value of α actually decreases the likelihood that the multilaterals will have to accept anything less than their promised sums. If $\alpha = 0$, then the multilaterals will be constrained by the minimum utilities that must be offered to each of the other bargainers. If multilateral debt is too large, the multilaterals may have to ask for less than full repayment. But in the extreme case where $\alpha = 1$, the multilaterals can always be repaid the full amount of their legal obligations; they can always count on the bilaterals contributing whatever is needed so that the IFIs will be repaid in full.

Who Pays for IFI Repayments in Practice?

In the preceding model, we suggested the possibility of an aid neutrality hypothesis for IFI lending. In the extreme case where the IFIs are merely veils for industrialized country lending, then (because they are relatively small) any impact of their actions on total aid flows or debt repayments will be fully offset by bilateral creditors and aid agencies. Perhaps the most suggestive practical example of the type of repayment reshuffling described in our bargaining model is the case of those developing countries that the World Bank calls its "reverse graduates." These are countries that had been borrowing from the World Bank's nonconcessional affiliate, the International Bank for Reconstruction and Development (IBRD); however, because they suffered from negative growth, the World Bank switched them to concessional loans through another World Bank affiliate, the International Development Association (IDA). From 1985 to 1989, 20 reverse graduates met all of their obligations from previous IBRD loans with new financing provided by IDA (see table 7). Tanzania, for example, received $413 million from IDA, from which it had to pay $196 million to IBRD. The World Bank has even established a special IDA "reflow" facility specifically to provide the reverse graduates with the extra funds needed to meet the burden of their IBRD loans.

Similarly, it has been argued that much of recent World Bank aid has simply "crossed 19th Street" (the Washington, D.C., street that separates World Bank and IMF headquarters) and has been used to repay the IMF. For example, IDA gave $8.71 billion in net transfers to sub-Saharan Africa from 1985–90. Of this amount, $1.69 billion was used for IBRD repayments and even more—$3.97 billion—found its way to the IMF.[28] (This gives credence to the IMF's view that it is at the top of the IFI food chain.[29])

Even in cases in which the IBRD and the IMF have been repaid without the help of IDA, legal and economic repayments still may differ. It is well known that Cote d'Ivoire received a special "loan" from France

28. World Bank (1991a, vol. 1).
29. Generally speaking, a country must be in good standing with the IMF to receive an IBRD loan. During the 1980s, the World Bank experimented with making sectoral adjustment loans to countries that had not yet reached a standby agreement with the IMF. This practice, however, was relatively short-lived.

Table 7. Debt Transfers of Low-Income Countries That Repaid IBRD Debt with IDA Funds, 1985–89

Millions of U.S. dollars

Country	IBRD payments	IDA receipts	Net transfers from World Bank	IBRD debt[a]
Bangladesh	24	1,419	1,395	61
Bolivia	166	225	58	189
Ethiopia	55	277	222	28
Ghana	93	767	674	109
Guinea	64	199	135	31
Kenya	451	468	17	853
Liberia[b]	22	27	5	133
Madagascar	18	372	354	26
Malawi	34	279	245	89
Mauritania	43	94	51	168
Senegal	65	346	281	92
Sierra Leone	3	20	17	10
Sri Lanka	34	323	289	80
Sudan	43	337	294	23
Tanzania	196	413	217	238
Togo	36	177	141	1
Uganda	28	414	386	34
Zaire	60	583	523	43
Zambia[b]	34	185	151	506
Zimbabwe	23	26	3	353
Total	1,492	6,951	5,458	3,067

Source: World Bank (1991a, vol. 2).
a. IBRD debt as of June 30, 1990, is shown.
b. Liberia and Zambia have been in default to IBRD and IDA.

specifically to meet an IBRD payment upon which it otherwise would have defaulted. Similarly, from 1985 to 1989, another 14 countries arguably repaid the World Bank out of funds they received from other official creditors, as table 8 shows. In most countries, the multilaterals extended a relatively small proportion of total official loans and grants, so it is at least plausible that IFI decisions are to some extent undone by the bilaterals.

Although the evidence on the reverse graduates is suggestive of the type of bargaining described in our model, the evidence must be interpreted with some caution. Clearly, if World Bank officials adjust IDA aid upward dollar-for-dollar to cover IBRD repayments, then the marginal burden to a country of having to pay off "senior" IBRD loans is

Table 8. Debt Transfers of Middle-Income Countries That Repaid the World Bank with Other Official Money, 1985–89

Millions of U.S. dollars

Country	World Bank net transfers	Other official creditors, grants plus net transfers	Total official creditors, grants plus net transfers
Botswana	− 56	444	388
Costa Rica	− 99	372	273
Cote d'Ivoire	− 226	681	455
Dominican Republic	− 70	474	404
Egypt	− 299	4,420	4,121
El Salvador	− 63	1,195	1,132
Guatemala[a]	− 120	400	280
Honduras[a]	− 77	972	895
Lebanon[b]	− 25	211	186
Mauritania	− 19	177	158
Paraguay	− 165	375	210
Philippines	− 829	2,841	2,012
Swaziland	− 33	73	40
Syria[a]	− 37	2,122	2,085
Total	− 2,118	14,757	12,639

Source: World Bank (1991a, vol. 2).
a. Guatemala, Honduras, and Syria have reached nonaccrual status with the World Bank.
b. Figures for Lebanon exclude negative grants of $946 million in 1985.

zero. However, if a reverse graduate's net transfers from IDA (and other sources) are independent of its IBRD obligations, then the marginal burden of IBRD debt is 100 cents on the dollar.

An interesting topic for future research—but beyond the scope of this paper—would be to try to see to what extent IFI decisions affected total aid to a country, holding constant standard aid factors (such as income per capita, trade with the major industrialized country donors, and political alignment with the donors).

Do IFIs Fill Missing Loan Markets?

The superior ability of official lenders to enforce repayments from sovereign countries is one of the main arguments generally used to justify why aid is provided in the form of conditional loans, rather than conditional grants. If because of their political power, international lending

agencies can better enforce debt repayments from sovereign govern-
ments than can private lenders, then the IFIs' practice of making loans
instead of making grants enhances the efficiency of international capital
markets. But if IFIs are only senior in the narrower sense of being able to
get repaid ahead of private creditors without increasing the total amount
countries repay, then the efficiency argument is spurious.

Again, the key to thinking about this problem is to think about the
marginal value of debt. In the conventional finance model that we em-
ployed in the early part of the paper, the marginal value of debt is inde-
pendent of the seniority of the new lender. The implication is that all new
lenders, regardless of seniority, have the same impact on the total
amount countries will repay. The missing markets model of IFI lending
posits that the marginal value of IFI debt is *greater* than the marginal
value for other types of debt.[30]

If the marginal value of official debt is indeed greater than the mar-
ginal value of private debt, then our secondary market results in table 5
become difficult to interpret. As an extreme example, suppose that the
presence of official creditors raises the amount the debtor country is
willing to pay by one dollar for every dollar in official debt, even in cases
in which the country is in partial default. In this case, the value of mar-
ginal debt is one for official creditors. Suppose further that official credi-
tors are strictly senior. Then, even though official creditors are senior,
their presence has no effect on private creditors. Thus although our sec-
ondary market regressions are suggestive, they do not capture this non-
conventional type of seniority.

Still, an observer of LDC debt renegotiations would be hard-pressed
to argue that official creditors are better able and willing to enforce re-
payments than private creditors. Why has the replacement of private
debt with IFI debt in Mexico and other Brady plan countries lessened
the debt crisis? Generally speaking, the extensive evolution of private
capital markets over the past twenty years makes the missing market ra-
tionale for IFI lending considerably more dubious than in the years im-
mediately following the Bretton Woods agreement.

Of course, there are other arguments—besides increasing capital
market efficiency—for having IFIs provide loans rather than grants.

---

30. Fernandez-Arias and Demigurac-Kunt (1991) discuss other rationales for IFI
lending.

Loan guarantees are easier for some governments to pass by their elec-
torates. Borrowers may sometimes find the obligation to repay foreign
debts helpful in convincing their populace to accept tough domestic ad-
justment programs. But none of these other arguments is nearly as com-
pelling in economic terms as the argument that IFI or other official loans
directly enhance the efficiency of capital markets.

Conclusion

The IMF and the World Bank are the only international organizations
with the capacity to provide the level of coordinated technical assistance
needed to deal with the massive economic reform problems facing East-
ern Europe and the former Soviet republics. Their technical assistance
is needed as part of any loan or grant package. However, it is a mistake
to believe that by channeling the financial component of aid as noncon-
cessional IFI loans, the industrialized countries can somehow "lever"
aid. First, our theoretical and empirical analysis challenges the view that
IFI debt is senior in an economically meaningful way. The apparent
"me-first" seniority status of these organizations may well come largely
at the expense of bilateral government creditors and other aid agencies
run by the industrialized countries that sponsor the IFIs.

Second, even if new official loans to the republics of the former Soviet
Union will be paid ahead of other creditors, the "leverage" that these
loans provide may come substantially at the expense of existing credi-
tors, who consist largely of taxpayers and government agencies in the
industrialized countries. Because Germany holds a much greater pro-
portion of existing FSU debt than does the United States, the actual cost
to the United States of FSU loans is far smaller than its IFI quota share
would suggest.

Our analysis does not attempt to determine the right amount of aid to
supply the former Soviet bloc. We take as given that the region requires
significant net transfers. Nevertheless, in comparing alternative multi-
lateral packages, it is helpful to have as clear a picture as possible of the
total costs to each donor.

Comments
and Discussion

Susan Collins: This paper covers a range of topics about lending by the IMF and other international financial institutions (IFIs). In particular, Jeremy Bulow, Kenneth Rogoff, and Afonso Bevilaqua analyze the burden-sharing to G-7 donors implicit in alternative ways to finance capital flows to the East. They then examine whether official debts are effectively senior to private debts and discusses institutional linkages between official creditors. The authors pull these pieces together to draw implications for the role of IFIs in aiding the former Soviet bloc. For the most part, I found the discussion of individual issues interesting and provocative. The discussion of burden-sharing is timely and informative. The analysis of linkages between creditors is worthy of further exploration.

However, the authors' claim that the pieces taken together imply that it would be a mistake to provide financing for the former Soviet bloc through IFI loans—as opposed to private loans or official grants—struck me as something of a non sequitur. An analysis of the appropriate role for the IMF and other multilateral institutions requires consideration of many important issues that are not incorporated into this paper. First, I will discuss the analyses of burden-sharing and of IFI loan seniority. Then I return to more general issues of financial assistance for the former Soviet bloc.

Developed countries have agreed to provide some financial resources to the former Soviet bloc, although the amounts and the forms of this assistance remain uncertain. Bulow and Rogoff begin their paper by asking whether the form of assistance matters from creditors' perspectives. They show clearly and conclusively that different creditors have very different interests, given that existing loans to the former Soviet bloc are

223

unevenly distributed among the countries that are preparing to provide additional resources. Germany, in particular, has large outstanding loans to the region. Thus Germany would bear considerably less of the net cost of a resource transfer if the transfer came in the form of a loan partly earmarked for debt repayments, rather than in the form of grants. The United States and other countries with small outstanding loans to the region would bear considerably more of the cost of a transfer that came in the form of a partially earmarked loan, rather than as a simple grant. Of course, another implication of the analysis is that part of the U.S. contribution to such an earmarked loan would go toward repaying the region's existing debts, rather than to assisting the region's transition. The burden-sharing implications of alternative forms of assistance deserve a prominent place in discussions about providing assistance to the former Soviet bloc. The authors have done a useful service in spelling out this point.

The paper then goes on to ask whether official debt is treated as senior by developing country borrowers. The main concern here is about the seniority of IMF lending, and ultimately about the role for IMF lending in assisting the former Soviet bloc. Two sets of information are presented to assess official debt seniority. I found this evidence suggestive—but not conclusive.

First, table 4 shows that, on average, repayment rates by severely indebted middle-income countries to private creditors have exceeded those to official creditors. While quite interesting, this need not say anything about the extent to which debtors treat official claims as senior. To make the point, suppose there were two types of countries. Type X countries are known to have a low probability of repayment. They are unable to borrow much from private creditors and those that do accumulate debts borrow primarily from official sources. Type Y countries are known to have a high probability of repayment. They tend to accumulate high proportions of private debt. Under these circumstances, it would be no surprise to observe higher repayment rates on private lending (that is, by type Y countries), even if all countries treated official debt as senior. This difference in observed repayment rates could be exacerbated by private creditors charging higher interest rates than official creditors.

Second, Bulow, Rogoff, and Bevilaqua present regression analysis examining whether secondary market debt prices are influenced by the share of official debt in total debt. Their analysis is appropriately con-

cerned with the probable endogeneity of this right-hand-side variable (as discussed above) and with the problem of selection bias pointed out recently by Ozler and Huizinga.[1] However, none of the specifications provide much support for the view that participants in these markets value official and private debt differently. The results are quite interesting and may benefit from additional analysis. It is also worth noting that they provide a justification for the use of secondary market prices in the valuation of official debts for the burden-sharing calculations at the beginning of the paper.

Nonetheless, it is far from clear what these regressions say about seniority. As pointed out in the paper, they may imply that secondary market participants view the presence of official debt as irrelevant for the expected value of private debts, given other country characteristics. Also, even if secondary markets value official and private debt equally, prices in these markets may be poor indicators of the underlying social values of the two types of debts. I will return to this point below.

The paper also points out that a number of countries that repaid low concessionary IFI loans did so with funds provided by other official sources. This includes so-called reverse graduates of the World Bank that repaid the IMF and IBRD from long-term concessional IDA funds. Another example is not discussed in the paper. Countries in arrears to the IMF have at times been brought back into the fold with the help of a friendly government that takes the lead in passing a hat to raise funds from bilateral sources. Those funds are then used to repay the arrears and return the country to good standing with the IMF.

It is certainly true that the IMF often gets repaid, not because the macroeconomic imbalances that precipitated the initial crisis have been resolved, but because of access to additional resources. The examples above illustrate this fact. However, they seem to me to have less to do with the question of whether official lending is senior than with the long-standing debate about whether short-term revolving IMF credits should be used to finance long-term structural adjustments. This debate is relevant for economies of the former Soviet bloc, as well as for developing countries.

What does all of this say about seniority? The authors reach three conclusions: that IFIs are senior only in the narrow sense that they get

1. Ozler and Huizinga (1992).

repaid first; that these institutions do not increase the total amount that countries repay; and therefore, that they do not increase capital market efficiency. The authors go on to argue that these conclusions remove the key rationale for financing the countries of the former Soviet bloc (and presumably less-developed countries, as well) through nonconcessional IFI loans. In my view, the evidence points to a much more ambiguous set of conclusions. But more importantly, acceptance of the authors' version would be far from enough to make a judgment about the role for IFI lending.

I would summarize the main results as follows. First, the IMF in particular does appear to be senior in the sense that its short-term loans do get repaid. (Note that because many debtors continue to receive net resource transfers from the World Bank, it often makes sense for them to repay World Bank loans, as well. This point is not discussed in the paper.) However, secondary market participants do not appear to value official debts more highly than private debts. Also, repayments of IMF and other non-concessional IFI loans do not always come from a debtor country's own resources. Quite a bit of taking from Peter (for example, IDA) to pay Paul (that is, the IMF) occurs. This in part may reflect the linkages among various official creditors.

These points touch on only part of the broader issue of what role nonconcessional IFI loans should play. I do not agree that the ability of IFIs to increase total repayment is the primary rationale for this type of lending. As important, if not more so, are issues such as "missing markets" and the political economy of external borrowing and lending; the authors mention these much too briefly at the end of their paper.

In addition, there are good reasons to believe that the expected social returns to supporting transition in the former Soviet bloc may exceed the expected private returns; thus private creditors may not provide the optimal level of financing—especially in the short run. Secondary market prices will not reflect social valuations that differ from private ones. Thus the paper's emphasis on these prices in the discussion of official financing may be misleading. This issue deserves a serious discussion in any analysis of the role for official lending.

The paper implicitly presents another argument against IFI loans to the former Soviet bloc that is worth making explicit. Short-term loans at market rates (such as IMF credits) extended today run a great risk of turning into tomorrow's debt crisis, with developed country govern-

ments eventually stepping in to help bail out countries in trouble. Would it make sense to avoid the likelihood of high negotiation costs and bailouts by simply providing direct concessional credits up front? This seems to me a clearer way to frame the underlying question than through the authors' lens of seniority. It is a very general question that does not have a simple answer. The remainder of my comments raise some additional considerations that I believe are central for tackling it adequately.

Suppose the West has decided on an amount of resources to provide the East. A comprehensive discussion of how those resources should be provided needs to distinguish between at least three separate issues: coordination, terms, and conditionality. A real need exists to coordinate the assistance of potentially dozens of well-meaning governments. The IMF is one sensible institution to play this role. However, agreeing on a coordinator quickly may well be more important than finding (or creating) the perfect one.

What are appropriate terms for the financing? On the one hand, short-term revolving credits may be ill-suited to finance long-term structural adjustments. On the other hand, dismissing nonconcessional IFI credits in favor of bilateral grants (or private loans) is simplistic and unrealistic. Funds for concessional lending appear quite limited and must be divided among a large number of competing uses.

How much concessional financing the former Soviet bloc will receive is very difficult to predict. One possible benchmark comes from looking at the annual official development assistance (ODA) provided to developing countries. (Overall, ODA from the United States has an interest rate of 2.5 percent and a repayment period of 27 years, with a 9-year grace period.) Suppose the countries of Eastern and Central Europe and the former Soviet Union (FSU) were treated "like" developing countries, in the sense that they received the same amounts of ODA as the average LDC with the same per capita income level and population. If so, the countries of Eastern and Central Europe and the FSU would receive about $2.5 billion and $6.0 billion in ODA a year, respectively. (These figures are based on a regression analysis of 65 ODA recipients from 1987 to 1989.) Even if amounts of this magnitude are forthcoming, plenty of room may exist for other types of financing.

Finally, the debate over conditionality—and the role of the IMF—has been long and heated; a full treatment is beyond the scope of these comments. I believe that some type of conditionality on the receipt of finan-

cial inflows is important to guard against the possibility that the funds simply enable governments to postpone difficult but necessary adjustments. On the macroeconomic front, I also believe that considerable consensus exists about *what* adjustments should be made. The real problem here is often over the politics of *how* to get these things done. The key political issues can be country-specific and may not be an area of IMF expertise. This consideration may well point to a role for the IMF in conjunction with others; however, broader involvement need not preclude a role for the IMF or other IFIs. Here again is an area that warrants attention as the international community decides how to assist the East.

Michael Bruno: As the IFIs and particularly the IMF prepare to channel very large sums of credit to the former Soviet Union during the next four years, some interesting questions arise about the form that aid should take and the burden that donors and creditors should share. The authors address many of these questions in this provocative paper. They ask what is the value to the creditors of such a large additional aid package, given that sizable sums of unrepaid debt remain outstanding? Are the IFIs the most efficient way to channel the additional money (apart from their accepted role of providing technical assistance)? Putting the question in another form, are the IFIs senior to other creditors, such as government bilateral lending or private banks? Do the IFIs have special collection techniques that make them a more efficient channel for G-7 credit? How does one empirically establish the existence of such seniority when no market for IFI debt exists? Why give aid mainly as loans rather than as grants? How does one correctly measure the burden-sharing among the G-7 countries, given that their initial debt is not proportional to their quotas in the IFIs and that additional lending may affect the value of existing debt disproportionately? Lastly, given that past transfers have flowed in both directions and among different creditors and borrowers, can one say who bailed out whom?

To address these questions, Jeremy Bulow, Kenneth Rogoff, and Afonso S. Bevilaqua have embarked on an ambitious and important research project, which continues and expands some of their earlier work on seniority and the marginal value of debt. Unfortunately, in this paper, too many of these issues are tackled simultaneously. As a result, some of the operational answers given may either be misleading or insufficiently well-grounded. This is particularly the case in three areas: estimating the

real effective cost to the creditors of extending new credit to the FSU; examining seniority; and defining the role of the IFIs. Each of these topics could be the subject of detailed investigation in its own right. On the other hand, the plurality of questions that the paper raises and the controversial nature of the answers it gives may distract readers from the important area in which the authors' research contributes the most new insights: the complex question of burden-sharing and the nature of the bargaining process among the industrial countries.

Let me start with the authors' two most controversial claims: that their "empirical analysis indicates that creditors as a whole would lose on the order of 90 cents for each dollar of new IFI loans they extend to the republic of Russia"; and that their estimates of "the low marginal values of debt . . . imply that the total burden of new loans to most Eastern European countries will be close to the burden of outright grants, regardless of whether the new lenders are senior or not."

The concept of the marginal value of debt, as distinct from the average market price, can be useful in a particular case: considering the effect on existing creditors of channeling relatively small amounts of additional debt into a country that has been in debt for a long time; where a well-functioning secondary market for its private debt exists; and where no fundamental change of policy regime is envisaged. None of these conditions hold in the case of the former Soviet bloc. It is not clear what the recent price of 40 cents on the dollar on the market for Russian debt really measures. The authors themselves question whether the much higher price of 70 quoted for Hungary may be too low because Hungary has been able to borrow limited amounts on private markets in 1992. Would the same argument not apply to Russia, once it undergoes a major stabilization and restructuring program with proper IMF conditionality attached? How can one extrapolate from shaky past market prices about the likely effect on the future Russian debt price—let alone the marginal value of debt—once the total external debt of the FSU more or less doubles from its current and not very high level of $200 per capita (see table 1)?

Of course, there is some likelihood that the massive aid effort that the G-7 is contemplating will not leave the FSU better off and that another debt crisis may loom a few years ahead. But is it reasonable to consider this a virtual certainty from the start? Neither the current subscribers to IMF capital nor the market lenders to the IBRD seem to think so. At any

rate, it would seem very far-fetched to deduce that premise from past observations based on a very thin market for private debt.

The authors are much more cautious with their claim that seniority of the IFIs over other creditors cannot be established. The attempt to get at seniority indirectly through regressions of market price of debt on the share of official debt is interesting (see table 5). Unfortunately, for the one regression that may be valid (the regression with instrumental variables) the claim is at least put into serious doubt, as the authors themselves admit. They are also frank in admitting that the regression results do not get at the "nonconventional" type of seniority, namely the type that would assign a higher marginal value to official debt than to private debt. Somehow, even though no clear market test is available, I find it hard to believe that the credit of IFIs, and particularly the IMF, which comes with so many strings of conditionality attached, does not on average have a higher standing both in the eyes of borrowers (thus making the credit senior in the narrow sense that it would be repaid first), and also in terms of its policy effectiveness (thus enhancing a borrowing country's ability to repay its total debt).

This question is closely tied to the issue of the special role that the IFIs play and the question of whether they replace any missing markets. It is hard to envisage an institution such as the IMF or IBRD as being effective in promoting or supporting a country's adjustment and structural reform agenda were it not also a creditor itself to the country in question. As to the issue of why the IFIs should extend loans, rather than simply grants, sufficient reasons exist—both economic and politico-economic, most of which are internal to the creditor countries. The authors themselves mention some of these. In particular, a mutual benefit exists to having an ongoing process of loan surveillance; this would account for the preponderance of loans, rather than grants. Finally, while the authors may be correct in their claim that "the extensive evolution of private capital markets over the past twenty years makes the missing markets rationale for IFI lending considerably more dubious than in the years immediately following the Bretton Woods agreement," it remains a fact that the massive injection of capital that in all likelihood will be channeled into the FSU with the aim of bringing about a quantum change has not and would not be likely to come from private markets. So something is still missing in these markets and will probably always be missing, when large relative magnitudes are involved.

While I have been somewhat critical of the authors' analyses of the overall implications and costs of a large aid package, I find their bargaining models and their attempts at empirical application to questions of burden-sharing very suggestive and interesting and well worth developing further. One line of reasoning that follows from the application of the marginal value of debt concept stresses the fact that a highly unequal share in an existing debt (as in the FSU's case, in which Germany holds 43 percent, while the United States holds only 1 percent) implies a very unequal effective burden-sharing of the cost of new debt, unless the new loans greatly enhance the borrowers' capacity to repay their old debt, including possibly being earmarked to repay specific old debt. Given our previous reservations about the estimate of the marginal debt value, one would have to be very careful with the relative numbers that come out of such an exercise, but the principle is certainly valid. Given the previous discussion, however, the same type of reasoning could also be applied in the positive direction: if the new aid package turns out to be the start of a major reform, don't the Germans stand a better chance of salvaging a larger part of the old debt? If so, their gain from a successful package would be greater than that of the other G-7 donors.

When countries bargain for their share of the burden, both the bilateral and the multilateral role of individual governments must be taken into account, as is done nicely in the authors' model. One additional thought comes to mind: in the utility functions of the bargainers in some of the recent debt reschedulings, governments may have included not only bilateral and multilateral considerations, but also have given some weight to the extent to which their own country's banking system was involved in the regions in question. Those banks, after all, provide some of the tax revenue (and loss) in their respective home countries.

In practice, the authors probably argue correctly that the seniority status of the IFIs may well come largely at the expense of bilateral government creditors and other agencies run by the IFIs' industrialized-country sponsors. The empirical analysis of repayments done with other other official money suggests the need to do the overall accounting more thoroughly. At the same time, there is not much to the argument "that much of recent World Bank aid has simply 'crossed 19th street' . . . and has been used to repay the IMF." It is not surprising that the IMF comes in first to a distressed country and gives short-term adjustment lending, while the World Bank follows later with the longer term structural or

investment loans. It is, in fact, inherent to the natural division of work (or what has remained of it) between the two great Bretton Woods institutions.

All in all, this is a provocative paper written by authors who have already contributed considerably to our thinking on these subjects and who should be encouraged to continue with their work. The role of institutions and of policies should always be questioned from new angles. Policymakers, however, should also be aware that new insights do not necessarily and immediately lead to new practical answers before the tools have been given a chance to be perfected.

General Discussion

Stanley Fischer found the notion of seniority unclear and cited three alternative concepts of seniority that do not involve market pricing of debt and could be employed to examine IFI seniority. First, in no case has a private creditor been repaid before one of the international intermediaries. Second, IFI bonds issued to cover loans to developing countries are better investments than corresponding bonds of private banks. According to these concepts, the IFIs clearly are senior creditors. Third, because of the commitment by governments—and ultimately, taxpayers, who have implicitly undertaken to provide financing as necessary to the IFI's client countries—the IFIs as institutions are themselves senior creditors that will get serviced, if anybody does. Fischer could not see how the analysis of actual net transfers in the 1980s could reveal anything relevant about seniority. The IFIs saw it as their mission to provide net transfers precisely when private creditors were trying to withdraw. This had nothing to do with which creditors were in a position to get serviced ahead of others.

Fischer added that the actions by governments to help out the private banks in this period, by providing net transfers when bank repayments were threatened, was a separate decision and not a matter of seniority. He hoped that, in a similar situation in the future, private creditors would be left to deal with their own problems.

Lewis Alexander pointed out that the ex post return on debt by different creditors would not, in general, reveal which creditor was senior. Over extended periods, if there were risk-averse junior creditors, they

would expect higher returns to compensate for the greater risk of being junior. For a relatively short period following a negative shock, senior creditors might buy out junior creditors, if bankruptcy costs were significant and the long-term prospects for solvency were reasonable. This is one possible explanation for the behavior of official creditors during the 1980s. Regressions presented in this paper cannot hope to sort out these possibilities.

Several panelists questioned whether grants would be preferable to concessional loans as a way of providing economic assistance. Fischer observed that loans carry the possibility of repayment if a project or country turns out well. He reasoned that Russia should receive loans rather than grants because it was likely to be able to repay loans. He also stressed that loans established a desirable ongoing relationship between borrower and lender in a way that grants do not. Alexander added that it is politically easier for donor countries to provide assistance through loans, rather than through grants. Martin Baily noted that grants to Russia, by postponing the need to transform the economy, could slow the processes of change necessary for development. He considered loans preferable because they could more easily be related to needed development projects and because they required repayment, making it more likely they would be used for investment. William Brainard reasoned that a large discrepancy probably existed between the social and private returns on either grants or loans to the former Soviet Union. Moreover, great uncertainty exists about whether good or bad outcomes will emerge from the current reform attempts in Russia and the other former republics. Loans have the advantage of being repaid if the outcomes are good, while providing at least as much current assistance as grants to minimize the risk of bad outcomes.

References

Bulow, Jeremy, and Kenneth Rogoff. 1988. "The Buyback Boondoggle." *BPEA, 2:1988*, 675–98.

————. 1989. "A Constant Recontracting Model of Sovereign Debt." *Journal of Political Economy* 97: 155–77.

————. 1991a. "Is the World Bank a Preferred Creditor?" Unpublished paper, Stanford University (June).

————. 1991b. "Sovereign Debt Repurchases: No Cure for Overhang." *Quarterly Journal of Economics* 106: 1219–35.

Claessens, Stijn, and others. 1990. "Market–Based Debt Reduction for Developing Countries: Principles and Prospects." World Bank Policy and Research Series no. 16. Washington: World Bank.

Cohen, Daniel. 1991. *Private Lending to Sovereign States: A Theoretical Autopsy*. Cambridge, Mass.: MIT Press.

Dooley, Michael, and Mark R. Stone. 1992. "Endogenous Creditor Seniority and External Debt Values." Unpublished paper, International Monetary Fund (January).

Fernandez, Raquel, and Sule Ozler. 1991. "Debt Concentration and Secondary Market Prices: A Theoretical and Empirical Analysis." Working Paper 3654. Cambridge, Mass.: National Bureau of Economic Research (March).

Fernandez, Raquel, and Robert W. Rosenthal. 1990. "Strategic Models of Sovereign-Debt Renegotiations." *Review of Economic Studies* 57: 331–49.

Fernandez-Arias, Eduardo. 1990. "Essays on International Debt Negotiations: A Game-Theoretic Approach." Ph.D. thesis, University of California at Berkeley.

Fernandez-Arias, Eduardo, and Asli Demigurac-Kunt. 1991. "Burdensharing among Official and Private Creditors." Unpublished paper, World Bank (August).

O'Connell, A. S. 1989. "A Bargaining Theory of International Reserves." Unpublished paper, University of Pennsylvania (August).

Ozler, Sule, and Harry Huizinga. 1992. "Bank Exposure, Capital and Secondary Market Discount on Developing Country Debt." Working Paper 3961. Cambridge, Mass.: National Bureau of Economic Research (January).

Warner, Andrew. 1992. "Did the Debt Crisis Cause the Investment Crisis?" *Quarterly Journal of Economics*, forthcoming.

World Bank. 1990. *Social Indicators of Development*. Washington: World Bank.

————. 1991a. *World Debt Tables, 1991–92: External Debt of Developing Countries*. 2 vols. Washington: World Bank.

————. 1991b. *World Tables 1991*. Washington: World Bank.