FIRST DRAFT--PRELIMINARY
July 9, 2002
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Estimating Private Returns to Emerging Market Lending, 1970-2000

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Abstract

We estimate ex-post returns to emerging market debt flows by constructing the relevant transfers between debtors and creditors from World Bank debt data, and combining them with with secondary market debt prices. We find that long run ex post risk premia have been close to zero for the asset class: from 1970-2000, returns averaged 9 percent per annum, about the same as the return on a 10 year U.S. government bonds based on the same net flows. However, there is considerable heterogeneity across time and across counties. The 1970-2000 period can be decomposed into a 1970-89 cycle with negative or very low returns, very high returns from 1989 until the Mexican crisis, and lower but positive ex post spreads since. Across countries, returns are negative for some countries and up to 200 basis points higher than the U.S. government bond for others. Countries with positive ex-post spreads tend to be countries that never defaulted.

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This paper could not have been written without the constant support of the World Bank's Financial Data team, headed by Punam Chuhan. We are particularly indebted to Nevin Fahmy and Ibrahim Levent, who provided us with most of the data used in this paper and answered countless questions. Their support does not imply that they necessarily endorse the methodology applied or results presented in this paper. We are also very grateful to Joyce Chang and Jarrad Linzie of the JP Morgan Research Department for providing us with data on secondary market debt prices, and to Olivier Jeanne for discussions on the subject. Priya Joshi provided outstanding research assistance and prepared Appendix II. The views expressed in this paper are those of the authors and do not necessarily reflect IMF views or policies.

I. INTRODUCTION

How high are average returns to emerging market lending—in particular, sovereign lending—over long periods? How volatile are they over shorter periods? After the dust settles in debt crises and restructurings are renegotiated, how much do private creditors actually loose? Ex post, have creditors of countries that did default fared much worse than creditors of other emerging market countries that did not? How have average returns evolved over time—in particular, when comparing the 1980s and the 1990s?

Questions of this type have direct relevance for the ongoing debate on reforming international financial architecture, limiting IMF bail-outs, and perhaps finding alternative ways to deal with sovereign debt problems. For example, it is generally assumed that the official sector's approach to crisis management in the second half of the 1990s, the era of large-scale crisis lending, was very different from the 1980s, when there were no big bail-outs and private creditors supposedly suffered heavy losses. Similarly, the debate on creditor moral hazard implicitly assumes that differences in the official sector's approach to various crisis countries during the 1990s made a major difference in terms of how private investors fared. Yet, there is little evidence supporting (or refuting) such views. In part, this is because of the difficulties of computing the ex post returns associated with particular loans or debt instruments in the face of rollovers, defaults and debt restructurings. To do this, one would either need to know the market value of the remaining claim, which often does not exist, or need to track actual cash flows deriving from this claim. This data is not generally available, at least not at the level of individual debt instruments.

This paper estimates returns to emerging market lending, from the perspective of private creditors, both for the entire period since private debt flows took off in the early 1970s and for a set of shorter sub periods since the mid-1980s. Following Lindert (1989), Cohen (1992) and Klingen (1994), we side-step the difficulties associated with computing investor returns for particular episodes and debt instruments by focusing on aggregate lending to countries (or sovereigns) and comparatively broad debt categories. This permits the use of World Bank *Global Development Finance* (GDF) data (since 1970) as a source for constructing the relevant debt flows between creditors and debtor countries. While the published data needs to be adjusted to ensure that we capture all cash flows associated with an initial disbursement and vice versa, the use of broad debt concepts makes this a comparatively manageable problem, and the necessary adjustments can be made using available (although generally unpublished) data collected by the World Bank. We then compute internal rates of return for these adjusted flows. In order to value final debt stocks—as well as initial debt stocks, when computing returns over sub-periods—we collect a large set of secondary market debt prices from several sources, and use it to construct country-level debt prices for the 1986-2000 period.

We stand on the shoulders of a small but significant literature which attempted to estimate repayment performance and private investors returns during the debt crisis. Lindert (1989) and Lindert and Morton (1990) used World Bank debt data to calculate internal rates of return from private lending from 1973 to 1986 under a full repayment and a complete default

scenario. They pointed to a number of potential problems with using "net transfers" as reported by the Bank (i.e. disbursements minus the sum of interest and repayments) for the purposes of computing internal rates of return, and instead suggested constructing flows from changes in debt stocks.[2] This idea was rejected by Cohen (1992) in the context of calculating debt repayments up to 1989 as a share of 1982 debt outstanding, on the grounds that changes in stocks would mismeasure flows to the extent that they reflected changes in the currency valuation of debt (i.e. cross-exchange rate movements with respect to the U.S. dollar). While agreeing with Cohen on this point, Klingen (1994) argued that Lindert's original reasons for constructing flows based on changes in stocks remained valid, and proposed a refinement of Lindert's approach that subtracted changes in currency valuation when deriving flows from changes in stocks, among several other adjustments. Using this methodology, Klingen computed internal rates of return for privately held debt for the 1970-92 period, using secondary market prices to value the end stock.

The present paper extends this literature in several respects. First, it is broader in scope. Not only do we calculate long run emerging market rates of return over a longer horizon—1970-2000, which includes both the debt crisis and the boom-bust cycle of the 1990s—but we also describe how returns evolved over time by estimating returns over a sequence of subperiods, beginning in 1986. Second, it contains some methodological innovations and new data work. Both Lindert (1989) and Klingen (1994) partly misjudge the coverage of "net transfers" as reported by the Bank, and as a result are not entirely correct in their interpretation of the stock-flow discrepancy, and in the adjustments necessary to derive the relevant flow concept based on stocks. We clarify these misunderstandings, modify the Klingen (1994) method accordingly, and implement it using both published and unpublished World Bank data, in a manner that is fully consistent with the Bank's own approach to reconciling stocks and flows in the GDF database. In addition, we present an alternative set of estimates based on adjusting reported net flows directly, rather than inferring net flows from changes in stocks. Finally, to estimate the dynamics of returns over time, we make much greater use of secondary market debt prices. Combining data since 1986 from a variety of sources, we construct average end-year debt prices for several classes of instruments and aggregate debt. We use this data to value debt both in the initial year of a particular holding period and in the final year.[3] This enables us to compute returns over short periods rather in addition to the long run. Our price data is made available in the appendix of the paper.

The main results are as follows. From 1970-2000, returns averaged about 9 percent per annum, about the same as a 10 year U.S. government bond. In other words, ex post risk premia over the entire 1970-2000 period were close to zero. However, this overall result masks considerable heterogeneity both across countries and over time. The 1970-2000 period can be decomposed into a 1970-89 cycle with negative or very low returns, a period of very

[2] See Lindert (1989), appendix B.

[3] For a related methodology, see Dooley, Haas and Symanski (1994).

high returns from 1989 until 1993, and lower but positive ex post spreads since then. The idea that large-scale official crisis lending drove extranormal ex post investor returns in the 1990s receives mixed support. On the one hand, the boom of the 1990s seems driven mainly by the 1989-93 period, which preceded large-scale crisis lending. However, there is one sub-period during the second half of the 1990s—from 1994 to 1997—where investors returns were indeed unusually high in all but the Asian crisis countries. Across countries, long-run returns range from negative to about 200 basis points above the U.S. government bond. With only one exception—Mexico—countries with consistently positive spreads are countries that never defaulted on their bonds.

II. METHODOLOGY AND DATA

As stated in the introduction, the basic approach in this paper is to compute internal rates of return based on debt flows recorded in the World Bank's "Global Development Finance" database, as if we were trying to evaluate the return on an investment project. Two obstacles stand in the way of applying this approach. The first is the mundane but non-trivial issue of constructing a relevant payments series based on the World Bank data. As observed by Lindert (1989) and Klingen (1994), it would be incorrect for our purposes to use the published GDF flow data directly (although the nature of the data problem and the necessary adjustments were somewhat misjudged by these authors).[4]

The second problem has to do with the fact that the investment project analogy itself is obviously not perfect. Most obviously, there is no "final repayment" at the end of our sample period. Instead, investors own an outstanding debt stock, i.e. a claim to (possibly doubtful) *future* principal repayments and interest payments. Similarly, in the first sample year, investors start out owning a positive debt stock in addition to making a disbursement. When we compute rates of return over the entire sample period (1970-2000), this is not a big problem–since the initial debt stock was tiny relative to the disbursements that followed–but it is if we want to compute returns over sub periods, say, for 1990-2000. A potential solution is to value both the first period and end-period debt stock at secondary market prices, i.e. to compute returns as if investors had bought debt in the market at the beginning of the period, received net flows, and finally sold their end-period holdings at market prices. However, secondary market debt prices are only available for some instruments and some countries and not available at all prior to 1986, so this approach requires some assumptions. In addition, to the extent that we choose our sample of countries based on the availability of secondary market prices at the end of the period, we are exposed to a possible "survival bias", as countries that performed very poorly may have disappeared from the debt market.

[4] Lindert (1989) and Klingen (1994) overstate the extent to which the GDF's "net transfers" concept needs to be adjusted. On the other hand, they place too little emphasis on how to deal with stock-flow discrepancies that are basically due to measurement error. See Appendix I.

We now discuss our approach to these problems in turn. In addition, we briefly describe our methodology for computing a alternative rate of return on U.S. debt instruments that we use as a benchmark to compare our results.

A. Measuring Net Transfers from the Creditor Perspective

Data on actual "net transfers" between creditor's and debtors—defined as disbursements minus the sum of interest payments and principal repayments—is directly available from the World Bank's GDF database for a variety of debt types (total, long term, long term public and publicly guaranteed, long term private non-guaranteed) and creditor classes (official and private, including some subcategories). This concept is already very close to what need. Not only will it capture standard disbursements and debt service, but—with one important exception that will be discussed below—debt restructuring operations will be reflected exactly as one would want it. For example, debt stock write-offs (or rescheduling) of principal will lead to correspondingly lower (or later) principal repayments. In addition, the GDF employs appropriately broad payments concepts. To name two important examples that have caused confusion in the past, cash payments associated with a debt buy back operations are regarded as "principal repayments" and are thus included in net transfers on long term debt. So is the *clearance* of interest arrears on long term debt, even though accumulated arrears themselves are regarded as short term debt.

The one major conceptual problem associated with the use of GDF net transfer data has to do with debt consolidation or restructuring operations that involve exchanges of instruments *across* asset classes. In that case, the GDF will record a stock operation in one debt category, but the counterpart operation will be recorded in a different debt category, and may not be recorded at all if the other asset is not debt (as in the case of debt-equity swaps). In the event of a stock reduction operation in the original debt class, this would lead us to underestimate investor returns. As in the case of a pure cancellation of claims, we would see debt stocks and subsequent payments decline in the category which we are tracking, ignoring the fact that investors may in fact have been compensated by obtaining new claims in a different asset class. Conversely, if we were tracking returns in the latter, these would be overestimated. Consider a few examples.

- In the case of debt-equity swaps mentioned earlier, the GDF would record a decline in the debt stock as well as subsequent debt service, but no repayment, since no cash repayment occurs. From the investor perspective, however, the receipt of equities constitutes a claim on a new payments stream; ignoring this claim would lead us to underestimate the return on debt.

- In the case of a consolidation of short term debt into long term debt, short term debt declines without a repayment while long term debt—and future debt service on long term debt—increases without a disbursement. The rate of return on long term debt would be overestimated, because the initial "investment" that creditors had to make (reducing their claims on short-term holdings) is ignored.

- In the case of an exchange of loans for bonds (as occurred in the context of the Brady deals) we would see the loan stock and subsequent debt service on loans decline without a repayment, while the bond stock increases without a disbursement, leading to the underestimation of returns on loans and overestimation of returns on bonds if reported net transfers are used mechanically.

In principle, the solution to the problem of debt exchanges across asset classes is simple: we must explicitly record such transactions as quasi-repayments or disbursements. In other words, we must construct a modified net transfer series from the creditor perspective, as follows:

(1) $ntr^* = -ntr + des + x$

where *ntr* are net transfers from the debtor perspective as recorded in the GDF, *des* stands for the market value of debt swapped for equity and x is the sum of quasi-repayments (entering with a positive sign) and quasi-disbursements (entering with a negative sign) attributable to any operation involving stock adjustments across debt categories.

What x precisely contains will depend on the debt category on which we are focusing. The more specific the category, the more potential cross-category restructurings we may have to account for. For example, if we are interested in *total* debt, then the only transaction we need to add to $-ntr$ is debt-equity swaps as a quasi-repayment; thus $x = 0$. If we are interested in privately held *long-term* debt, then $x = -sc$, the increase in the long term debt stock resulting from short term debt consolidation (a quasi-disbursement). If we focus on privately held *long-term public and publicly guaranteed* debt, we may in addition have to worry about conversions of private non-guaranteed debt into public debt, and so forth.

The approach taken in this paper is to focus mainly on broad debt categories to keep the problem of accounting for cross-category restructurings relatively manageable. However, we stop short of computing rates of return on *total* debt, which would include short term debt, for several reasons. First, virtually all emerging market debt traded in secondary markets has an original maturity of more than one year, and is thus classified as long-term by the world bank; second, except for interest arrears, the GDF does not break down short term debt by public and private creditors, third, the World Bank's debtor reporting system, in which debt is reported by debtor country officials on an annual basis, is not considered a very reliable source for short term, mostly privately issued, debt. Accordingly, most of the focus of the paper is on privately held long-term debt (both public and publicly guaranteed, and private non-guaranteed), and privately held public and publicly guaranteed debt only, i.e. essentially sovereign debt held by private creditors.

The question is how to measure x for these debt concepts. There are two ways: either by attempting to measure its components directly, or by "backing it out" from changes in the debt stock. We refer to the former as the "direct approach" and the latter as the "indirect

approach". As it turns out, the World Bank maintains and kindly supplied us with data on both debt-equity swaps and short-term debt consolidations,[5] so in this paper, the direct approach is feasible at least for our broadest debt category—privately held long-term debt—where $ntr^* = -ntr + des - sc$. The indirect approach, which was initially suggested by Lindert (1989) and refined by Klingen (1994), works as follows. Consider the following identity, which relates long term debt stocks to flows:[6]

$$(2) \qquad \Delta D = d - r - dsr - df + ccv + ic - x + u$$

where x is our placeholder for net cross-category debt restructurings other than debt-equity swaps, ΔD denotes the measured change in the long-term debt stock (in U.S. dollars) for the relevant creditor class, d denotes (recorded) disbursements, r denotes (recorded) principal repayments, dsr denotes debt stock reduction as a result of any debt restructuring operation, including debt-equity swaps, net of the cash payments associated with buybacks (since these are already recorded as principal repayments), df denotes debt forgiveness, ccv (cross-currency valuation) denotes changes in measured dollar debt stocks as a result of exchange rate movements vis a vis the dollar, ic denotes interest and interest arrears capitalized, and u denotes a residual attributable to measurement error in any of the categories in the identity.

All items in equation (2) except for x and u are observable.[7] In principle, u should be zero. In that case, x can be computed as the residual in equation (2).

In this paper, we try both the direct and indirect approach for the broadest two debt categories. In the absence of any measurement error, they should give us exactly the same answer. In practice, of course, u is not zero and the two methods give somewhat different

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[5] Debt-equity swaps are a sub item of "debt stock reduction", which is shown in the aggregate in Section 7 of the published GDF country tables. Short term debt consolidation is tracked separately and is not explicitly shown in the published GDF, although it can generally be backed out as a residual by subtracting changes in the short term debt stock from net flows on short term debt (see line "of which: short term debt", below "Net flows on debt") in Section I of the GDF and adding the line "Net change in interest arrears" from Section 8. See Appendix I.

[6] This identity closely resembles the debt stock-flow reconciliation presented in Section 8 of the print version of the GDF. Appendix I explains how the two are related.

[7] The World Bank maintains data on debt stock reductions, debt forgiveness, interest capitalization and cross-currency valuation for various debt and creditor classes. At the most aggregate level (total debt), these are available in the public database. Disaggregated data, which we used to construct the concepts on the right hand side of equation (2) at exactly the level of aggregation at which we need it (namely, for privately held sovereign debt and all privately held debt) was kindly provided to us by the Bank.

answers. As we shall see, the answers are not that far apart for most countries and in the aggregate, and our overall conclusions do not depend on which answer we believe. This said, it is worth asking which method we should trust more. The answer, of course, depends on what generates the residual. If the measurement error is mostly in reported net flows (i.e. disbursements and repayments) and *x* as recorded directly by the debtor reporting system, then the direct approach would mismeasure *ntr**, and we would be advised to go with the indirect method. If, on the other hand, we are primarily mismeasuring the adjustments *dsr*, *df*, *ccv* and *ic* that we are making to the changes in the debt stock, or changes in the debt stock itself, then the direct method would be better.

Our colleague Nevin Fahmy of the World Bank's Financial Data Group, which maintains the debt data used in this paper, has done us the favor of examining the major residuals we found, i.e. the discrepancy between *x* as reported directly and *x* as inferred from (2). While the residuals often have idiosyncratic "causes", there appear to be a few systematic sources of error. In general, these will be filtered out by the "indirect method" but not the direct method. First, the Bank's debtor reporting system's data on short term debt consolidation (one of the variables in *x*) is not very reliable for the 1980s—when many of these restructuring took place—and is in fact not published for that reason. Perhaps more importantly, the countries examined in this paper occasionally "discovered" previously unrecorded debt in the context of a debt crisis or a debt restructuring agreement, and sometimes broadened the definition of external debt covered in the GDF (for example, to include state and provincial debt in addition to central government debt). In these cases, the debt stock would be adjusted upward, generally without recording a corresponding disbursement.[8] Since subsequent repayments and interest payments are related to the new debt stock, the reported net flows need to be adjusted by a "quasi-disbursement" to avoid exaggerating the rate of return. This is exactly what the indirect approach achieves, since it adds the residual *u* to recorded net flows.

This said, not all potential sources of error favor the "indirect approach". In particular, *ccv* data is available in the GDF only for public and publicly guaranteed debt, but not for private non-guaranteed debt, which is included in one of the two broad debt concepts we look at. In addition, it is of course possible that the direct approach might deal better with some of the idiosyncratic residuals than the indirect approach. While we believe that the indirect method is closer to the truth, there are thus reasons to look at the results from both sides.

[8] The flow counterpart of the higher debt are unrecorded net disbursements in the past. While the Bank will attempt to adjust past flows if there is new information on the timing and level of past disbursements, these are often unclear, and in that case no flow adjustments will take place.

B. Valuing Debt Stocks and Addressing Survival Bias

Valuing the first and last period debt stock is conceptually simple: we take the outstanding stock of privately held long term debt (in case of the final period, inclusive of interest arrears)[9] and multiply the result with a weighted average of secondary market debt prices. This average is computed over all debt issues for which prices are available, using the face value outstanding of each instrument to compute the weight. For the mid 1990 until 2000, we mainly use instrument-level prices contained in J.P. Morgan's "EMBI Global" bond index. For the late 1980s and early 1990s, we mainly use representative, country specific secondary market loan prices that are available for the pre-Brady deal period. Our sources, calculations and resulting prices series are described in detail in Appendix II.

Three potential problems are raised by this approach. First, no secondary market price data is available prior to 1986, preventing us from computing rates of return for any sub sample that begins before that year. However, we do compute rates of return for the entire sample 1970-2000, treating the face value of debt outstanding in 1970 as an "initial disbursement". To the extent that the outstanding debt in 1970 was actually worth less, this implies that our results for the long-run (1970-2000) rate of return will slightly understate the true ex post rate of return over that period. However, any bias is likely to be minimal, for two reasons. First, end-1970 developing country debt held by private creditors was very small relative to the flows that followed (for example, developing country sovereign debt held by private creditors increased almost twenty-fold between 1970 and 1982). Second, any market discount would have been very small, since 1970 preceded the first developing country default experiences to private creditors by several years.[10]

Second, we must assume that debt prices available for the period after 1986 are representative beyond the specific instrument to which they refer. This is not a big problem "within" the loans and bonds debt classes, since we have prices for the vast majority of sovereign bonds trading since the mid 1990s, while the loan prices we use for the late 1980s and early 1990s are representative by construction. A more difficult question is whether the loan and bond prices we use can be assumed to apply to *other* debt categories—for example, whether the bond prices we use in 2000 would also apply to bank loans if these were traded (no secondary market for loans existed in 2000). Assuming this may or may not create a bias depending on whether the terms of the instruments for which we don't have prices resemble those of the instruments for which we do, and of course depending on the relative size of the debt class for which we have prices. Appendix II shows that the issues for which prices are

[9] Interest arrears on long term debt constitute a claim on future long term debt flows, but are classified as short term debt in the GDF and are thus not automatically part of the long term debt stock as reported in the GDF.

[10] The first postwar debt crises to involve privately held debt in significant amounts were Zaire and Peru in the mid-seventies.

available generally represent a substantial share of the total debt stock, but there are exceptions for some countries and time periods.

The third problem is that we only have end-2000 debt prices for a particular set of countries, namely approximately two dozen countries that are usually referred to as "emerging markets". If we allow this set to define our sample (in particular, for the purposes of computing long run, 1970-2000 returns), our aggregate results–pooling debt flows to these countries–may display "survival bias", because some countries may no longer be traded on the secondary debt market on the grounds that they were poor performers, from an investor perspective. Indeed, there are several countries—Bolivia, Egypt, Sudan, the Republic of Congo and the Democratic Republic of Congo (Zaire)—whose debt was traded in secondary markets in the late 1980s and early 1990s but which subsequently disappeared from the debt market.

To deal with this problem, we take the following approach. First, we present the results for the 2000 sample without addressing survival bias. We then show the results for a sample of countries defined by the existence of secondary market debt prices in *1991*, *assuming a zero 2000 price* for the countries for which no secondary market price existed in 2000. Until 1991, the presence in the secondary debt market was not necessarily a sign of "survivorship": the secondary market was created during the 1980s to trade loans to these countries that had large stocks of debt outstanding *and* had run into debt service troubles in the course of the 1980s. Moreover, no country had yet "dropped out" of this market (the first to do so was Bolivia in 1993). Thus, letting the existence of secondary market debt prices in 1991 define our sample does not create an upward bias to returns (if anything, in might create a downward bias). Moreover, assuming that the debt of the countries that dropped out of the sample was worth nothing in 2000 is of course an exaggeration. Thus, comparing our results for the 1991 sample with those for the 2000 sample gives us an upper bound for the survival bias that might be distorting our results.

C. Computing Rates of Return on an Alternative Investment

Our final methodological problem is how to compute a benchmark rate of return that we can compare our results to. In this paper, we compute the *ex post* rate of return on a risky asset. As such, we would expect to see a risk premium even ex post. Since we are looking at a long period which includes many debt crises and defaults, we expect this premium to be significantly smaller than the usual ex ante premium reflected in interest rate spreads, but because of risk aversion, we do not expect it to be zero.

The ideal comparison would be between the ex-post returns computed in this paper with the ex post return on another liquid asset in a similar risk category, say risky corporate bonds in the United States. However, while interest rates for such bonds are readily available, ex post returns are not, and computing them would constitute a research project of its own. As a result, we undertake a more modest comparison, which is to compare our returns to the returns on a U.S. government bond of appropriate maturity. When we compute the long run average return, we use the U.S. ten year government benchmark bond since the average

maturity as the loans and bonds considered here is about 10 years; when we compute returns over shorter holding periods, we use the U.S. government bond over the maturity of the holding period. Because the U.S. government did not default on its bonds during the 1970-2000 period, ex ante and ex post returns are effectively the same: we can compute ex post returns, assuming that bonds are held to maturity, using ex ante yields. In the event that we find an ex post premium on emerging market debt returns, this comparison will not allow us to say whether the premium was surprisingly large or rather small, but at least it will answer the question whether there was an (ex post) emerging market debt premium.

The only complication is that we need to compute the "correct" average of U.S. government bond yields over the 1970-2000 period to our emerging market returns, i.e. an average that reflects the time distribution of actual debt flows to emerging markets over the period. For example, if most of flows to emerging markets had occurred in the 70s and early 80s, when U.S. inflation and government bond yields were relatively high, we would need to weight this period correspondingly higher. In practice, our approach is to compute the rates of return on an "alternative investment", using the same internal rate of return methodology as elsewhere in the paper, assuming that actual disbursements to emerging market countries had instead been used to purchase an asset returning the U.S. government bonds yield. This results in a different benchmark rate of return for each country in our sample. In most (but not all) cases this is somewhat higher than the unweighted average of government bond yields over the 1970 to 2000 period, reflecting large emerging market flows in the late 1970s and early 1980s. In addition, for each country we obtain slightly different benchmark rates of return depending on whether the "direct" or "indirect" methodology is applied to calculate net flows, because this affects the profile of disbursements that we use to compute average U.S. bond yields. Details of the methodology are described in Appendix III.

III. RESULTS

A. Long Run Returns on Emerging Market Debt, 1970-2000

We begin by presenting long-run results for all developing countries and emerging markets for which secondary market debt prices were available in 2000, ignoring the issue of survival bias for the time being. We show four sets of results: for a very broad concept that includes all private creditor debt flows, to both official and private borrowers, and a slightly narrower concept that includes only sovereign debt owed to private creditors, [11] using both the

[11] In GDF terminology, the former is based on the sum of "PPG, private creditors" and "PNG" in its entirety (PPG stands for public and publicly guaranteed debt, PNG for private non-guaranteed debt), while the latter only includes "PPG, private creditors". Throughout the paper, we use the terms "public and publicly guaranteed debt" and "sovereign debt" synonymously, although the former may include publicly guaranteed private debt that usually would not be referred to as "sovereign debt".

"indirect" and "direct" methodologies in each case, as described in Section II. A. . The main trade-offs is as follows. Since the GDF data is based on information supplied by debtor country officials, we feel more comfortable using only sovereign debt data compared to a broader concept that also includes debt issued by private debtors. However, the broader concept has the advantage that we do not have to worry about reclassifications between private and sovereign debt when applying the "direct" method, and that no assumptions are required on whether short term debt consolidation affected only sovereign debt or also privately issued debt. Using the "indirect" method in conjunction with the broad debt concept avoids these problems, but requires an assumption on cross currency valuation changes for private debt, for which no data is directly available in the GDF. Table 1 summarizes the assumptions underlying the four concepts. It shows that sovereign debt flows computed through the indirect method are probably somewhat more trustworthy than the alternatives: it avoids using the potentially unreliable data about private issues, while requiring no particular methodological assumptions. Moreover, as argued in Section II. A. , we generally expect the indirect method to deal with underreporting errors more effectively than the direct method.

Table 1. Comparison of Assumptions

Methodology	Debt Concept: all privately held long run debt	Debt Concept: only sovereign (public and publicly guaranteed) privately held long run debt
indirect approach	Assumes that currency composition for PNG is the same as for public debt to estimate cross-currency valuation data for private non-guaranteed (PNG) debt.	no particular assumption needed
direct approach	Assumes that all recorded short-term debt consolidation refers to privately held debt only.	Assumes (1) all recorded short-term debt consolidations refer to privately held *public and publicly guaranteed* debt only; (2) no debt stock adjustments *across* the private and sovereign debt categories

Table 2 is our main table for this section. Apart from showing returns for each of the four concepts summarized in Table 1, we show also show the returns that investors would have received had they instead invested in U.S. 10 year government bonds, assuming the same path of gross disbursements. Since these disbursement paths of course differ across countries, debt concepts and methodologies, so will the alternative returns.

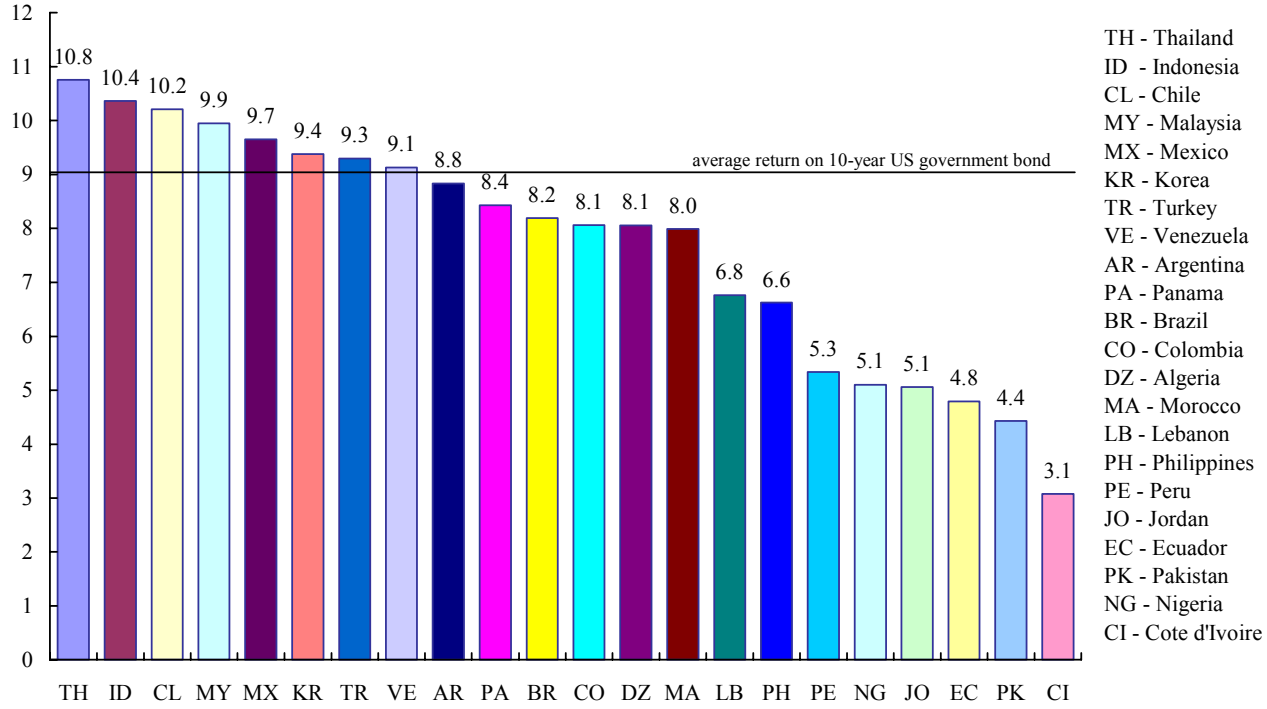
Table 2. Countries with Secondary Market Prices in 2000:
Ex-Post Returns to Private Creditors, 1970-2000

	all long term debt				sovereign debt only			
	indirect approach		direct approach		indirect approach		direct approach	
	actual	US 10yr	actual	US 10yr	actual	US 10yr	actual	US 10yr
All countries	8.4	8.8	9.3	8.8	8.5	9.1	9.1	9.0
Latin America	8.5	8.9	9.5	8.9	8.3	9.2	9.5	9.0
Argentina	7.2	8.8	8.5	8.6	7.3	9.4	11.8	8.5
Brazil	8.5	8.8	9.2	8.7	8.5	9.3	7.7	9.1
Chile	9.5	9.2	9.7	9.4	9.0	9.6	12.6	9.9
Colombia	8.5	8.4	8.6	8.6	8.0	8.6	8.1	8.6
Ecuador	4.5	9.1	4.5	9.2	4.0	9.2	6.4	9.2
Mexico	9.6	9.0	11.0	9.1	9.3	9.2	10.4	9.1
Panama	8.0	8.8	9.0	8.8	8.1	8.8	9.1	8.9
Peru	6.0	8.7	2.5	9.0	6.2	9.3	3.7	9.1
Venezuela, RB	7.6	9.1	13.1	8.8	7.9	8.9	11.5	8.6
Emerging Asia	8.7	8.6	9.8	8.9	9.5	9.2	9.5	9.2
Indonesia	8.4	8.4	11.2	9.1	10.0	9.2	11.1	9.3
Korea, Rep.	9.6	8.7	9.1	8.7	9.8	9.2	8.6	8.9
Malaysia	8.8	9.2	8.6	9.3	9.5	9.8	10.8	10.0
Philippines	6.9	8.6	6.4	8.5	7.0	8.7	5.8	8.7
Thailand	8.9	8.2	12.0	9.2	10.8	9.1	10.7	9.0
Other emerging	7.6	8.7	7.6	8.6	8.0	8.8	7.0	8.7
Algeria	8.6	9.0	7.1	8.8	8.6	9.0	7.1	8.8
Cote d'Ivoire	4.6	9.5	8.2	9.5	4.0	9.4	1.2	9.3
Jordan	6.0	9.0	3.2	8.6	6.0	9.0	3.2	8.6
Lebanon	7.0	6.5	6.5	6.5	7.0	6.4	6.2	6.4
Morocco	8.9	9.1	5.7	8.9	9.2	9.2	5.6	9.0
Nigeria	7.6	10.0	-0.2	9.1	7.7	9.9	0.0	9.0
Pakistan	4.6	8.1	4.6	8.3	4.9	8.5	3.6	8.5
Turkey	6.7	7.5	12.8	7.6	7.6	7.9	12.7	7.8

The main finding of Table 2 is rather startling: for aggregate debt flows to emerging markets as a whole, most regional aggregate flows and many country flows, *long run ex-post risk premia have been close to zero*. For overall aggregate flows and aggregate flows to Latin America, we tend to see small positive premia if the "direct" method is used and small negative premia if the "indirect method" is used. For East Asia, risk premia are always positive regardless of the method used, but small (between 10 and 110 basis points). For "Other emerging", a highly heterogeneous residual category, ex post risk premia were negative regardless of the method, in the order of -80 to -170 basis points.

This aggregate picture masks considerable cross-country heterogeneity (see Table 2 and Figure 1, where we show sovereign debt returns using a weighted average of the "indirect" and "direct" methods with weights 0.66 and 0.34 respectively, in line with our view that the former is generally more reliable). While the results for individual countries are sometimes sensitive to the methodology used—particularly in four cases: Argentina, Venezuela, Nigeria and Turkey—the following are robust statements. First, there is a large difference, in the order of 600-1000 basis points per annum between the highest and lowest performing countries in our sample. This is true even though some of the lowest performing countries in the early 1990s are no longer in the sample, i.e. survival bias considerable biases down heterogeneity in returns, as we shall see below. Second, only a half-dozen countries tend to have positive ex post sovereign risk premia regardless of the weights placed on the "direct" and "indirect" results, namely Chile, Mexico, Indonesia, Korea, Malaysia and Thailand. Note that Mexico is the only Brady deal country in this group; the others never experienced a debt crisis that ended in either default or a debt write-off involving principal. Conversely, the half dozen countries at the bottom of the distribution of returns—Peru, Ecuador, Pakistan, Nigeria, Jordan and Cote d'Ivoire—all defaulted or restructured their principal at some point in their debt histories. Indeed, with the exceptions of Morocco and Pakistan, all countries whose sovereign returns tend to be below the U.S. 10 year bond benchmark are Brady deal countries. Third, the highest and lowest return groups are asymmetric in the sense that ex-post spreads in the high return group are generally below 200 basis points, while spreads in the low return group are in the order of -400 to -600. Because flow volumes to the latter were comparatively small, overall flows to emerging markets nevertheless broke even, approximately, with respect to the 10 year U.S. bond standard.

Figure 1. Countries with Secondary Market Prices in 2000:
Internal Rates of Return for Public and Publicly Guaranteed debt, 1970-2000



We now explore the robustness of these results, beginning with the issue of survival bias, i.e. the fact that the sample used so far is defined by the availability of debt price data in 2000. As explained in the previous section, we deal with this by recomputing aggregate rates of return for country groups defined by the availability of debt price data in 1991, assuming that the end-2000 value of the debt of countries that subsequently dropped out of the sample is zero. Because the latter is surely an exaggerated assumption, the estimates that follow (Table 3) should be treated as a lower bound rather than as a best guess. The truth is somewhere in the range between this lower bound and the aggregate results shown in Table 2. The sample underlying Table 3 consists of the following countries: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Panama, Peru, Venezuela, Indonesia, Malaysia, Philippines, Thailand, Algeria, Democratic Republic of Congo, Republic of Congo, Cote d'Ivoire, Egypt, Jordan, Morocco, Nigeria, Sudan and Turkey. Thus, the 2000 sample equals the 1991 sample minus 5 countries that exited (Bolivia, Egypt, Democratic Republic of Congo, Republic of Congo and Sudan) [12] plus 3 countries that entered (Korea, Pakistan and Lebanon).

[12] Egypt is a special case here, since debt prices are available for most of the 1990s and 2001, but not 2000.

Table 3. Countries with Secondary Market Prices in 1991:
Aggregate Ex-Post Returns to Private Creditors, 1970-2000 1/

	all long term debt				sovereign debt only			
	indirect approach		direct approach		indirect approach		direct approach	
	actual	US 10yr	actual	US 10yr	actual	US 10yr	actual	US 10yr
All countries	8.2	8.8	9.1	8.9	8.3	9.1	8.8	9.0
Latin America	8.4	8.9	9.5	8.9	8.3	9.2	9.5	9.0
Emerging Asia	8.3	8.6	10.0	9.0	9.3	9.2	9.9	9.3
Other emerging	7.3	8.8	6.4	8.7	7.6	9.0	5.7	8.8

1/ Assuming a 2000 debt price of zero for the five countries (Bolivia, Egypt, Republic of Congo, Democratic Republic of Congo and Sudan) which did not have a secondary market debt price in 2000.

The upshot of Table 3 is that using the 1991 sample makes very little difference to the aggregate returns, which decline by less than 30 basis points for all countries, less than 10 basis points for Latin America, and less than 40 basis points for Asia. The reason is that countries that dropped out of the sample received a very small share of total debt flows. The main conclusions from Table 2 are thus unaffected. Only in the "other" group do we see a somewhat bigger impact. This is due to the fact that the countries that exited the sample and whose debt is valued at zero in 2000 are mostly members of this group.

Note that while the inclusion of non-"survivors" makes no big difference on the average *level* of returns, it has a stronger impact on the *distribution* of returns across countries. In the year in which we last observe a price (between 1992 and 1994 in all cases), long run average sovereign debt returns for Bolivia, D.R. Congo, Republic of Congo and Sudan were 0.1, -1.5, 0.2 and -11.4 respectively (assuming a 0.66 weight on the "indirect" approach when averaging across the two methods, as in Figure 1). Thus, adding these countries to Figure 1 would very significantly extend the right tail of the distribution.

Finally, we ask whether the long run results presented in this section are very sensitive to the average debt prices used to value the debt end-stock for each country. In Table 4, we compute average sovereign debt returns for the 1970-2000 periods using a variety of alternative price assumptions. First, we reproduce the weighted average of returns using 2000 prices. Next, we use end-2001 prices. In the remaining columns we use prices that are either 15 percent above or below, or 25 percent above or below, the 2000 prices for every country. 15 percent is roughly the average standard deviation of actual year-to-year debt price changes for the 1995-2000 period, so these are reasonable orders of magnitude.

Table 4. Countries with Secondary Market Prices in 2000:
Price Sensitivity of Ex-Post Sovereign Returns to Private Creditors 1/

	Return on Sovereign Debt, 1970-2000 valuing debt endstock at ...					
	2000 prices	2001 prices	2000 + 15%	2000 - 15%	2000 + 25%	2000 - 25%
All countries	8.7	8.6	9.0	8.3	9.3	8.0
Latin America	8.7	8.5	9.1	8.4	9.3	8.1
Argentina	8.8	3.7	9.5	8.1	9.8	7.5
Brazil	8.2	8.1	8.5	7.9	8.7	7.7
Chile	10.2	10.2	10.3	10.1	10.4	10.1
Colombia	8.1	9.0	8.8	7.2	9.2	6.6
Ecuador	4.8	5.3	5.2	4.4	5.4	4.1
Mexico	9.7	9.7	9.9	9.3	10.1	9.1
Panama	8.4	8.4	8.9	7.9	9.1	7.6
Peru	5.3	5.6	5.6	5.1	5.7	4.9
Venezuela, RB	9.1	9.0	9.4	8.9	9.6	8.7
Emerging Asia	9.5	9.6	9.9	9.0	10.1	8.7
Indonesia	10.4	10.5	10.6	10.1	10.7	10.0
Korea, Rep.	9.4	9.6	9.8	8.8	10.1	8.4
Malaysia	9.9	10.0	10.4	9.5	10.6	9.1
Philippines	6.6	7.2	7.2	6.0	7.5	5.5
Thailand	10.8	10.9	11.3	10.2	11.6	9.7
Other emerging	7.7	7.9	8.0	7.2	8.3	6.9
Algeria	8.1	8.1	8.1	8.0	8.2	7.9
Cote d'Ivoire	3.1	3.2	3.2	3.0	3.2	2.9
Jordan	5.1	5.3	5.3	4.8	5.5	4.6
Lebanon	6.8	5.7	10.7	0.8	12.6	-4.8
Morocco	8.0	8.0	8.2	7.8	8.3	7.7
Nigeria	5.1	5.3	5.2	5.0	5.3	4.9
Pakistan	4.4	5.5	5.0	3.8	5.3	3.3
Turkey	9.3	9.8	10.1	8.3	10.6	7.6

1/ Weighted average of "direct method" and "indirect method", with weights 0.34 and 0.66.

Table 4 shows that the conclusions of this section are not very sensitive to the price assumptions made. The use of 2001 rather than 2000 prices makes virtually no difference for the aggregate results, and makes a significant difference at the individual country level in only one case: Argentina, which drops from 8.8 percent to 3.7 percent in its average long run return. This reflects the combination of a complete collapse in Argentine debt prices by end 2001 (from an average of 88 cents on the dollar at end-2000 to 29 cents at end-2001) and the

large volume of Argentine debt outstanding relative to its debt history. As far as the mechanical increase or decreases in prices by 15 or 25 percent go, even the latter is not enough to change the basic finding that aggregate returns to emerging markets from 1970 to 2000 are close to those on a U.S. ten year bond over the same period. Assuming that end-2000 prices had been higher by 25 percent, for example, leads to an average ex post risk premium of only about 30 basis points, as opposed to a small negative premium of about -30 basis points when actual prices are used.

B. Changes in Emerging Market Returns over Time

We now turn to estimating emerging market returns over shorter horizons. One motivation is to better understand the long run results presented in the previous section. We know both that *ex ante* spreads in emerging markets are highly volatile and that many countries in our sample have experienced debt crises, which sometimes led to payments moratoria and eventually write-downs in either interest or principal. Thus, one would suspect that the mediocre long run performance of emerging market debt on average represents a mix between catastrophic results in some sub periods and very high returns in others. What are those sub periods, and can they be given an interpretation?

A natural point of departure is to distinguish between the time until the end of the 1980s, which includes both the initial 1970s lending cycle and the eighties debt crisis, and the 1990s. Conventional wisdom would suggest that investors made large losses during the first period, but did rather well during the latter, not because the 1990s were crisis free, but because they generally did not lead to protracted payments moratoria and defaults, perhaps because of a different official sector response. Table 5 examines whether this view is borne out by the facts. To avoid clutter, the table presents ex-post spreads rather than returns, in other words, the difference between emerging market debt returns and the return on the corresponding alternative investment at U.S. 10 year bond rates, computed in the same way as in Table 2. Furthermore, this and the tables that follow focus on sovereign (public and publicly guaranteed) debt. The results of this section would not be substantially affected if we had instead used the broader debt concept that also includes privately issued debt.

Table 5. The "Eighties" versus the Nineties
Ex-Post Spreads, Sovereign Debt, Private Creditors 1/

	Dividing Sample in 1989				Dividing Sample in 1992			
	indirect approach		direct approach		indirect approach		direct approach	
	1970-89	1989-2000	1970-89	1989-2000	1970-92	1992-2000	1970-92	1992-2000
All countries 2/	-5.0	11.0	-3.3	6.9	-2.3	5.1	-1.4	3.0
Latin America	-6.1	15.6	-2.8	10.9	-2.5	6.4	-0.6	5.0
Argentina	-15.0	22.9	-0.9	16.0	-2.9	2.1	4.2	-1.6
Bolivia	-7.4	n.a.	-14.2	n.a.	-7.1	n.a.	-13.5	n.a.
Brazil	-6.0	19.6	-5.4	10.1	-3.7	15.6	-4.5	12.3
Chile	-2.7	16.8	1.9	15.9	-0.6	1.8	3.1	2.3
Colombia	-3.4	3.7	-2.7	2.8	-1.0	0.4	-0.5	-0.9
Ecuador	-14.6	14.1	-11.5	19.3	-6.4	-1.0	-4.6	4.4
Mexico	-3.1	10.5	-0.8	8.5	-1.0	4.6	0.4	5.2
Panama	-6.5	19.3	-5.7	21.7	-3.1	8.6	-3.0	15.2
Peru	...	134.4	-33.6	29.8	-6.0	23.9	-17.6	33.7
Venezuela, RB	-7.2	13.6	-0.6	14.0	-2.7	5.9	2.3	5.9
Emerging Asia	-0.6	2.0	0.0	2.4	0.1	0.6	0.8	0.3
Indonesia	1.0	0.7	2.2	1.0	1.1	-0.1	2.1	0.6
Malaysia	-0.9	1.7	0.2	3.4	-0.5	1.0	1.2	0.0
Philippines	-6.0	9.2	-8.8	9.4	-3.7	7.3	-5.3	6.4
Thailand	2.0	1.3	2.4	0.5	2.5	0.0	2.8	-0.9
Other emerging 2/	-10.1	16.2	-12.9	6.4	-5.3	8.1	-8.1	0.9
Algeria	-1.5	3.3	-1.1	-3.6	-0.4	1.1	-0.1	-9.2
Congo, Dem. Rep.	-6.8	n.a.	-17.4	n.a.	-7.0	n.a.	-17.4	n.a.
Congo, Rep.	-14.7	n.a.	-24.3	n.a.	-6.9	n.a.	-17.1	n.a.
Cote d'Ivoire	-9.5	72.3	-13.7	21.9	-7.4	27.0	-12.2	26.9
Egypt, Arab Rep.	-10.4	n.a.	-22.5	n.a.	-5.0	n.a.	-19.3	n.a.
Jordan	n.a.	n.a.	n.a.	n.a.	-12.4	27.1	-13.2	11.5
Morocco	-5.1	25.8	-12.1	15.1	-1.5	13.0	-7.0	13.3
Nigeria	-12.4	32.9	-33.3	18.1	-5.0	18.6	-15.8	15.7
Sudan	-27.3	n.a.	-37.6	n.a.	-25.5	n.a.	-32.1	n.a.
Turkey	n.a.	n.a.	n.a.	n.a.	0.6	-1.5	6.6	0.4

1/ Spreads computed wirth respect to returns on ten year U.S. government bond
2/ Only countries with prices in 1989, i.e. excludes Jordan and Turkey. For Bolivia, the two Congos, and Sudan, 2000 debt price is assumed zero.

Should we think of the long run returns of Tables 2 and 3 in terms of the booming 1990s not quite offsetting the disaster of the debt crisis? Table 5 shows that the answer depends in part on where exactly the line between the 1980s debt crisis and the "1990s" is drawn. If we cut the sample in 1989, a time when the chances of an orderly end to the crisis where still viewed

pessimistically (see, for example, the 1990 *Journal of Economic Perspectives* symposium on that topic)[13] and secondary market debt prices had reached a lowpoint, the answer is clearly yes. On one side, we have highly negative ex post spreads, in the order of -330 to -500 basis points for aggregate flows, and much worse for individual countries; on the other, extraordinary returns, with ex post spreads between 690 and 1100 basis points per annum for average flows to the entire sample of countries with debt prices in 1989. If, however, the sample is cut in 1992, at the time when a number of debt crisis countries had either just negotiated their Brady deals or where in the process of negotiating them, the picture looks rather different. To be sure, spreads on aggregate flows for the 1970-92 period are still negative, in the order of -130 to -230 basis points, but much reduced, and in fact imply a positive real return over the period. And the remainder of the 1990s no longer looks quite as hot, with ex post spreads down by about half, in the 300-500 basis point range.

Two conjectures follow from the last observations. The first is that, in spite of terrible returns until 1989 and the fact that the Brady deal involved write downs in either principal or interest, creditor banks weathered the debt crisis reasonably well (a point already made by Cohen, 1992 and Klingen, 1994). The second is that the booming 1990s could be driven largely by an extraordinary recovery in the early years of the decade, prior to the large official bail-outs of the 1990s. The next two tables basically confirm these points. Table 6 shows ex-post spreads on sovereign debt for all Brady deal countries in our sample for the period 1970 until the Brady deal year, both for all private creditors (the perspective adopted in the earlier tables) and only for the Banks. Bank spreads were worse than -300 point in only two cases, Jordan and Nigeria. In two other important cases, Mexico and Venezuela, they were basically zero, and in some cases they were even positive. Note also that without exception, the banks did better than the average private creditor. Overall, the banks' strategy of rolling over, sitting out the crisis and waiting for a debt restructuring with official backing seems to have worked well in containing losses and eventually even making profits in some cases. From the banks' perspective, the write-down in claims resulting from the Brady deal was offset by the high prices of the restructured instruments they received, i.e. an expectation that the new claims would actually be honored.

[13] See Rogoff (1990), Bulow and Rogoff (1990), and other contributions in the same volume.

Table 6. Brady Deal Countries:
Ex-post sovereign spreads up to Brady deal year 1/

	Brady deal year (B)	Banks 2/ indirect 1970-B	All private creditors indirect 1970-B	All private creditors direct 1970-B
Argentina	1992	-2.7	-2.9	4.2
Brazil	1992	-3.0	-3.7	-4.5
Ecuador	1994	n.a.	-3.6	-1.9
Mexico	1990	-0.1	-2.1	-0.3
Panama	1996	0.9	n.a.	n.a.
Peru	1996	-1.5	-1.5	-4.0
Venezuela, RB	1990	0.1	-3.4	2.0
Philippines	1992	-2.9	-3.7	-5.3
Algeria	1999	1.2	-0.4	-1.9
Cote d'Ivoire	1997	-3.0	-5.2	-8.0
Jordan	1993	-5.2	n.a.	n.a.
Nigeria	1991	-4.4	-5.8	-17.7

1/ Refers to public and publicly guaranteed debt. Spreads computed wirth respect to ten year U.S. government bond
2/ Uses secondary market prices for loans except for Panama and Algeria, where Brady bond prices are used

Table 7 is analogous to Table 5, except that it splits the 1970 to 2000 period three ways: from 1970 to 1989, i.e. the "deep debt crisis" period, from end-1989 until end-1994, and from end 1994 until end-2000. The end of 1994 as point at which to split the sample is interesting because at this time the Mexican crisis was already priced into debt prices and returns, which--as we shall see below--declined from a peak in 1993; however, the large U.S.-IMF Mexican rescue package had not yet been announced. Thus, any positive effect on ex post return from what could be interpreted as an investor-friendly shift in official policies beginning with the Mexican rescue would not yet be reflected in the 1989-1994 return, and correspond entirely to the 1994-2000 period.

Table 7. Decomposing Spreads, 1970-89, 1989-94, 1994-2000
Ex-Post Sovereign Spreads, Private Creditors 1/

	indirect approach			direct approach		
	1970-89	1989-1994	1994-2000	1970-89	1989-1994	1994-2000
All countries 2/	-5.0	15.2	4.9	-3.3	9.5	3.9
Latin America 2/	-6.1	23.0	6.0	-2.8	15.7	5.8
Argentina	-15.0	34.1	4.5	-0.9	26.5	5.8
Bolivia	-7.4	n.a.	n.a.	-14.2	n.a.	n.a.
Brazil	-6.0	28.5	8.2	-5.4	15.3	5.3
Chile	-2.7	22.5	0.6	1.9	23.0	0.4
Colombia	-3.4	11.4	-2.1	-2.7	11.4	-3.5
Ecuador	-14.6	40.1	-9.8	-11.5	40.0	-6.1
Mexico	-3.1	12.4	8.2	-0.8	8.4	8.4
Panama	-6.5	46.4	0.3	-5.7	38.8	6.1
Peru	...	143.3	-5.5	-33.6	50.9	3.2
Venezuela, RB	-7.2	13.4	13.7	-0.6	14.0	13.7
Emerging Asia	-0.6	4.5	-0.7	0.0	5.5	-0.8
Indonesia	1.0	2.8	-1.7	2.2	2.5	-0.6
Korea	n.a.	n.a.	1.7	n.a.	n.a.	1.2
Malaysia	-0.9	4.0	-0.2	0.2	8.1	-0.9
Philippines	-6.0	14.0	2.0	-8.8	14.6	1.3
Thailand	2.0	3.2	-0.2	2.4	2.9	-1.3
Other emerging 2/	-10.1	12.3	34.0	-12.9	2.3	19.3
Algeria	-1.5	-7.6	49.2	-1.1	-13.1	15.0
Congo, Dem. Rep.	-6.8	-5.2	n.a.	-17.4	-6.8	n.a.
Congo, Rep.	-14.7	n.a.	n.a.	-24.3	n.a.	n.a.
Cote d'Ivoire	-9.5	84.5	1.3	-13.7	34.8	2.0
Egypt, Arab Rep.	-10.4	38.7	n.a.	-22.5	-7.0	n.a.
Jordan	n.a.	n.a.	25.4	n.a.	n.a.	12.5
Lebanon	n.a.	n.a.	1.8	n.a.	n.a.	1.6
Morocco	-5.1	32.5	6.8	-12.1	18.9	7.0
Nigeria	-12.4	33.5	28.3	-33.3	16.8	23.3
Sudan	-27.3	26.7	n.a.	-37.6	26.0	n.a.
Turkey	n.a.	n.a.	-0.2	n.a.	n.a.	0.7

1/ Spreads computed wirth respect to ten year U.S. government bond
2/ Only countries with prices in 1989, i.e. excludes Jordan, Lebanon and Turkey. For Bolivia and Rep. of Congo, 1994 and 2000 prices are not available and are assumed zero when computing aggregate returns that include these countries. The same applies to the Democratic Rep. of Congo, with respect to 2000 only.

The message from Table 7 is that when the 1989-2000 period is decomposed into two roughly equal halves, 1989-1994 and 1994-2000, returns in the first of these sub periods were far higher than in the second one, notwithstanding the fact that end-1994 debt prices already reflected the impact of the Mexican crisis, and did *not* yet reflect the Mexican bail-out and any associated signal about official sector policies. This said, it is noteworthy that aggregate returns were also quite high in the 1994-2000 period, in spite of the bunching of emerging market crises during those years. Thus, Table 7 does lend some support to the view that in spite of these crises, investors did well in the second half of the 1990s.

Table 7 also shows some interesting regional and cross-country differences. One of the starkest is the contrast between the bust-boom cycles in Latin America and East Asia. It is Latin America that drives the aggregate picture: a terrible bust until 1989, a vehement recovery in the early 1990s, and a continued good performance until the end of 2000. Asian returns, in contrast, did not experience much of a bust in the eighties, and in fact would show aggregate positive spreads for the 1970-89 period were it not for the Philippines, which looks much like a Latin American country at least until the mid-1990s. Asia and Latin America also differ completely with respect to the second half of the 1990s, when aggregate Asian returns were poor. Of the four countries hit hardest by the crisis, only Korea achieved a modest positive spread over the whole period. Thus, if official policies helped returns in Latin America stay high in the second half of the 1990s in spite of a succession of crises, they don't seem to have achieved all that much for spreads on debt flows to Asia during the same period, at least comparatively.

We next go one step further and decompose the 1986-2000 period for which secondary market debt prices are available into a sequence of overlapping three-year holding periods (Table 8). To be able to show reasonably long series, we only include countries with continuous secondary market debt prices since at least 1990, except for two—Korea and Chile—which are shown as memorandum items, but not included in the aggregate concepts. As in Figure 1, we show a weighted average of the "indirect" and "direct" methodologies, using a weight of two thirds for the indirect approach. The results discussed below are not sensitive to this choice of weight.

Table 8: Spreads over 3-year holding periods
Ex-Post Spreads, Public and Publicly Guaranteed Debt, Private Creditors 1/

	1970-86	1986-89	1987-90	1988-91	1989-92	1990-93	1991-94	1992-95	1993-96	1994-97	1995-98	1996-99	1997-00
All countries 2/	n.a.	n.a.	n.a.	n.a.	n.a.	18.7	6.5	8.2	1.0	9.3	1.3	0.5	0.9
All Brady countries 2/	-3.1	-13.7	9.4	23.1	28.9	23.3	8.6	9.7	0.5	13.8	4.5	1.1	1.2
All non-Brady countries 2/	n.a.	n.a.	n.a.	n.a.	n.a.	8.8	2.7	5.4	2.3	0.1	-5.2	-0.8	0.2
Latin America countries 2/	-2.5	-13.3	9.6	21.2	28.8	22.1	7.7	9.1	-0.1	12.9	3.5	0.8	1.1
Argentina	-3.1	-22.0	16.4	55.1	53.9	30.1	2.0	-2.7	0.4	13.8	6.0	1.7	-0.5
Brazil	-1.9	-19.8	12.5	-0.3	19.7	16.4	24.0	26.9	-2.8	12.7	1.3	1.5	1.9
Colombia	-2.2	-4.4	5.5	16.1	12.8	14.1	8.3	12.8	6.8	-0.3	-8.6	-3.3	-3.6
Ecuador	-2.6	-37.4	-13.0	32.6	45.2	54.5	37.6	3.4	-8.3	-0.4	4.4	-14.6	-15.2
Mexico	-2.7	0.3	7.9	21.3	20.2	20.3	0.1	1.7	-0.7	12.6	6.5	4.1	4.9
Peru	-20.5	-40.1	-30.4	46.2	104.7	503.1	138.1	83.2	5.9	-3.2	-14.1	-18.3	0.6
Venezuela, RB	-0.9	-14.1	5.8	28.8	27.4	12.0	-10.5	3.6	7.3	28.9	8.0	-2.5	-3.4
Memorandum: Chile	-3.4	10.1	20.0	34.4	29.4	12.2	3.6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Asian countries 2/	n.a.	n.a.	n.a.	n.a.	5.9	8.7	5.4	4.8	1.7	-4.0	-5.0	-0.3	3.7
Indonesia	n.a.	n.a.	n.a.	4.1	3.3	1.2	2.3	4.5	3.9	-4.0	-14.6	-4.9	2.6
Malaysia	n.a.	n.a.	n.a.	2.5	6.9	7.5	6.3	1.1	-1.1	-5.0	-0.6	3.0	4.8
Philippines	-8.0	-3.3	6.2	35.2	12.5	44.6	21.0	19.0	5.1	5.3	3.8	2.5	-0.6
Thailand	n.a.	n.a.	n.a.	n.a.	5.9	5.8	0.6	n.a.	n.a.	-10.3	n.a.	n.a.	8.2
Memorandum: Korea, Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-1.8	-12.5	-9.9	1.3	9.6
Other countries 2/	n.a.	n.a.	n.a.	n.a.	n.a.	16.0	3.4	8.4	4.9	8.2	-1.3	0.1	-2.6
Cote d'Ivoire	-4.3	-46.4	-39.7	-13.0	61.8	128.6	56.1	46.6	23.3	9.3	13.6	-5.6	-8.8
Morocco	-5.0	-14.4	-6.7	6.9	29.2	46.6	37.9	20.3	5.6	11.7	9.1	1.7	1.6
Nigeria	-17.4	-19.5	14.4	51.4	31.1	23.2	13.2	20.3	21.6	40.2	19.5	3.4	1.1
Turkey	n.a.	n.a.	n.a.	n.a.	n.a.	9.0	-2.8	5.2	2.2	4.4	-4.7	-0.3	-3.5

1/ Average of returns according to "direct" and "indirect" approaches. Spreads computed w.r.t. 10 year U.S. government bond for 1970-86 and 3 year U.S. government bond for following periods.
2/ Refers only to countries shown in the table, excluding memorandum countries.

Consider first the lines for "All countries" and "All Brady countries" at the top of the Table 8. They give precise content to the basic message transpiring in the earlier tables. First, spreads over 3 year holding periods peaked during the early 1990s. Clearly, this is a rebound effect from the debt crisis, at a time when the Brady deals were successfully being concluded and a new wave of capital flows to emerging markets began to take off, well ahead of the second Mexican crisis. Second, following the Mexican crisis, there is a second period of peak spreads from 1994-97, yielding ex post spreads of more than 1300 basis points in the Brady deal countries. If there is anything in this paper to support the view that official interventions in the 1990s helped investors achieve extraordinary spreads on emerging market debt even during times of crises, it is this result (note however, that the effect is driven mainly by countries that were not directly affected by the Asian crisis). Ex-post spreads decline to significantly lower levels only after 1998, as can be seen from the substantially lower figures in the last three columns.

The cross-sectional comparison is also instructive. Consider first the contrast between the Brady countries and the non-Brady countries. As one would expect, spreads in the non-Brady countries are much lower in the 1990-93 period, reflecting the absence of a recovery effect. The 1994-97 peak in the Brady country spreads is absent in the non-Brady group, where spreads are poor during this period. This is clearly an Asia crisis effect. However, as in the Brady group, returns get even worse after 1997. Note the fast recovery of spreads in 1997-2000 in Korea, Thailand, and to a lesser extent Malaysia.

Finally, consider Table 9, which provides a summary of how the long run returns shown in Table 2 and 3 for 1970-2000 have evolved over time. Like Table 8, Table 9 shows rolling spreads, but keeps the initial year, 1970, fixed. The punch line is that, following very poor returns in the Brady countries from 1970 to the late eighties, the recoveries of the 1990s have fallen just short of pushing spreads back into positive territory for the entire period, although they came close in several instances (notably, 1993, 1997 and again 2000). In contrast, the non-Brady countries never experienced negative ex post spreads in the aggregate. However, long-run spreads are modest even in this group of countries. Only two countries consistently have long run ex post spreads above, or around, 200 basis points: Thailand and Turkey (the latter however, is not robust to the choice of method: assigning the indirect method a weight of unity in Table 9 reduces long run spreads for Turkey to low, though generally positive, numbers).

Table 9: Average Long-Run Spreads over an Increasing Horizon
Ex-Post Spreads, Public and Publicly Guaranteed Debt, Private Creditors 1/

	1970-86	1970-87	1970-88	1970-89	1970-90	1970-91	1970-92	1970-93	1970-94	1970-95	1970-96	1970-97	1970-98	1970-99	1970-00
All countries 2/	n.a.	n.a.	n.a.	n.a.	-2.6	-2.0	-1.7	-0.4	-1.3	-0.9	-0.4	-0.5	-0.8	-0.4	-0.4
All Brady countries 2/	-3.1	-5.9	-6.6	-5.9	-3.4	-2.8	-2.4	-0.8	-1.9	-1.5	-0.9	-0.8	-1.1	-0.8	-0.7
All non-Brady countries 2/	n.a.	n.a.	n.a.	n.a.	0.0	0.7	0.8	1.1	0.9	1.2	1.0	0.7	0.5	0.9	0.7
Latin America countries 2/	-2.5	-5.1	-5.6	-5.2	-2.7	-2.3	-1.9	-0.4	-1.5	-1.1	-0.5	-0.4	-0.8	-0.5	-0.4
Argentina	-3.1	-11.9	-14.1	-10.2	-4.7	-1.9	-0.5	-0.2	-1.4	-0.7	-0.2	0.1	0.0	0.1	0.0
Brazil	-1.9	-4.8	-4.5	-5.8	-2.4	-4.1	-3.9	-0.7	-2.1	-1.8	-1.1	-1.1	-1.7	-1.1	-1.0
Colombia	-2.2	-4.2	-4.6	-3.2	-2.4	-1.0	-0.8	-0.3	0.0	0.5	0.4	-0.1	-0.5	-0.1	-0.5
Ecuador	-2.6	-8.6	-15.2	-13.5	-9.8	-7.9	-5.8	-2.0	-3.0	-5.0	-3.1	-2.7	-4.0	-4.8	-4.4
Mexico	-2.7	-2.9	-3.2	-2.3	-1.5	-0.7	-0.5	0.2	-0.6	-0.3	0.1	0.2	0.1	0.3	0.5
Peru	-20.5	-33.4	-37.0	-33.6	-35.2	-13.6	-9.9	-3.3	-4.0	-2.9	-2.4	-4.0	-4.1	-3.9	-3.9
Venezuela, RB	-0.9	-3.5	-5.8	-5.0	-1.6	-0.3	-1.0	0.0	-1.6	-0.7	0.5	0.6	-0.1	0.3	0.3
Memorandum: Chile	-3.4	-3.0	-2.5	-1.2	0.0	0.6	0.6	0.5	0.5	n.a.	n.a.	n.a.	n.a.	0.5	0.5
Asian countries 2/	n.a.	n.a.	n.a.	-0.5	-0.5	0.0	0.1	0.4	0.4	0.4	0.3	0.0	0.0	0.3	0.3
Indonesia	n.a.	n.a.	1.4	1.4	1.6	1.6	1.4	1.4	1.5	1.6	1.5	1.1	0.7	1.1	1.1
Malaysia	n.a.	n.a.	-0.3	-0.5	-0.3	-0.1	0.1	0.3	0.3	0.2	0.0	-0.2	-0.1	0.2	0.1
Philippines	-8.0	-12.5	-13.4	-7.0	-7.7	-5.2	-4.2	-2.6	-2.9	-2.6	-2.2	-2.4	-2.1	-1.6	-2.1
Thailand	n.a.	n.a.	n.a.	2.1	2.0	2.7	2.6	2.7	2.3	2.1	1.7	0.8	1.8	1.8	1.7
Memorandum: Korea, Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.5	-0.1	0.4	0.3	-0.8	-0.1	0.5	0.3
Other countries 2/	n.a.	n.a.	n.a.	n.a.	-5.2	-3.2	-2.7	-1.7	-2.3	-1.3	-1.1	-1.2	-1.5	-1.0	-1.3
Cote d'Ivoire	-4.3	-6.8	-8.8	-10.9	-10.5	-9.3	-9.0	-7.8	-6.9	-7.2	-6.4	-6.1	-6.4	-6.4	-6.3
Morocco	-5.0	-6.1	-7.0	-7.5	-6.7	-5.2	-3.4	-1.7	-2.0	-1.8	-1.2	-1.3	-1.3	-1.2	-1.1
Nigeria	-17.4	-23.0	-30.7	-19.5	-12.3	-9.9	-8.7	-7.0	-7.2	-5.9	-4.6	-4.6	-4.8	-4.2	-4.5
Turkey	n.a.	n.a.	n.a.	n.a.	1.1	3.1	2.6	3.0	1.7	2.9	2.5	2.1	1.6	2.1	1.4

1/ Average of returns according to "direct" and "indirect" approaches. Spreads computed w.r.t. 10 year U.S. government bond, in points.
2/ Refers only to countries shown in the table, excluding memorandum countries.

IV. CONCLUSIONS

This paper distinguished between "long run" (1970-2000) and short run results. One way of describing its findings is to say that the "long-run" results are counterintuitive if taken seriously as long run properties of an asset class, but intuitive if we think of them as a summaries of the short-run experience. One of our central findings was that average ex-post risk premia for emerging market debt flows over the 1970-2000 period were approximately zero. In the long run, this would be inconsistent with risk aversion by investors. While we would expect long run ex post premia, which reflect actual defaults and write-down, to be much lower tan ex ante risk premia, the must be significantly positive. Investors must be compensated for the anxieties they experience by holding a risky claim. Another finding was that countries with consistently positive ex-post premia tend to be countries that did not default. Again, this is the reverse of what we would expect to find in the long run, when riskier countries should carry higher premia.

The most straightforward interpretation of these findings is that in spite of our 30 years of data, these "long run" results are still not really about the long run, but merely the summary of two boom-bust cycles with particularly outcomes. They reflect expectational errors, which can hardly be expected to cancel in a sample of just two cycles. The first cycle—from 1970 until the debt crisis, which reached its low point in 1989—involved a particularly large such error. By the second half of the 1980s, emerging market debt performance had clearly turned out much worse than expected ten or fifteen years earlier, and this was reflected in very poor ex post returns. The second cycle was better and more in line with expectations, but not quite enough to bring overall premia back into the black. Viewed in this light, our "long run" results are plausible, albeit not necessarily indicative of the true long run.

Some of the most interesting results of the paper refer to returns over particular subperiods. Two findings stand out, both somewhat surprising. First, in spite of very low returns over the 1970-89 period, the returns received by banks over the entire length of the debt crisis—defined from the beginning of the 1970s lending cycle until the Brady deals—were reasonably good. Ex post spreads were zero or even positive in several countries, and on average only mildly negative, implying positive real interest rates. Second, while the decade of the 1990s was indeed a boom period, this is largely driven by the first three or four years of the decade, before the era of big bail-outs. Of course, the two findings are not independent. Both are driven by the extraordinary recovery experienced on emerging debt markets between 1989 and 1993.

Finally, consider the role of the official sector and moral hazard. This paper does not offer much support for the notion that high ex-post returns during the 1990s were driven by an unexpected shift towards a much more generous official safety net. In large measure, the boom of the 1990s took place during the first half of the decade, before the Mexican bail-out. It was driven by the success of the Brady deals—negotiated, orderly debt write-downs with official sponsoring—not by large scale crisis lending. Perhaps the success of the Brady deals

does reflect moral hazard of some kind, but it is not the kind that comes to mind when thinking about the 1995 Mexican rescue.

This said, there is some support for the notion that the impact of the large scale capital account crises on private returns was at least delayed by presence of an official safety net. After the sharp recovery of the early 1990s, the next-best episode for ex post debt returns in the Brady countries was the period from 1994 to 1997. Of course, this reflected some bounce-back from the Mexican crisis, which was incipient at end-1994. But that is precisely the point: this bounce back was quite pronounced, in spite of the fact that the crisis spread more widely than was probably anticipated at end-1994, and that the following three years continued to be a period of crisis and instability in international financial markets, culminating in the Asian crisis. It is plausible to think that the official response, and expectations of a continued official response along similar lines, had something to do with keeping ex-post returns high. Similarly, the moral hazard interpretation squares well with the fact that returns collapsed in 1998 and remained low for the remainder of the decade, after the official sector had demonstrated—in its response to the Russian crisis, which resulted in default—that there were limits to the extent to which it was willing to intervene. In this sense, this paper offers limited support for the presence of moral hazard prior to 1998.[14]

[14] Two papers consistent with this view are Dell'Ariccia, Schnabel and Zettelmeyer (2002), who find evidence consistent with moral hazard for the pre-Russian crisis period, and Kamin (2002), who using a similar test argues that moral hazard cannot be detected in the post-Russian crisis period.

APPENDIX I: GDF DATA ISSUES

Coverage of "Net Tranfers" reported in the GDF

Since Lindert's (1989) initial contribution, there has been a debate about the extent to which the "net transfers" concept in the GDF needs to be adjusted for the purpsoes of computing internal rates of return from the creditor perspective. This appendix describes our understanding of what the "net transfers" concept exactly comprises, based both on our reading of the GDF documentation (including the Debtor Reporting System questionnaires and instructions) and conversations with Bank staff who maintain this data.

In his Appendix B, Lindert (1989) argues that the reported "net transfers" concept (i.e. reported disbursements minus repayments minus interest payments) is biased down for two reasons. First, because it excludes "involuntary refinancing" during the 1980s, i.e. roll-overs in crisis situations, in which the creditor would rather get his money back but cannot. Lindert argues that by not recording "involuntary refinancing" as a disbursement, "a large share of gross new lending has been ommitted from the data ... yet the data will go on reporting debt service paid on the old loans (by the unreported new ones) and may even report debt service on the new involuntary loans" (p. 268). Second, because it ignores consolidation of short-term debt into long-term debt. As we argued in the text, Lindert was correct on the second point. Consolidation of short-term into long-term debt is one of the possible cross-category stock operations which will lead to an underestimation of returns in the category which was written down (in this case,short-term debt) and an overestimation in the category where stocks went up (in this case, long term debt).

Lindert's worries about "involuntary refinancing", however, reflect a misunderstanding. As explained in World Bank et al. (1988), which Lindert cites, and in more detail in World Bank (1985), Box 2, on which World Bank et al. (1988) is based, the Bank's point is merely that "involuntary refinancing", i.e. pure rollovers, are treated like a rescheduling where no flows take place and no stocks change. In other words, the distinction between "voluntary" and "involuntary" refinancing is one between an operation in which both a repayment and a new disbursement are explicitly recorded, and one where no flows are recorded as an immediate consequence of the operation. A bias cannot arise: while the Bank does not record a new disbursement in the event of an "involuntary refinancing", neither does it record a repayment. Note also that if the Bank had failed to make the distinction between "involuntary" and "voluntary" refinancing and had classified all refinancing operations as "voluntary", it would have made no difference to reported "net transfers" since the repayments and disbursements associated with involuntary rollovers would have exactly cancelled.

In addition to taking Lindert's points on board, Klingen (1994), suggests that three additional adjustments need to be made to the reported net transfers concept (1) treating debt-equity swaps as repayments, (2) treating cash buy-backs as repayments and (3) reflecting the clearance of interest arrears as repayments. As it turns out, only the first is in fact necessary for our purposes (again, as a special case of the broader problem of accounting for cross-category debt stock changes). Cash payments associated with buy-backs are already captures

as repayments in the GDF. Similarly, the Bank makes an effort to reflect clearance of interest arrears on long-term debt as interest payments on long-term debt, even though the accumulation of such arrears are counted as part of the short-term debt stock.

Stock-flow reconciliations

The published GDF contain a stock-flow reconciliation for *total* debt (short-term plus long-term plus IMF debt, which is classified separately from long-term debt) in Section 8 of the country tables. We now briefly state how this relates to the stock-flow reconciliation identity presented in the text (equation 2) for the purpose of computing the residuals used in our "indirect method". We first reproduce equation (2) for easier reference:

(2) $\Delta D \equiv d - r - dsr - df + ccv + ic + u'$

where the residual u' is defined to include all unobservable items, i.e. $u' = -x + u$ in the notation used earlier. As discussed, if the concept to which this identity is applied is all long-term debt, then x equals short term debt consolidation into long-term debt.

The stock-flow identity implicit in Section 8 is as follows:

(3) $\Delta D \equiv nfl + nia - dsr - df + ccv + ic + u''$

nfl stands for "Net flows on (total) debt" and *nia* stands for "Net change in interest arrears"; all other terms have the same meanings, in the context of total debt, as the items in equation (2). The question is how the residual published in the GDF, u'', relates to our residual u'. To see this, consider first the case where (2) is applied only to public and publicly guaranteed (PPG) long term debt:

(2a) $\Delta D_{PPG} \equiv d_{PPG} - r_{PPG} - dsr_{PPG} - df_{PPG} + ccv_{PPG} + ic_{PPG} + u'_{PPG}$

Next, write (3) in long-hand after decomposing each term into the main categories that make up total debt. There are four: short-term debt, IMF debt, and two kinds of long-term debt, namely public and publicly guaranteed (PPG) and private non-guaranteed (PNG). The following facts need to be reflected:

- The GDF data on cross-currency valuation (*ccv*) applies exclusively to PPG and IMF. There is not data on the currency composition of either short-term debt or PNG long-term debt, and *ccv* for these debt categories is implicitly assumed to be zero.

- Except for ad hoc adjustments in exceptional cases, the GDF's "Net flows on debt" are defined as follows: (Disbursements on long term debt and by the IMF) – (Repayments on long term debt and to the IMF) + Change of the short-term debt stock – Net change in interest arrears + Consolidation of short-term debt. Thus, a reported consolidation of short term debt to long term debt leaves "net flows on debt"

unaffected, because a positive entry in the last term in the definition is canceled by a reduction in the short-term debt stock.

With this in mind, identity (3) can be rewritten as follows:

$$\begin{aligned}&\Delta D_{TD} \equiv \Delta D_{PPG} + \Delta D_{PNG} + \Delta D_{IMF} + \Delta D_{STD} \equiv \\ &(d_{PPG} - r_{PPG}) + (d_{PNG} - r_{PNG}) + (d_{IMF} - r_{IMF}) + (\Delta D_{STD} - nia + stc) \\ &+ nia - dsr_{TD} - df_{TD} + ccv_{PPG} + ccv_{IMF} + ic_{TD} + u''_{TD}\end{aligned} \tag{4}$$

This simplifies to:

$$\begin{aligned}&\Delta D_{PPG} + \Delta D_{PNG} + \Delta D_{IMF} \equiv \\ &(d_{PPG} - r_{PPG}) + (d_{PNG} - r_{PNG}) + (d_{IMF} - r_{IMF}) + stc - dsr_{TD} - df_{TD} + ccv_{PPG} + ccv_{IMF} + ic_{TD} + u''_{TD}\end{aligned} \tag{5}$$

Comparing (5) and (2a) it is clear that, other than referring to different debt concepts, there are only two differences between the identities:

- short-term debt consolidation leaves the published residual u''_{TD} unaffected. In equation (4), short-term debt consolidation implies no change on either the left hand side or right hand side of the equation, while in equation (5), a positive *stc* on the right hand side is offset by an equal change in the long-term debt stock on the left hand side. In contrast, in (2a) short-term debt consolidation is reflected in a change of the residual u'_{PPG} (short-term debt consolidation leads to an increase in ΔD_{PPG} on the left hand side without an offsetting change in any of the measured items on the right hand side).

- The cross-currency valuation term included in (5) only refers to a subitem of the debt for which the stock-flow reconciliation is attempted, while it refers to the entire debt concept in (2a). Thus, we would expect the residual in (5) to contain unaccounted currency valuation effects (namely, changes in the valuation of PNG debt), but not the residual in (2a).

To summarize: the primary economic interpretation of the residual published in the GDF is unaccounted currency valuation effects for PNG debt. The primary economic interpretation of the residual we back out of an analogous stock-flow reconciliation exercise for PPG is short-term debt consolidation. In addition, as discussed in the text, the stock-flow residual is likely to be driven by measurement error—or the discovery of measurement error, which leads to revisions in the debt stock without corresponding flows in the same period. To the extent that these occur for PPG, they would affect both the residual in equation (2a) and in equation (5). So we would expect the two residuals to be positively correlated for this reason, and indeed they are.

APPENDIX II

As discussed in the text, we also use a version of equation (2) applied to both PPG and PNG to implement our "indirect method" for a broader concept of debt that includes PNG. In that case, we attempt to estimate a *ccv* term for PNG rather than assuming that currency valuation effects are zero for PNG, by assuming that PNG has the same currency composition as PPG for each country. Of course this assumption may be incorrect, and as a result, our residual in the context of this stock-flow reconciliation may also include differences between true and assume *ccv* for PNG.

APPENDIX II: SECONDARY MARKET PRICE DATA, SOURCES AND METHODOLOGY[15]

Overview

In the early 1980s, the suspension of principal payments by Mexico and rescheduling agreements with Brazil, Argentina, Chile, Costa Rica, Ecuador, Panama, Peru and Uruguay led to the development of a secondary market on which European and US banks began to trade defaulted loans. Prices for this market are available from the mid-1980s until the Brady agreements of the 1990s, in which debtor countries and banks negotiated the conversion of loans into "Brady bonds", whose principal was collateralized by a U.S. treasury zero-coupon bond. The initial Brady agreement——with Mexico in January of 1990—included "par bonds" (which maintained the face value of the loan but at a reduced interest rate), "discount bonds" (which maintained market interest rates but cut the face value) and "new money bonds" (NMB), in which Bank's maintained the full claim but provided new lending. Subsequent Brady deals extended this set to a variety of other instruments including debt conversion bonds (DCB), Past Due Interest (PDI) and Capitalization bonds (C-bonds). As Brady deals were concluded, these instruments replaced loans in the secondary market. While initially dominated by the Brady bonds, a new wave of international bond issues beginning in the early 1990s gradually shifted the composition of this bond market in the direction of new issue bonds.

Aggregate secondary market debt prices for each country were compiled in two steps. First, we separately compiled debt prices for the three major categories of instruments that have been traded on secondary debt markets since the mid-1980s, namely loans, Brady bonds and other restructured instruments (for example, pre-Brady Brazilian exit and new money bonds), and new issue bonds. This three-way distinction provides one with the flexibility of either including Brady bonds with new issue bonds or treating them as successor instruments to loans for the purposes of computing rates of return in particular debt categories. We then aggregated these three categories to an overall average secondary market debt price for each country. The basic principle in both steps was to compute aggregate prices as a weighted average of the prices of the underlying instruments, weighted by the face amount outstanding. When the source used did not provide information on amounts outstanding, we used issue amounts instead (see notes on individual sources below for details).

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[15] This appendix was prepared by Priya Joshi.

APPENDIX II

We used the following sources:

1. The *LDC Debt Report* (renamed to *Emerging Markets Debt Report* after mid 1995) a weekly newletter on developing country debt markets which was published between 1988 and 2000.

2. *Financial Flows and the Developing Countries* (FFDC), a quarterly publication by the World Bank published from 1988 until 1998;

3. Data obtained by Christoph Klingen in 1994 from *Salomon Brothers* (SB) and *Latin Finance* (NMB Bank, New York) through personal faxes covering end of year loan data from 1986 to 1989.

4. Instrument-level data underlying the EMBI, EMBI+ and EMBI Global Bond indices, kindly provided to us by the *JP Morgan* Research Department;

5. The *Bloomberg* financial database.

The *LDC debt report* is the most comprehensive and easily accessible source on pre-Brady deal loan prices and was our primary source the period 1988 until the Brady deals. For the period prior to 1988, we relied primarily on *Salomon Brothers* data. Our main source following the Brady deal is the *JP Morgan* data underlying the EMBI Global index. Relative to the alternatives (primarily, the Bloomberg data base) this data has the advantage that it provides data on oustanding volumes rather than just issue volumes, and has somewhat better year-to-year continuity. However, we also used Bloomberg data to fill some holes in the other sources between 1991 and 2001 and as our primary datasource for Indonesia and Malaysia (the former is not covered by the EMBI Global; for the latter, Bloomberg provides better coverage). *Financial Flows and the Developing Countries* was the primary datasource for the Republic of Congo and the Republic of Egypt, which are not covered not in the LDC Debt Report. The *Latin Finance* (NMB, New York) data is used for Colombia and Panama (1986 - 1988).

In what follows, we first reproduce the results of our price compilation exercise, in summary tables containing average debt prices by country and type of instrument (loans, Bradys, bonds) and for all instruments. Next, we provide more details on compilation methodology for each source. Finally, we present some information on the representativeness of our average debt prices.

Table A1. Aggregated Secondary Market Prices, 1986 - 2001. [1/]

country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Algeria	n.a.	n.a.	75.0	80.0	80.0	91.0	92.0	64.0	30.0	n.a.	n.a.	n.a.	n.a.	73.7	80.2	86.0
Argentina	65.5	34.9	21.0	28.6	33.0	48.2	63.2	79.2	56.8	68.1	83.7	89.6	86.0	88.7	87.9	29.1
Bolivia	7.0	11.0	10.0	11.0	9.0	13.9	16.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brazil	75.0	46.0	40.0	23.1	49.3	30.7	30.4	82.5	57.6	61.8	77.2	81.7	61.5	80.6	83.7	80.7
Chile	67.0	61.0	57.0	59.3	73.3	89.5	90.0	90.0	95.0	n.a.	n.a.	n.a.	n.a.	93.2	97.1	101.6
Colombia	84.0	63.0	57.5	63.5	64.0	75.0	75.0	85.0	89.9	102.3	100.1	93.3	83.5	91.8	83.8	101.3
Congo, Dem. Rep.	n.a.	n.a.	20.0	19.0	***16.0***	13.0	9.0	9.0	12.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Congo, Rep.	n.a.	n.a.	n.a.	15.0	8.0	4.0	6.0	9.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cote d'Ivoire	76.0	40.0	23.0	7.0	3.0	7.0	7.0	15.0	21.0	16.0	26.0	35.7	25.3	16.3	12.0	14.5
Ecuador	65.0	36.5	12.5	14.0	19.8	22.0	27.8	57.6	n.a.	38.2	58.5	64.6	43.4	30.0	46.7	56.1
Egypt, Arab Rep.	n.a.	n.a.	n.a.	40.0	43.0	51.0	45.0	46.0	48.0	48.0	47.0	49.0	n.a.	n.a.	n.a.	99.5
Indonesia	n.a.	n.a.	97.0	97.0	99.2	99.5	99.9	99.6	***99.8***	99.9	100.6	87.0	66.8	83.6	***89.3***	94.9
Jordan	n.a.	n.a.	n.a.	n.a.	n.a.	30.0	35.0	52.0	42.0	47.0	62.9	71.5	56.6	66.5	75.4	84.6
Korea, Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	100.1	89.7	103.8	101.2	79.7	95.1	99.7	102.0	108.7
Lebanon	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	99.6	102.3	102.5	101.9	101.8	98.0	98.5	95.3
Malaysia	n.a.	n.a.	95.4	96.2	95.4	96.3	100.6	102.9	103.8	99.5	99.8	97.2	99.3	104.5	106.4	107.0
Mexico	56.0	50.0	42.8	40.6	53.6	66.1	71.4	89.8	64.3	71.5	86.1	92.0	85.1	91.5	101.0	105.3
Morocco	68.0	52.0	48.0	38.0	39.3	46.1	46.8	79.8	66.0	64.9	80.4	85.0	80.5	87.8	86.5	88.8
Nigeria	36.0	29.0	23.0	30.0	37.0	39.5	38.5	48.8	31.8	41.0	59.1	55.9	50.2	60.8	55.0	69.1
Pakistan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	100.8	94.2	54.7	71.7	67.5	90.0
Panama	67.0	35.0	20.0	12.0	12.6	20.5	29.0	53.3	52.5	n.a.	n.a.	73.4	84.1	81.5	83.7	83.7
Peru	18.0	7.0	5.0	5.5	4.0	11.4	19.3	68.2	54.7	72.8	116.0	62.6	59.9	65.5	61.7	73.4
Philippines	72.0	50.0	33.5	50.0	36.5	49.6	57.0	85.2	74.0	80.4	96.0	88.2	89.3	97.3	86.3	99.5
Sudan	n.a.	n.a.	2.0	1.0	2.3	1.0	1.0	2.0	3.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Thailand	n.a.	n.a.	n.a.	97.5	94.8	106.8	***109.1***	111.4	102.8	n.a.	n.a.	82.7	97.3	98.3	104.3	108.2
Turkey	n.a.	n.a.	n.a.	n.a.	86.7	104.9	102.3	104.9	85.7	99.4	100.0	100.5	88.3	100.4	91.1	98.7
Venezuela, RB	74.0	57.0	40.8	37.7	56.1	69.0	58.2	74.1	46.2	56.2	83.0	89.2	63.5	72.8	74.3	69.8

1/ Aggregate average debt prices based on loan prices, brady prices and bond prices, calculated using the methodology described in the text.

Table A2. Secondary Market Loan Prices, 1986 - 2001. [1/]

country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Algeria	n.a.	n.a.	75.0	80.0	80.0	91.0	92.0	64.0	30.0	n.a.	n.a.	n.a.	n.a.	73.7	80.2	86.0
Argentina	65.5	34.9	21.0	13.0	20.6	32.3	43.6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bolivia	7.0	11.0	10.0	11.0	9.0	13.9	16.0	na	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brazil	75.0	46.0	40.0	22.3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Chile	67.0	61.0	57.0	59.3	73.3	89.5	90.0	90.0	95.0	na	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Colombia	84.0	63.0	57.5	63.5	64.0	75.0	75.0	85.0	90.0	na	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Congo, Dem. Rep.	n.a.	n.a.	20.0	19.0	***16.0***	13.0	9.0	9.0	12.0	na	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Congo, Rep.	n.a.	n.a.	n.a.	15.0	8.0	4.0	6.0	9.0	n.a.	na	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cote d'Ivoire	76.0	40.0	23.0	7.0	3.0	7.0	7.0	15.0	21.0	16.0	26.0	34.0	n.a.	n.a.	n.a.	n.a.
Ecuador	65.0	36.5	12.5	14.0	19.8	22.0	27.8	52.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Egypt, Arab Rep.	n.a.	n.a.	n.a.	40.0	43.0	51.0	45.0	46.0	48.0	48.0	47.0	49.0	na	n.a.	n.a.	n.a.
Indonesia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Jordan	n.a.	n.a.	n.a.	n.a.	n.a.	30.0	35.0	52.0	42.0	47.0	58.0	67.0	n.a.	n.a.	n.a.	n.a.
Korea, Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Lebanon	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Malaysia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mexico	56.0	50.0	42.8	35.8	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Morocco	68.0	52.0	48.0	38.0	39.3	46.1	46.8	79.8	66.0	64.9	80.4	85.0	80.5	87.8	86.5	88.8
Nigeria	36.0	29.0	23.0	30.0	37.0	39.5	38.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Pakistan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Panama	67.0	35.0	20.0	12.0	12.6	20.5	29.0	53.3	52.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Peru	18.0	7.0	5.0	5.5	4.0	11.4	19.3	66.8	55.8	70.0	116.0	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	72.0	50.0	33.5	50.0	36.5	49.6	57.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sudan	n.a.	n.a.	2.0	1.0	2.3	1.0	1.0	2.0	3.0	na	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Thailand	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Turkey	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Venezuela, RB	74.0	57.0	41.0	34.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

2/ Taken directly from datasources (primarily *LDC Debt Report* and *Salomon Brothers,* see text), without weighting since there is only one price per y

Table A3. Secondary Market Brady Prices, 1986 - 2001. [3/]

country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Algeria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Argentina	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	77.5	52.1	63.3	73.5	80.8	77.4	77.9	78.8	39.2
Bolivia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brazil	n.a.	n.a.	n.a.	42.4	49.3	30.7	29.6	81.8	57.6	61.6	76.7	80.5	60.2	75.7	77.9	75.1
Chile	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Colombia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Congo, Dem. Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Congo, Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cote d'Ivoire	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	35.7	25.3	16.3	12.0	14.5
Ecuador	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	58.5	64.6	43.4	30.0	46.7	56.1
Egypt, Arab Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Indonesia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Jordan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	62.9	71.5	56.6	66.5	75.4	84.6
Korea, Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Lebanon	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Malaysia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mexico	n.a.	n.a.	n.a.	n.a.	53.0	65.5	70.6	88.7	62.7	69.7	79.2	86.3	78.7	82.9	92.8	93.2
Morocco	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Nigeria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	48.8	31.8	41.0	59.1	55.9	50.2	60.8	55.0	69.1
Pakistan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Panama	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	73.4	78.4	74.8	78.5	77.4	85.7
Peru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	57.5	62.6	59.9	65.5	61.7	73.4
Philippines	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	85.2	74.0	80.4	94.3	88.1	85.8	87.3	83.8	84.4
Sudan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Thailand	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Turkey	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Venezuela, RB	n.a.	n.a.	n.a.	n.a.	55.2	68.0	53.8	74.1	46.2	56.2	83.0	88.9	64.5	75.0	78.7	72.9

3/ Brady prices are weighted averages of all Brady issues for which prices and amount issued or amount outstanding are available. See text for source

Table A4. Secondary Market Bond Prices, 1986 - 2001. [4/]

country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Algeria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Argentina	n.a.	n.a.	n.a.	77.5	57.3	78.2	101.4	81.8	63.7	75.7	98.2	97.5	92.9	96.2	91.1	25.6
Bolivia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brazil	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	96.7	102.4	97.5	100.6	99.4	94.6	71.2	95.9	91.5	86.1
Chile	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	93.2	97.1	101.6
Colombia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	88.2	102.3	100.1	93.3	83.5	91.8	83.8	101.3
Congo, Dem. Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Congo, Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cote d'Ivoire	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ecuador	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	102.8	90.5	40.3	47.2	56.4
Egypt, Arab Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	99.5
Indonesia	n.a.	n.a.	97.0	97.0	99.2	99.5	99.9	99.6	***99.8***	99.9	100.6	87.0	66.8	83.6	***89.3***	94.9
Jordan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Korea, Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	100.1	89.7	103.8	101.2	79.7	95.1	99.7	102.0	108.7
Lebanon	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	99.6	102.3	102.5	101.9	101.8	98.0	98.5	95.3
Malaysia	n.a.	n.a.	95.4	96.2	95.4	96.3	100.6	102.9	103.8	99.5	99.8	97.2	99.3	104.5	106.4	107.0
Mexico	n.a.	n.a.	n.a.	104.9	103.1	102.5	104.3	106.4	79.7	88.6	100.8	106.0	98.0	106.4	108.5	109.0
Morocco	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	104.8	n.a.	n.a.	n.a.	n.a.	n.a.
Nigeria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Pakistan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	100.8	94.2	54.7	71.7	67.5	90.0
Panama	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	95.1	94.4	90.9	92.6	99.1
Peru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	104.0	88.5	98.1	99.2	86.3	99.5
Sudan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Thailand	n.a.	n.a.	n.a.	97.5	94.8	106.8	***109.1***	111.4	102.8	n.a.	n.a.	82.7	97.3	98.3	104.3	108.2
Turkey	n.a.	n.a.	n.a.	n.a.	86.7	104.9	102.3	104.9	85.7	99.4	100.0	100.5	88.3	100.4	91.1	98.7
Venezuela, RB	n.a.	n.a.	n.a.	84.5	92.2	91.9	96.1	102.1	94.4	99.6	99.9	89.8	61.4	68.7	67.5	65.4

4/ Bond prices are weighted averages of all bond issues for which prices and amount issued or amount outstanding are available. See text for sources.

APPENDIX II

Notes on Specific Sources

LDC Debt Report / Emerging Markets Debt Report (LDCDR)

- Loans: The LDCDR provides one end of year loan price per country, which was used directly.

- Bradys: whenever brady or pre-brady bonds are recorded in the LDCDR, they are weighted by their issue amounts, using Bloomberg data. Brady bond prices from the LDCDR were used for the early 1990s for countries with early Brady deals.

- Bonds: The LDCDR lists a few select bonds for the early years which we used for large Latin American countries such as Argentina, Brazil, Mexico and Venezuela. We use the World Debt Tables (WDT) , the Bonds, Equities and Loan (BEL) database, Bloomberg (BB) and bradynet.com to assign these bonds their respective amount issued, which are then used as weights to get the bond price by country. In case the amount issued of the bonds are unavailable from our sources we take the simple average of the bond issues. This is not a problematic assumption since the bond prices over which we are taking the average are very similar.

- "All": When only one type of issue is available, e.g. only loans or only Bradys, we replace the loan or Brady value into our "all" section. When either loan prices and Brady prices or loan and bond prices exist, we take a weighted average, using the ratio of public and publicly guaranteed debt commercial bank debt to public and publicly guaranteed bonds reported in the GDF database. When both Brady and bond prices are reported, we use issue amount information from various sources including Bloomberg, "bradynet.com", and hardcopies of the World Debt Tables as weights.

J.P. Morgan data underlying the "EMBI Global"and "EMBI plus" indices

"EMBI Global" instruments are required to have available daily prices, a minimum of $500 million outstanding, at least 2 ½ years of remaining maturity to be first included (and at least one year to remain in the index), and must be able to settle internationally. Included instruments in the index are Brady bonds, Emerging markets loans, Eurobonds and local market debt instruments issued by sovereign and quasi-sovereign entities. All of the issues are denominated in US dollars. "EMBI plus" instruments have more stringent requirements for inclusion and are typically, but not always, a subset of EMBI Global instruments. In the event that they were not already in the EMBI Global data, we added them to our instrument-level data to have the most complete set of instruments possible. For each instrument, we use the face amount outstanding (FACE OS) and Current Face Price Bid or Close Bid (BID).[16]

[16] We use bid prices for consistency with one of our other sources, *Financial Flows and the Developing Countries*, which mostly reports bid prices.

Our first step is to classify the instruments into bonds, Bradys and loans. One way of separating Bradys from the other bonds is to compare the data with the EMBI Index instruments, which only consist of at Brady bonds[17]. We then weigh each instrument within these categories using their face amounts outstanding and computed a weighted average price for that group. The same methodology is applied to get aggregate prices.

Bloomberg, 1988 – 2001.

We use Bloomberg data on international government bonds for our calculations of prices. (GOVT TK). All issues for which data are available are collected and sorted by Bloomberg market issue. We separate the Brady and bond categories using the Bloomberg category "restructured debt" (Brady bonds and other restructured instruments). The remainder are classified as "non restructured debt", i.e. (new issue) bonds. Since Bloomberg does not keep a historical record of amount outstanding for each bond, we use information on the amount issued and issue currency in order to compute weights based on issue volume in U.S. dollars. This information is merged with Bloomberg historical data on bid prices to compute a weighted price per year, in an analogous procedure to the EMBIG weighting.

Other:

As in the case of the LDC Debt report, data from *Salomon Brothers* (SB) and *NMB Bank*, New York (NMB)/Latin Finance comprises just one loan price per country, so weighting is not an issue here.

Financial Flows and the Developing Countries (FFDC) reports secondary market prices for just one instrument per country. When countries undergo Brady deals or other restructurings, a specific issue is chosen. For this reason, we use the FFDC only in rare cases.

On rare occasions, it was necessary to combine a Brady, bond or loan price from one source with a Brady, bond or loan price price from another datasource to obtain an aggregated price. In the event of a Brady and bond aggregation across datasources, we use amounts outstanding or amount issued as weights. In the event of a loan and Brady or loan and bond aggregation, we use the ratio of public and publicly guaranteed bank and bonds debt stocks from the GDF database.

Representativeness

Tables A5 and A6 provide information on the representativeness of our price data relative to the stock of total privately held debt (privately held public anc publicly guaranteed debt plus

[17] This is not a foolproof method since there are many countries that are not in included in the EMBI but are in the EMBIG. This comparison serves as a useful check nonetheless.

private non-guaranteed debt) and privately held public and publicly guaranteed debt only, by dividing the total amount issued or amount outstanding used to aggregate prices with the corresponding debt stock data from the GDF. For the early years, when no issue amounts are available and country-specific representative loan prices were used to arrive at an average price (either by setting the average price is equal to the country-specific loan price, or by taking a weighted average of loan and bond prices using GDF weights) the tables show the ratio of GDF public and publicly guaranteed bank loans to the stock of privately held debt or PPG privately held debt, respectively. In the event that average prices are a weighted average that reflect the prices of bonds as well as loans, this would somewhat understate the true representativeness of our average prices.

The results are generally reassuring, with most representativeness rates in the 50 to 100 percent range. However, there are a few outliers in both directions. Representativeness rates above 100 percent generally have to do with using "amount issued" data rather than "amount outstanding" data in the weighting. Very low representativeness rates have to do with the use of a price sources that only provided data on one benchmark issue, in particular the *LDC debt report* as a source for early bond issues. In addition, the JP Morgan data presently used does not include Euro denominated Eurobonds and bonds that have less than $ 500 million outstanding. The first problem can be resolved by obtaining Euro-EMBIG data. A solution to the latter problem (for the Latin American countries only) is to incorporate instruments underlying JP Morgan's LEI index, which includes smaller issues. In the future, we hope to extend the data to include these instruments.

Table A5. Representativeness of prices in all outstanding privately held debt [1/]

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Algeria			38.5	34.0	29.1	25.5	27.7	26.2	28.0					17.2	20.4	11.6
Argentina	58.5	68.4	68.7	70.2	60.4	59.8	58.9	**110.5**	91.3	78.6	66.4	60.0	48.4	47.0	45.9	24.1
Bolivia	47.7	69.8	2.7	1.0	0.8	2.2	2.5									
Brazil	68.1	68.7	72.2	75.6	90.1	90.7	78.4	10.3	50.8	50.7	44.2	33.5	25.9	24.5	24.9	31.4
Chile	72.4	76.6	72.6	61.7	49.9	44.5	38.0	32.6	29.1					1.6	1.5	4.1
Colombia	61.9	56.3	58.5	57.3	58.1	59.3	55.4	47.6	45.3	3.4	2.5	3.7	5.9	12.0	11.7	27.8
Congo, Dem. Rep.			61.2	59.2	58.9	59.5	60.5	61.1	60.3							
Congo, Rep.				53.2	63.3	59.1	62.1	74.3								
Cote d'Ivoire	42.8	46.4	45.9	45.4	47.7	48.1	47.8	46.7	48.3	49.2	57.0	27.2	19.2	20.5	21.4	22.3
Ecuador	89.2	88.5	85.4	82.9	81.9	83.4	86.1	35.6		84.4	81.3	72.6	76.1	74.8	65.2	69.7
Egypt, Arab Rep.				6.7	8.6	17.3	19.1	19.7	22.0	25.0	29.4	43.1				**146.0**
Indonesia			1.5	1.3	1.2	1.1	1.0	1.1		0.6	1.4	0.7	0.5	0.6		3.6
Jordan						47.6	51.6	23.5	20.5	17.6	36.3	39.8	44.5	36.5	56.8	68.2
Korea, Rep.								7.2	6.7	9.9	12.5	12.9	15.0	18.1	15.2	17.2
Lebanon									82.7	34.1	46.7	15.8	25.4	19.8	7.4	39.6
Malaysia			19.1	27.0	34.7	36.8	22.2	18.0	2.2	3.0	2.7	2.3	0.7	4.8	6.4	12.0
Mexico	69.9	72.0	76.5	77.9	11.2	45.3	48.6	43.2	41.1	38.3	37.5	30.6	27.7	24.7	25.0	34.4
Morocco	45.4	45.5	52.2	54.1	53.8	55.6	57.6	44.8	42.5	40.8	43.0	41.9	37.2	35.9	32.4	32.7
Nigeria	29.2	40.8	36.1	40.1	38.3	41.4		73.4	71.7	74.0	80.2	92.7	87.0	84.1	**129.8**	**129.9**
Pakistan											9.3	6.5	3.2	3.6	4.0	20.4
Panama	83.4	84.7	84.5	84.2	83.7	85.9	86.4	86.7	97.3			68.1	78.7	71.9	77.7	75.6
Peru	49.7	45.9	45.6	44.6	42.9	59.1	73.3	41.6	37.5	37.1	26.8	51.1	46.1	39.9	37.6	49.3
Philippines	64.0	67.2	67.5	73.1	67.0	63.2	17.3	45.8	41.6	40.7	33.9	26.5	21.7	15.4	20.8	22.7
Sudan			79.1	73.5	76.8	76.0	74.6	74.3	76.5							
Thailand				2.0	1.7	1.2		2.4	0.8			1.1	1.1	1.2	1.5	1.8
Turkey					3.4	3.3	5.5	13.9	0.7	1.9	1.1	2.1	1.8	3.2	8.3	9.4
Venezuela, RB	68.5	72.4	72.4	72.1	51.8	52.6	53.9	60.0	60.9	62.1	62.1	53.6	46.9	44.2	38.1	39.5

1/ Calculated as either total amount issued or amount outstanding of debt used for calculation of aggregate prices, divided by debt stock outstanding, in percent.

Table A6. Representativeness of prices in all public and publicly guaranteed privately held debt [1/]

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Algeria			38.5	34.0	29.1	25.5	27.7	26.2	28.0					17.2	20.4	11.6
Argentina	65.7	71.5	71.9	73.2	63.5	62.9	62.8	**134.6**	**128.9**	**115.5**	96.2	88.8	72.1	67.3	64.0	32.2
Bolivia	67.8	82.3	3.7	1.5	1.2	3.3	3.7									
Brazil	83.4	83.4	84.8	83.0	**100.5**	**103.1**	95.5	13.8	69.6	72.6	74.7	72.6	65.5	68.6	69.4	87.4
Chile	93.2	93.1	91.2	90.5	90.5	88.3	86.5	94.4	97.1					14.0	15.2	50.5
Colombia	80.2	72.0	74.4	69.6	68.6	69.0	67.6	64.4	65.3	6.2	4.8	7.8	11.4	21.8	20.8	50.8
Congo, Dem. Rep.			61.2	59.2	58.9	59.5	60.5	61.1	60.3							
Congo, Rep.				53.2	63.3	59.1	62.1	74.3	86.5							
Cote d'Ivoire	73.8	77.6	81.6	83.0	88.6	92.3	95.1	95.4	96.7	98.0	97.9	49.6	33.2	33.9	34.6	35.4
Ecuador	90.5	90.0	87.2	85.2	84.2	85.5	87.7	37.2		89.8	84.9	75.7	78.1	79.6	74.9	76.8
Egypt, Arab Rep.				8.0	10.0	21.0	22.8	23.8	25.8	29.4	32.2	48.3				**330.0**
Indonesia			2.0	1.9	2.0	2.1	2.2	2.3		2.1	5.0	3.0	2.2	2.3		13.8
Jordan						47.6	51.6	23.5	20.5	17.6	36.3	39.8	44.5	36.5	56.8	68.2
Korea, Rep.								12.3	17.5	19.9	26.8	32.7	26.9	31.9	35.4	37.7
Lebanon									82.7	35.6	61.4	24.3	31.7	22.8	8.4	42.8
Malaysia			23.3	30.9	43.2	48.3	33.6	29.5	4.4	6.2	5.7	5.1	1.5	10.5	14.3	25.3
Mexico	86.4	86.9	83.6	83.2	12.4	51.8	59.8	56.8	54.8	50.9	49.3	44.3	44.1	42.9	45.8	54.5
Morocco	47.0	46.9	53.8	55.8	55.5	57.6	59.8	46.3	44.6	43.2	46.2	50.2	46.7	49.6	48.8	52.3
Nigeria	31.1	42.1	37.1	41.2	39.4	42.3	0.0	76.3	74.4	76.9	83.8	97.6	91.2	87.7	**137.8**	**137.0**
Pakistan											24.4	12.7	6.6	7.4	7.8	47.0
Panama	83.4	84.7	84.5	84.2	83.7	85.9	86.4	86.7	97.3			74.1	85.4	81.3	91.4	87.1
Peru	52.9	48.7	48.5	47.3	44.9	61.6	77.4	47.6	49.1	50.0	33.4	78.2	79.0	71.8	75.2	87.9
Philippines	76.8	77.8	77.5	82.1	76.2	74.2	20.0	61.8	60.5	64.3	59.1	49.9	49.7	28.1	33.6	37.3
Sudan			99.7	99.7	99.8	99.7	99.7	99.7								
Thailand				3.9	4.8	4.5		9.7	3.7			8.7	6.1	6.3	7.2	8.9
Turkey					3.6	3.6	6.3	17.0	0.8	2.3	1.5	3.3	3.1	5.6	13.8	15.0
Venezuela, RB	88.8	88.6	85.0	83.6	60.0	61.4	63.1	68.5	67.1	67.4	66.8	60.1	60.8	59.9	53.2	56.4

1/ Calculated as either total amount issued or amount outstanding of debt used for calculation of aggregate prices, divided by debt stock outstanding, in percent.

APPENDIX III

Computation of Net Transfers on Alternative Investment

When computing rates of return on alternative investments, we want to use a net transfer concept that is consistent with the modified net transfers used in our main rate of return calculations. In general net transfers *from the creditor perspective* are defined as:

$$-nt_t = r_t - d_t + \text{interest payments}$$

where r_t denotes gross repayments, d_t denotes gross disbursements, and nt_t denotes net transfers in the GDF convention, i.e. from the country perspective. The question is how we can construct the right hand side terms of this equation, for an "alternative investment" in a bond of maturity τ, based on the net flows data used for each country and/or the implicit debt stock consistent with this net flow data. Throughout, we assume that bonds pay a coupon each year which equals the interest rate.

We focus on the case where $\tau > 1$ (in the paper, we have $\tau = 3$ or $\tau = 10$). By definition, $r_t = d_{t-\tau}$. Thus, the net transfer definition becomes:

$$-nt_t = r_t - d_t + i_{t-1}d_{t-1} + i_{t-2}d_{t-2} + ... + i_{t-\tau}d_{t-\tau} = -d_t + i_{t-1}d_{t-1} + i_{t-2}d_{t-2} + ... + (1 + i_{t-\tau})d_{t-\tau}$$

We compute $d_t, d_{t-1}, d_{t-2}, ..., d_{t-\tau}$ based on implicit debt stock data. The standard law of motion for the debt stock is $D_t = D_{t-1} + d_t - r_t$. Substituting $r_t = d_{t-\tau}$, we have: $D_t = D_{t-1} + d_t - d_{t-\tau}$, or $d_t = D_t - D_{t-1} + d_{t-\tau}$. Using $D_o = d_0$ and $d_{t-\tau} = 0$ for all $t < \tau$, we can now compute $d_{t-1}, d_{t-2}, ..., d_{t-\tau}$ recursively.

Example: $\tau = 3$

$d_0 = D_0$
$d_1 = D_1 - D_0$
$d_2 = D_2 - D_1$
$d_3 = D_3 - D_2 + d_0$
$d_4 = D_4 - D_3 + d_1$
etc.

Finally, consider net transfers in the last period. In the computation of the emerging market debt rate or return, the last period is treated as follows: interest payments are received, any net repayments are received, and the final debt stock is treated at market prices (which in turn embody expectations of future repayments and interest payments). To treat the alternative investment analogously, we must assume that all disbursements until the last period, denoted *T*, "count". In other words, *T* is defined as the last period in which disbursements happen; however, interest payments and repayments continue to flow until everything is repaid:

APPENDIX III

$$-nt_T = -d_T + i_{T-1}d_{T-1} + i_{T-2}d_{T-2} + \ldots + (1 + i_{T-\tau})d_{T-\tau}$$
$$-nt_{T+1} = i_T d_T + i_{T-1}d_{T-1} \ldots + (1 + i_{T+1-\tau})d_{T+1-\tau}$$
...
$$-nt_{T+\tau} = (1 + i_{T+\tau-1})d_{T+\tau-1}$$

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