

CARMEN M. REINHART

International Monetary Fund

KENNETH S. ROGOFF

International Monetary Fund

MIGUEL A. SAVASTANO

International Monetary Fund

Debt Intolerance

IN THIS PAPER WE argue that history matters: that a country's record at meeting its debt obligations and managing its macroeconomy in the past is relevant to forecasting its ability to sustain moderate to high levels of indebtedness, both domestic and internal, for many years into the future. We introduce the concept of "debt intolerance" (drawing an analogy to, for example, "lactose intolerance"), which manifests itself in the extreme duress many emerging market economies experience at overall debt levels that would seem quite manageable by the standards of the advanced industrial economies. For external debt, "safe" thresholds for highly debt-intolerant emerging markets appear to be surprisingly low, perhaps as low as 15 to 20 percent of GNP in many cases, and these thresholds depend heavily on the country's record of default and inflation. Debt intolerance is indeed intimately linked to the pervasive phenomenon of serial default that has plagued so many countries over the past two centuries. Debt-intolerant countries tend to have weak fiscal structures and weak financial systems. Default often exacerbates these problems, making these same countries more prone to future default. Understanding and measuring debt intolerance is fundamental to assessing the problems of debt sustainability, debt restructuring, and capital market integration, and to assessing the scope for international lending to ameliorate crises.

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Certainly, the idea that factors such as sound institutions and a history of good economic management affect the interest rate at which a country can borrow is well developed in the theoretical literature. Also well established is the notion that, as its external debt rises, a country becomes more vulnerable to being suddenly shut out of international capital markets, that is, to suffer a debt crisis.¹ However, there has to date been no attempt to make these abstract theories operational by identifying the factors (in particular, a history of serial default or restructuring) that govern how quickly a country becomes vulnerable to a debt crisis as its external obligations accumulate. One goal of this paper is to quantify this debt intolerance, drawing on a history of adverse credit events going back to the 1820s. We argue that a country's current level of debt intolerance can be approximated empirically as the ratio of the long-term average of its external debt (scaled by GNP or exports) to an index of default risk. We recognize that other factors, such as the degree of dollarization, indexation to inflation or short-term interest rates, and the maturity structure of a country's debt, are also relevant to assessing a country's vulnerability to symptoms of debt intolerance.² We argue, however, that in general these factors are different manifestations of the same underlying institutional weaknesses. Indeed, unless these weaknesses are addressed, the notion that the "original sin" of serial defaulters can be extinguished through some stroke of financial engineering, allowing these countries to borrow in the same amounts, relative to GNP, as more advanced economies, much less at the same interest rates, is sheer folly.³

The first section of the paper gives a brief overview of the history of serial default on external debt, showing that it is a remarkably pervasive and enduring phenomenon: the European countries set benchmarks, centuries ago, that today's emerging markets have yet to surpass. For example, Spain defaulted on its external debt thirteen times between 1500 and 1900, whereas Venezuela, the recordholder in our sample for the period since 1824, has defaulted "only" nine times. We go on to show how coun-

1. See Obstfeld and Rogoff (1996, chapter 6).

2. See Goldstein (2003) for a comprehensive discussion of these factors.

3. Some analysts, such as Eichengreen, Hausmann, and Panizza (2002), have put the blame for recurring debt cycles on the incompleteness of international capital markets and have proposed mechanisms to make it easier for emerging market economies to borrow more. Needless to say, our view is that the main problem for these countries is how to borrow *less*. For another critical discussion of the notion of original sin, argued on different grounds, see Reinhart and Reinhart (2003).

tries can be divided into debtors' "clubs" and, within those clubs, more or less debt-intolerant "regions," depending on their credit and inflation history. We also develop first broad-brush measures of safe debt thresholds. The data overwhelmingly suggest that the thresholds for emerging market economies with high debt intolerance are much lower than those for advanced industrial economies or for those emerging market economies that have never defaulted on their external debt. Indeed, fully half of all defaults or restructurings since 1970 took place in countries with ratios of external debt to GNP below 60 percent.⁴

Our key finding, presented in the second section of the paper, is that a country's external debt intolerance can be explained by a very small number of variables related to its repayment history, indebtedness level, and history of macroeconomic stability. Markets view highly debt-intolerant countries as having an elevated risk of default, even at relatively low ratios of debt to output or exports. Whether markets adequately price this risk is an open question, but it is certainly a risk that the citizens of debt-intolerant countries should be aware of when their leaders engage in heavy borrowing.

The third section turns to the question of how debt intolerance affects conventional calculations of debt sustainability, which typically assume continual market access. For debt-intolerant countries, sustaining access to capital markets can be problematic unless debt ratios are quickly brought down to safer levels. To assess how such "deleveraging" might be accomplished, we examine how, historically, emerging market economies with substantial external debts have managed to work them down. To our knowledge, this is a phenomenon that has previously received very little, if any, attention. We analyze episodes of large debt reversals, where countries' external debt fell by more than 25 percentage points of GNP over a three-year period. Of the twenty-two such reversals that we identify for a broad group of middle-income countries since 1970, two-thirds involved some form of default or restructuring. (Throughout

4. See Sims (2001) for a model that implies that an economy with low taxation and low indebtedness may optimally repudiate its debt, or inflate at high rates, more frequently than an economy that has inherited high levels of taxation and debt (as have some industrial economies). Indeed, as we shall see, and consistent with some of the predictions of that model, the countries with the highest historical default probabilities, and the highest probability of inflation rates above 40 percent a year, also had (on average) much lower levels of debt than the typical industrial economy.

the paper “restructuring” denotes a recontracting of debt service payments at terms that are tantamount to a partial default.) Only in one case—Swaziland in 1985—was a country able to bring down a high ratio of external debt to GNP solely as a result of rapid output growth.

Because history plays such a large role in our analysis, we focus primarily on understanding emerging market economies’ access to external capital markets. For most emerging markets, external borrowing has been the only financial game in town for much of the past two centuries, and our debt thresholds are calculated accordingly. Over the past decade or so, however, a number of emerging market economies have, for the first time, seen a rapid expansion in domestic, market-based debt, as we document using an extensive new data set, which we present in the paper’s fourth section. The calculus of domestic default obviously differs from that of default on external debt, and we lack sufficient historical data to investigate the question fully. However, we argue that a record of external debt intolerance is likely to be a good predictor of future domestic debt intolerance. It is certainly the case that many of the major debt crises of the past ten years have involved domestic debt, and that the countries that seem to be experiencing domestic debt intolerance rank high on our debt intolerance measures.⁵

Finally, if serial default is such a pervasive phenomenon, why do markets repeatedly lend to debt-intolerant countries to the point where the risk of a credit event—a default or a restructuring—becomes significant? Part of the reason may have to do with the procyclical nature of capital markets, which have repeatedly lent vast sums to emerging market economies in boom periods (which are often associated with low returns

5. Some policymakers, of course, have come to recognize the problem at least since the Mexican debt crisis of 1994. The academic literature has lagged behind, in part because of lack of data, but also because the theoretical connections between external and domestic debt have not been well articulated. Nonetheless, among the participants in this debate, Ronald McKinnon merits special mention for anticipating the emergence of domestic government debt as a problem to be reckoned with. McKinnon wrote in 1991 that “One of the most striking developments of the late 1980s was the extent to which the governments of Mexico, Argentina and Brazil went into debt *domestically*. Because of the cumulative effect of very high interest rates (over 30 percent real was not unusual) on their existing domestic liabilities, government-debt-to-GNP ratios have been building up in an unsustainable fashion even though most of these countries are not paying much on their debts to international banks. In many [developing countries], people now anticipate that governments will default on its own domestic bonds—as in March 1990 with the Brazilian government’s freeze of its own outstanding liabilities” (McKinnon, 1991, p. 6).

in the industrial countries) only to retrench when adverse shocks occur, producing painful “sudden stops.”⁶ As for the extent to which borrowing countries themselves are complicit in the problem, one can only conclude that, throughout history, governments have often been too short-sighted (or too corrupt) to internalize the significant risks that overborrowing produces over the longer term. Moreover, in the modern era, multilateral institutions have been too complacent (or have had too little leverage) when loans were pouring in. Thus a central conclusion of this paper is that, for debt-intolerant countries, mechanisms to limit borrowing, either through institutional change on the debtor side, or—in the case of external borrowing—through changes in the legal or regulatory systems of creditor countries, are probably desirable.⁷

Debt Intolerance: Origins and Implications for Borrowing

We begin by sketching the history of debt intolerance and serial default, to show how this history importantly influences what “debtors’ club” a country belongs to.

Debt Intolerance and Serial Default in Historical Perspective

A bit of historical context will help to explain our approach, which draws on a country’s long-term debt history. The basic point is that many countries that have defaulted on their external debts have done so repeatedly, with remarkable similarities across the cycles. For example, many of the Latin American countries that are experiencing severe debt problems today also experienced debt problems in the 1980s—and in the 1930s, and in the 1870s, and in the 1820s, and generally at other times as well. Brazil, whose debt problems have attracted much attention lately,

6. The procyclicality of capital flows to developing countries has been amply documented, particularly since Carlos Díaz-Alejandro called attention to the phenomenon on the eve of the Latin American debt crisis of the 1980s (Díaz-Alejandro, 1983, 1984). For a recent and systematic review of the evidence on the procyclicality of capital flows, see Kaminsky, Reinhart, and Végh (2003).

7. The need for institutional and legal changes to help rechannel capital flows to developing countries from debt toward foreign direct investment, other forms of equity, and aid, so as to prevent the recurrence of debt crises, is the central theme of Bulow and Rogoff (1990).

has defaulted seven times on its external debt over the past 175 years. During that same period, Venezuela has defaulted nine times, as already noted, and Argentina four times, not counting its most recent episode. But the problem is by no means limited to Latin America. For example, Turkey, which has been a center of attention of late, has defaulted six times over the past 175 years. These same countries have at times also defaulted, *de facto*, on their internal obligations, including through high inflation or hyperinflation. On the other side of the ledger, a number of countries have strikingly averted outright default, or restructuring that reduced the present value of their debt, over the decades and centuries. India, Korea, Malaysia, Singapore, and Thailand are members of this honor roll.

The contrast between the histories of the nondefaulters and those of the serial defaulters, summarized in table 1, is stunning. Default can become a way of life. Over the period from 1824 to 1999, the debts of Brazil and Argentina were either in default or undergoing restructuring a quarter of the time, those of Venezuela and Colombia almost 40 percent of the time, and that of Mexico for almost half of all the years since its independence. On average, the serial defaulters have had annual inflation exceeding 40 percent roughly a quarter of the time as well.⁸ By contrast, the emerging market economies in the table that have no external default history do not count a single twelve-month period with inflation over 40 percent among them. For future reference, the table also includes a sampling of advanced economies with no modern history of external default.

Today's emerging markets did not invent serial default. It has been practiced in Europe since at least the sixteenth century, as table 2 illustrates. As already noted, Spain defaulted on its debt thirteen times from the sixteenth through the nineteenth centuries, with the first recorded default in 1557 and the last in 1882. In the nineteenth century alone, Portugal, Germany, and Austria defaulted on their external debts five times, and Greece, with four defaults during that period, was not far behind. France defaulted on its debt eight times between 1550 and 1800. (Admittedly, the French governments' debts were mainly held internally before

8. The list of serial defaulters in table 1 is far from complete. Russia's 1998 default was hardly the first for that country (as table 2 shows, although the period covered does not include the default on the tsarist debt after the 1917 revolution). Many other countries have also defaulted on their external debts, including, recently, Indonesia and Ukraine in 1998, Pakistan in 1999, and Ecuador in 2000.

Table 1. Inflation, Default, and Risk of Default, Selected Countries, 1824–2001

Country	Percent of 12-month periods with inflation ≥ 40 percent, 1958–2001 ^a	No. of default or restructuring episodes, 1824–1999 ^b	Percent of years in a state of default or restructuring, 1824–1999 ^b	No. of years since last year in default or restructuring	Institutional Investor rating, September 2002 ^c
<i>Emerging market economies with at least one external default or restructuring since 1824</i>					
Argentina	47.2	4	25.6	0	15.8
Brazil	59.0	7	25.6	7	39.9
Chile	18.6	3	23.3	17	66.1
Colombia	0.8	7	38.6	57	38.7
Egypt	0.0	2	12.5	17	45.5
Mexico	16.7	8	46.9	12	59.0
Philippines	2.1	1	18.5	10	44.9
Turkey	57.8	6	16.5	20	33.8
Venezuela	11.6	9	38.6	4	30.6
Average	23.8	5.2	29.6	16	41.6
<i>Emerging market economies with no external default history</i>					
India	0.0	0	0.0	...	47.3
Korea	0.0	0	0.0	...	65.6
Malaysia	0.0	0	0.0	...	57.7
Singapore	0.0	0	0.0	...	86.1
Thailand	0.0	0	0.0	...	51.9
Average	0.0	0	0.0	...	61.7
<i>Industrial economies with no external default history</i>					
Australia	0.0	0	0.0	...	84.5
Canada	0.0	0	0.0	...	89.4
New Zealand	0.0	0	0.0	...	81.2
Norway	0.0	0	0.0	...	93.1
United Kingdom	0.0	0	0.0	...	94.1
United States	0.0	0	0.0	...	93.1
Average	0.0	0	0.0	...	89.2

Source: Authors' calculations based on data in Beim and Calomiris (2001); Standard & Poor's *Credit Week*, various issues; *Institutional Investor*, various issues; International Monetary Fund, *International Financial Statistics*, various issues.

a. Period begins in 1962:1 for Singapore, 1964:1 for Brazil, 1966:1 for Thailand, 1970:1 for Turkey, and 1971:1 for Korea.

b. Period begins in 1952 for Egypt and 1946 for the Philippines.

c. On a scale of 0 to 100, where 100 indicates the lowest probability of default on government debt.

Table 2. Defaults on External Debt in Europe before the Twentieth Century

Country	1501–1800		1801–1900		Total defaults
	No. of defaults	Years of default	No. of defaults	Years of default	
Spain	6	1557, 1575, 1596, 1607, 1627, 1647	7	1820, 1831, 1834, 1851, 1867, 1872, 1882	13
France	8	1558, 1624, 1648, 1661, 1701, 1715, 1770, 1788	n.a.		8
Portugal	1	1560	5	1837, 1841, 1845, 1852, 1890	6
Germany ^a	1	1683	5	1807, 1812, 1813, 1814, 1850	6
Austria	n.a.	n.a.	5	1802, 1805, 1811, 1816, 1868	5
Greece	n.a.	n.a.	4	1826, 1843, 1860, 1893	4
Bulgaria	n.a.	n.a.	2	1886, 1891	2
Holland	n.a.	n.a.	1	1814	1
Russia	n.a.	n.a.	1	1839	1
Total	16		30		46

Sources: Winkler (1933); Wynne (1951); Vives (1969); Bouchard (1891); Boshier (1970).

a. Defaults listed are those of Prussia in 1683, 1807, and 1813, Westphalia in 1812, Hesse in 1814, and Schleswig-Holstein in 1850.

1700, and “restructuring” was often accomplished simply by beheading the creditors—giving new meaning to the term “capital punishment.”⁹)

This central fact—that some countries seem to default periodically, and others never—both compels us to write on this topic and organizes our thinking. True, as we will later illustrate, history is not everything. Countries can eventually outgrow debt intolerance, but the process tends to be exceedingly slow, and backsliding is extremely difficult to avoid.

9. Episodes of *saignée*, or bloodletting, of financiers took place a few years after each of several of France’s defaults, including those of 1558, 1624, and 1661, when particularly prominent creditors of the government were executed; see Boshier (1970) and Bouchard (1891). The authors are grateful to Harold James for these references.

Is Serial Default Really Such a Problem?

What does history tell us about the true costs of default? Might periodic default (or, equivalently, restructuring) simply be a mechanism for making debt more equity-like, that is, for effectively indexing a country's debt service to its output performance? After all, defaults typically occur during economic downturns.¹⁰ Although there must be some truth to this argument, our reading of history is that the deadweight costs to defaulting on external debt can be significant, particularly for a country's trade, investment flows, and economic growth. In more advanced economies, external default can often cause lasting damage to a country's financial system, not least because of linkages between domestic and foreign financial markets. Indeed, although we do not investigate the issue here, we conjecture that one of the reasons why countries without a default history go to great lengths to avoid defaulting is precisely to protect their banking and financial systems. Conversely, weak financial intermediation in many serial defaulters lowers their penalty to default. The lower costs of financial disruption that these countries face may induce them to default at lower thresholds, further weakening their financial systems and perpetuating the cycle. One might make the same comment about tax systems, a point to which we will return at the end of the paper. Countries where capital flight and tax avoidance are high tend to have greater difficulty meeting debt payments, forcing governments to seek more revenue from relatively inelastic tax sources, in turn exacerbating flight and avoidance. Default amplifies and ingrains this cycle.

We certainly do not want to overstate the costs of default or restructuring, especially for serial defaulters. In fact, we will later show that debt-intolerant countries rarely choose to grow or pay their way out of heavy debt burdens without at least partial default. This revealed preference on the part of debt-intolerant countries surely tells us something. Indeed, many question whether, in the long run, the costs of allowing or precipitating a default exceed the costs of an international bailout, at least for some spectacular historical cases. But there is another side to the question

10. Bulow and Rogoff (1989) argue that one alternative, namely, formal output indexation clauses, although preferable to nonindexed debt, might be difficult to verify or enforce.

of whether debt-intolerant countries really do borrow too much, and that has to do with the benefit side of the equation. Our reading of the evidence, at least from the 1980s and 1990s, is that external borrowing was often driven by shortsighted governments that were willing to take significant risks to raise consumption temporarily, rather than to foster high-return investment projects. The fact that the gains from borrowing come quickly, whereas the increased risk of default is borne only in the future, tilts shortsighted governments toward excessive debt. So, although the costs of default are indeed often overstated, the benefits to be reaped from external borrowing are often overstated even more, especially if one looks at the longer-term welfare of the citizens of debtor countries.

What does history tell us about the lenders? We do not need to tackle this question here. Each of the periodic debt cycles the world has witnessed has had its own unique character, either in the nature of the lender (for example, bondholders in the 1930s and 1990s versus banks in the 1970s and 1980s) or in the nature of the domestic borrower (for example, state-owned railroads in the 1870s versus core governments themselves in the 1980s). There are, however, clearly established cycles in lending to emerging markets, with money often pouring in when rates of return in industrial countries are low. Heavy borrowers are particularly vulnerable to “sudden stops” or reversals of capital flows, when returns in industrial countries once again pick up.

Debt Thresholds

Few macroeconomists would be surprised to learn that emerging market economies with ratios of external debt to GNP above 150 percent run a significant risk of default. After all, among advanced economies, Japan’s current debt-to-GDP ratio, at 120 percent, is almost universally considered high. Yet default can and does occur at ratios of external debt to GNP that would not be considered excessive for the typical advanced economy: for example, Mexico’s 1982 debt crisis occurred at a ratio of debt to GNP of 47 percent, and Argentina’s 2001 crisis at a ratio slightly above 50 percent.

We begin our investigation of the debt thresholds of emerging market economies by chronicling all episodes of default or restructuring of external debt among middle-income economies during the period from 1970 to

2001.¹¹ Table 3 lists twenty-seven countries that suffered at least one default or restructuring during that period, the first year of each episode, and the country's ratios of external debt to GNP and to exports at the end of the year in which the episode occurred. (Many episodes lasted several years.) It is obvious from the table that Mexico's 1982 default and Argentina's 2001 default were not exceptions: many other countries also suffered adverse credit events at levels of debt below 50 percent of GNP. Table 4 shows further that external debt exceeded 100 percent of GNP in only 13 percent of these episodes, that more than half of these episodes occurred at ratios of debt to GNP below 60 percent, and that defaults occurred despite debt being less than 40 percent of GNP in 13 percent of episodes.¹² (Indeed, the external debt-to-GNP thresholds reported in table 3 are biased *upward*, because the debt-to-GNP ratios corresponding to the year of the credit event are driven up by the real depreciation that typically accompanies the event.)

We next compare the external indebtedness profiles of emerging market economies with and without a history of default. The top panel of figure 1 shows the frequency distribution of the external debt-to-GNP ratio, and the bottom panel the external debt-to-exports ratio, for two groups of countries over the period 1970–2000. The two distributions are very distinct and show that defaulters borrow more (even though their ratings tend to be worse at a given level of debt) than nondefaulters. The gap in external debt ratios between those emerging market economies with and those without a history of default widens further when the ratio of external debt to exports is considered. It appears that those countries that risk default the most when they borrow (that is, those with the greatest debt intolerance) also borrow the most—much as if a lactose-intolerant individual

11. Following the World Bank, for some purposes we divide developing countries by income per capita into two broad groups: middle-income countries (those developing countries with GNPs per capita higher than \$755 in 1999) and low-income countries (those below that level). Most but not all emerging market economies—defined here as developing countries with substantial access to private external financing—are middle-income countries, and most but not all low-income countries have no access to private capital markets and instead rely primarily on official sources of external funding.

12. Tables 3 and 4 measure *gross* total external debt, as debtor governments have little capacity to tax or otherwise confiscate private citizens' assets held abroad. When Argentina defaulted in 2001 on \$140 billion of external debt, for example, the foreign assets held by its citizens abroad were estimated by some commentators at about \$120 billion to \$150 billion. This phenomenon is not uncommon and indeed was the norm in the 1980s debt crisis.

Table 3. External Debt Ratios in Middle-Income Countries at Time of Adverse Credit Event, 1970–2001^a

Percent			
<i>Country</i>	<i>Initial year of credit event</i>	<i>External debt-to-GNP ratio in initial year</i>	<i>External debt-to-exports ratio in initial year</i>
Albania	1990	45.8	616.3
Argentina	1982	55.1	447.3
	2001	53.3	458.1
Bolivia	1980	92.5	246.4
Brazil	1983	50.1	393.6
Bulgaria	1990	57.1	154.0
Chile	1972	31.1	n.a.
	1983	96.4	358.6
Costa Rica	1981	136.9	267.0
Dominican Rep.	1982	31.8	183.4
Ecuador	1982	60.1	281.8
	1999	89.2	239.3
Egypt	1984	112.0	282.6
Guyana	1982	214.3	337.7
Honduras	1981	61.5	182.8
Iran	1992	42.5	77.7
Jamaica	1978	48.5	103.9
Jordan	1989	179.5	234.2
Mexico	1982	46.7	279.3
Morocco	1983	87.0	305.6
Panama	1983	88.1	56.9
Peru	1978	80.9	388.5
	1984	62.0	288.9
Philippines	1983	70.6	278.1
Poland	1981	n.a.	108.1
Romania	1982	n.a.	73.1
Russia	1991	12.5	n.a.
	1998	58.5	179.9
Trinidad and Tobago	1989	48.1	112.8
Turkey	1978	21.0	374.2
Uruguay	1983	63.7	204.0
Venezuela	1982	48.6	220.9
	1995	44.1	147.2
Average		70.6	254.3

Sources: World Bank, *Global Development Finance*, various issues; Beim and Calomiris (2001); Standard & Poor's *Credit Week*, various issues.

a. A "credit event" is a default on or restructuring of the country's external debt. Debt ratios are based on end-of-period debt stocks. Credit events in Iraq in 1990, South Africa in 1985, and Yugoslavia in 1983 are excluded because debt ratios are unavailable.

Table 4. Frequency Distribution of External Debt Ratios in Middle-Income Countries at Time of Credit Event, 1970–2001^a

<i>External debt-to-GNP ratio in first year of event</i>	<i>Percent of all credit events^b</i>
Below 40 percent	13
41 to 60 percent	40
61 to 80 percent	13
81 to 100 percent	20
Above 100 percent	13

Sources: Table 3 and authors' calculations.

a. Events for which debt ratios are not available are excluded from the calculations.

b. Frequencies do not sum to 100 because of rounding.

were addicted to milk. It should be no surprise, then, that so many capital flow cycles end in an ugly credit event.

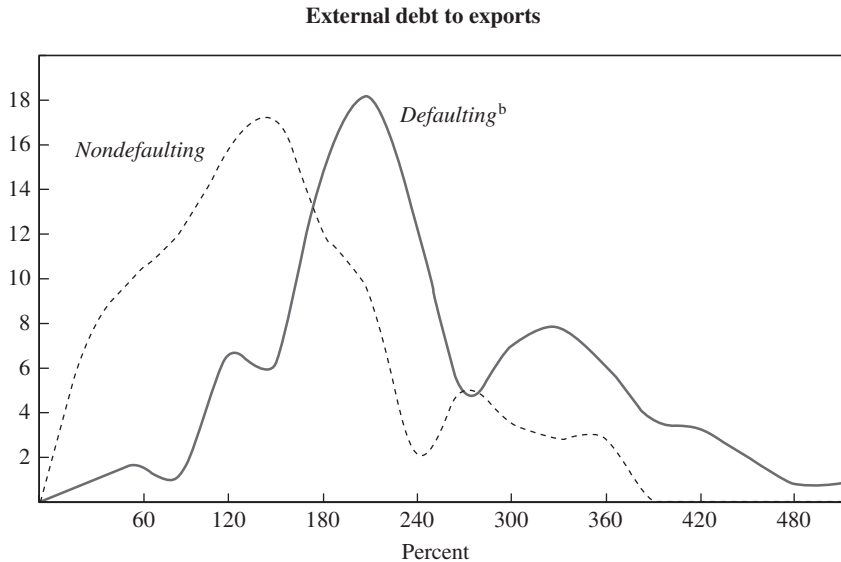
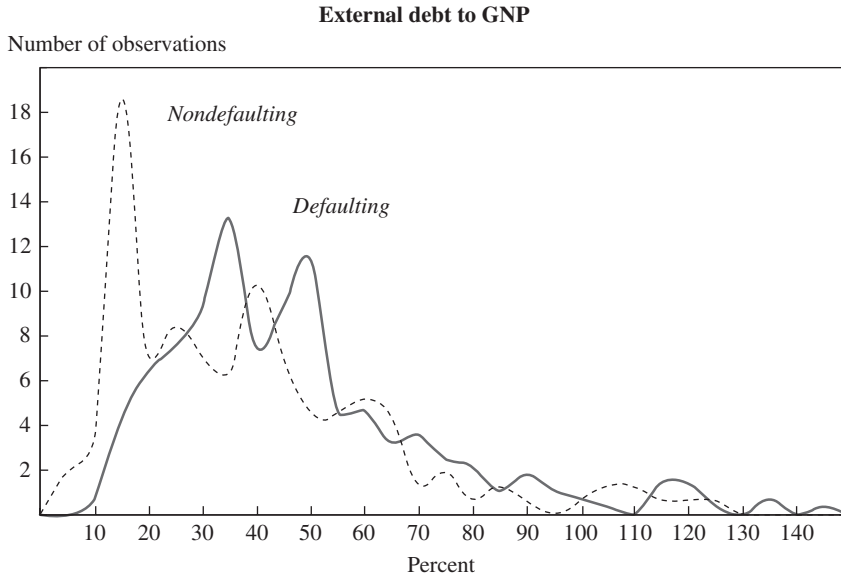
Figure 2 presents a subset of the numbers that underpin figure 1, as well as the cumulative distribution of external debt-to-GNP ratios for defaulters and nondefaulters. Over half of the countries with sound credit histories have ratios of external debt to GNP below 35 percent (and 47 percent have ratios below 30 percent). By contrast, for those countries with a relatively tarnished credit history, a threshold external debt-to-GNP ratio above 40 percent is required to capture the majority of observations. We can see already from table 4 and figure 2, without taking into account any country-specific factors that might explain debt intolerance, that when external debt exceeds 30 to 35 percent of GNP in a debt-intolerant country, the risk of a credit event starts to increase significantly.¹³ We will later derive country-specific bounds that are much stricter for debt-intolerant countries.

The Components of Debt Intolerance

To operationalize the measurement of debt intolerance, we focus on two indicators: the sovereign debt ratings reported by *Institutional Investor*, and the external debt-to-GNP ratio (or, alternatively, the external debt-to-exports ratio). The *Institutional Investor* ratings (IIR), which

13. Using an altogether different approach, an International Monetary Fund (2002) study of debt sustainability arrived at external debt thresholds for developing countries (excluding the heavily indebted poor countries) in the neighborhood of 31 to 39 percent, depending on whether one includes official financing in the indebtedness measure. The results we present later suggest that country-specific thresholds for debt-intolerant countries should probably be much lower.

Figure 1. Frequency Distribution of External Debt Ratios among Defaulting and Nondefaulting Emerging Market Economies, 1970–2000^a

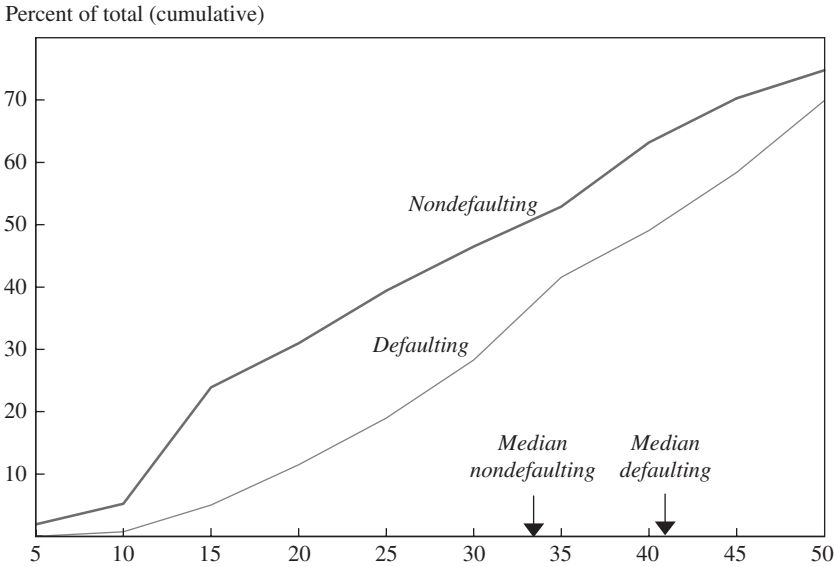
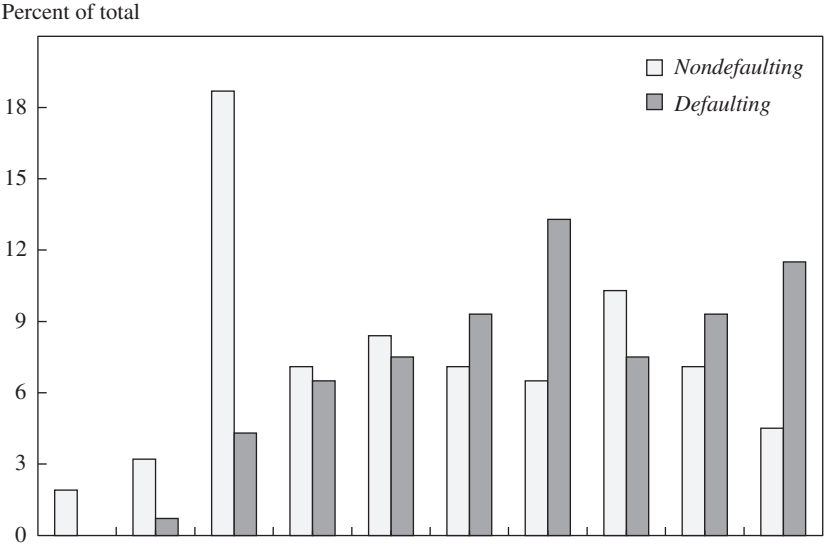


Sources: International Monetary Fund, *World Economic Outlook*, various issues, and World Bank, *Global Development Finance*, various issues.

a. Sample consists of annual observations of nine defaulting and six nondefaulting emerging market economies. “Defaulting” countries include those that underwent restructuring of their debt.

b. Distribution covers 98 percent of all observations in the sample.

Figure 2. Frequency Distribution of External Debt-to-GNP Ratios in Emerging Market Economies, 1970–2000



Source: Authors' calculations from data in World Bank, *Global Development Finance*, various issues.

are compiled twice a year, are based on information provided by economists and sovereign risk analysts at leading global banks and securities firms. The ratings grade each country on a scale from 0 to 100, with a rating of 100 given to those countries perceived as having the lowest chance of defaulting on their government debt obligations.¹⁴ Hence we take the transformed variable $(100 - \text{IIR})$ as a proxy for default risk. Market-based measures of default risk are also available, but only for a much smaller group of countries and over a much shorter sample period.¹⁵

The second major component of our debt intolerance measure is total external debt, scaled either by GNP or by exports. We emphasize total (public and private) external debt because most government debt in emerging markets until the late 1980s was external, and because it often happens that external debt that was private before a crisis becomes public after the fact.¹⁶ (As we later show, however, in future analyses it will be equally important to measure intolerance with reference to the growing stock of *domestic* public debt.)

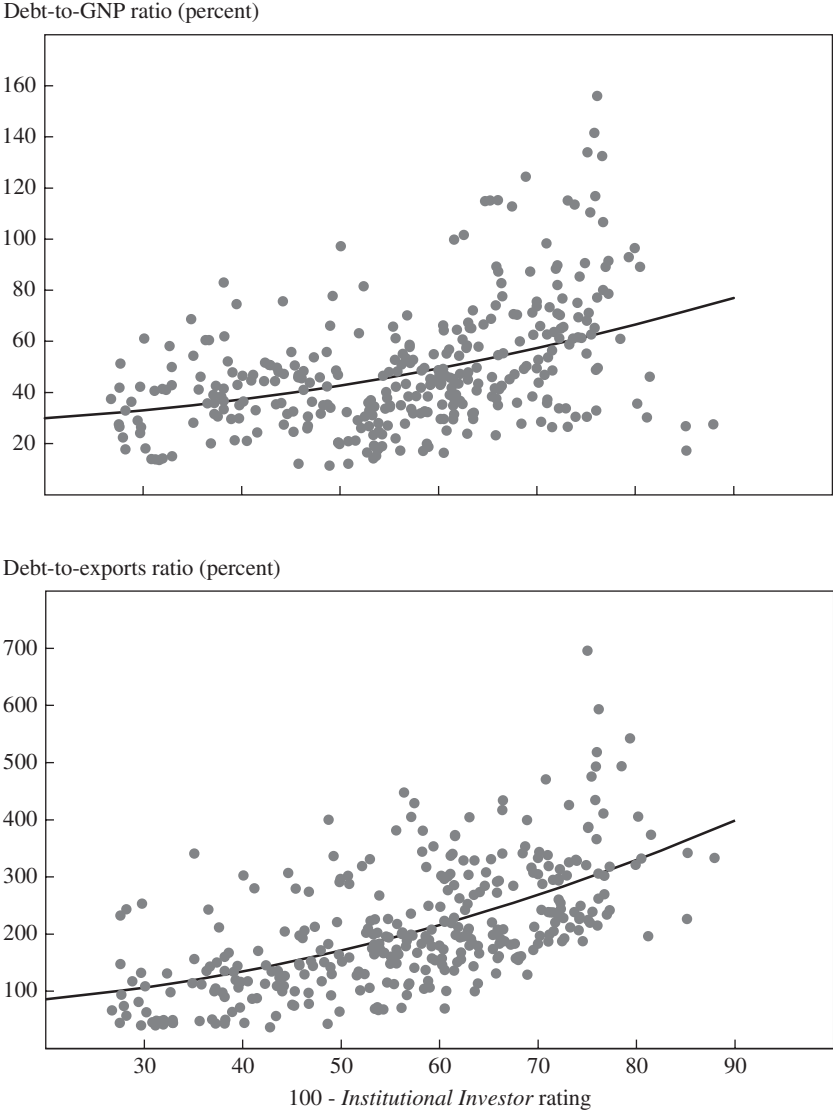
Figure 3 plots against each other the major components of debt intolerance for each year in the period 1979–2000 for sixteen emerging market economies. As expected, our preferred risk measure $(100 - \text{IIR})$ tends to rise with the stock of external debt, but the relationship may be nonlinear. In particular, when the risk measure is very high (concretely, when the IIR falls below 30), it matters little whether the external debt-to-GNP ratio is 80 percent or 160 percent, or whether the external debt-to-exports ratio is 300 percent or 700 percent. This nonlinearity simply reflects the

14. For details of the survey see the September 2002 issue of *Institutional Investor*. Although not critical to our analysis below, we interpret the ratings reported in each semi-annual survey as capturing the near-term risk of default within one to two years.

15. Secondary market prices of external commercial bank debt, available since the mid-1980s, provide a measure of expected repayment for a number of emerging market countries. However, the Brady debt restructurings of the 1990s converted much of this bank debt to bonds, so that from 1992 onward the secondary market prices would have to be replaced by the Emerging Market Bond Index (EMBI) spread, which remains the most commonly used measure of risk today. These market-based indicators introduce a serious sample selection bias, however: almost all the countries in the EMBI, and all the countries for which secondary-market price data from the 1980s are available, had a history of adverse credit events, leaving the control group of nondefaulters as approximately the null set.

16. See appendix A for brief definitions of the various concepts of debt used in this paper.

Figure 3. External Debt and Default Risk in Selected Emerging Market Economies, 1979–2000^a



Sources: World Bank, *Global Development Finance*, various issues, and *Institutional Investor*, various issues.
a. The sixteen countries whose annual observations are depicted are those in the top two panels of table 1 except Singapore, plus Kenya, South Africa, and Uruguay.

fact that, below a certain threshold of the IIR, typically about 24, the country has usually lost all access to private capital markets.¹⁷

Table 5 shows the period averages of various measures of risk and external debt (the components of debt intolerance) for a representative sample of countries, which we will refer to as our core sample (see appendix B). Because some researchers have argued that the “right” benchmark for emerging market indebtedness is the level of public debt that advanced economies are able to sustain,¹⁸ table 5 also includes this measure for a group of nondefaulting advanced economies. The table makes plain that, although the relationship between external debt and risk may be monotonic for emerging market economies, it is clearly not monotonic for the public debt of advanced economies; in those countries, relatively high levels of government debt can coexist with low levels of risk. Table 5, together with table 6, which shows the panel pairwise correlations between the two debt ratios and three measures of risk for a larger sample of developing economies, also highlights the fact that the different measures of risk present a very similar picture both of countries’ relative debt intolerance and of the correlation between risk and indebtedness. As anticipated by figure 3, the correlations are uniformly positive in all regional groupings and are usually statistically significant.

Debt Intolerance: Clubs and Regions

We next use our component measures of debt intolerance—IIR risk ratings and external debt ratios—in a two-step algorithm, mapped in figure 4, to define debtors’ clubs and vulnerability regions. We begin by calculating the mean (45.9) and standard deviation (21.8) of the IIR for fifty-three developing and industrial countries over 1979–2002, and we use these statistics to loosely group countries into three “clubs” (the countries and their period averages are listed in appendix table B1). Club A includes those countries whose average IIR over the period 1979–2002 is 67.7 (the mean plus one standard deviation) or above; members of this club—essentially, the advanced economies—enjoy virtually continuous access to capital markets. As their repayment history and debt absorption

17. A similar picture emerges (for a smaller sample, not shown) when one uses other measures of risk, such as secondary market prices of commercial bank debt or EMBI spreads.

18. See, for example, Reisen (1989).

Table 5. Indicators of Debt Intolerance, Selected Countries^a

Country	Average Institutional Investor rating, 1979–2002 ^b	Average secondary market price of debt, 1986–92 ^c	Average EMBI spread (basis points) ^d	Average external debt-GNP ratio, 1970–2000 (percent)	Average external debt-exports ratio, 1970–2000 (percent)
<i>Emerging market economies with at least one external default or restructuring since 1824</i>					
Argentina	34.7	31.0	1,756	37.1	368.8
Brazil	37.4	40.3	845	30.5	330.7
Chile	47.5	69.9	186	58.4	220.7
Colombia	44.6	70.0	649	33.6	193.5
Egypt	33.7	n.a.	442	70.6	226.7
Mexico	45.8	54.1	593	38.2	200.2
Philippines	34.7	54.1	464	55.2	200.3
Turkey	34.9	n.a.	663	31.5	210.1
Venezuela	41.5	57.2	1,021	41.3	145.9
Average	39.4	54.0	638	44.0	232.9
<i>Emerging market economies with no external default history</i>					
India	46.5	n.a.	n.a.	19.0	227.0
Korea	63.4	n.a.	236	31.9	85.7
Malaysia	63.5	n.a.	166	40.1	60.6
Singapore	79.9	n.a.	n.a.	7.7	4.5
Thailand	55.7	n.a.	240	36.3	110.8
Average	61.8	n.a.	214	27.0	97.7
<i>Industrial economies with no external default history^e</i>					
Australia	77.3	n.a.	n.a.	29.8	159.3
Canada	86.0	n.a.	n.a.	68.9	234.4
Italy	76.4	n.a.	n.a.	81.6	366.0
New Zealand	70.7	n.a.	n.a.	51.9	167.3
Norway	84.3	n.a.	n.a.	34.4	87.5
United States	92.8	n.a.	n.a.	58.4	671.7
Average	81.4	n.a.	n.a.	54.2	281.0

Sources: World Bank, *Global Development Finance*, various issues; *Institutional Investor*, various issues; data from JP Morgan Chase and Salomon Brothers; ANZ Bank, *Secondary Market Price Report*, various issues; OECD data.

a. Period averages.

b. Defined as in table 1.

c. In cents on the dollar based on monthly averages.

d. Difference between the current yield on the country's traded external debt and the yield on U.S. Treasury bonds of comparable maturity. Data are averages through 2002; the initial date varies by country as follows: Argentina, 1993; Brazil, Mexico, and Venezuela, 1992; Chile, Colombia, and Turkey, 1999; Egypt and Malaysia, 2002; the Philippines and Thailand, 1997; Korea, 1998.

e. Debt ratios are based on total debt issued by the general government.

capacity show (tables 1 and 3), these countries are the least debt intolerant. At the opposite extreme, in club C, are those countries whose average IIR is below 24.2 (the mean minus one standard deviation). This club includes those countries that are so debt intolerant that markets give them only sporadic opportunities to borrow; hence their primary sources of

Table 6. Pairwise Correlations between Alternative Measures of Risk and Debt by Developing Region

<i>Region</i>	<i>100 minus Institutional Investor rating, 1979–2000</i>	<i>100 minus secondary market price of debt, 1986–92</i>	<i>EMBI spread^a</i>
<i>Correlations with external debt-to-GNP ratio</i>			
Full sample	0.40*	0.47*	0.55*
Africa	0.22	0.65*	0.73*
Emerging Asia	0.44*	n.a.	n.a.
Middle East	0.18	n.a.	n.a.
Western Hemisphere	0.38*	0.50*	0.45*
<i>Correlations with external debt-to-exports ratio</i>			
Full sample	0.61*	0.58*	0.37*
Africa	0.60*	0.59*	0.67*
Emerging Asia	0.74*	n.a.	n.a.
Middle East	0.51*	n.a.	n.a.
Western Hemisphere	0.43*	0.59*	0.06

Sources: World Bank, *Global Development Finance*, various issues; *Institutional Investor*, various issues; data from JP Morgan Chase and Salomon Brothers; ANZ Bank, *Secondary Market Price Report*, various issues.

*Statistically significant at the 5 percent level.

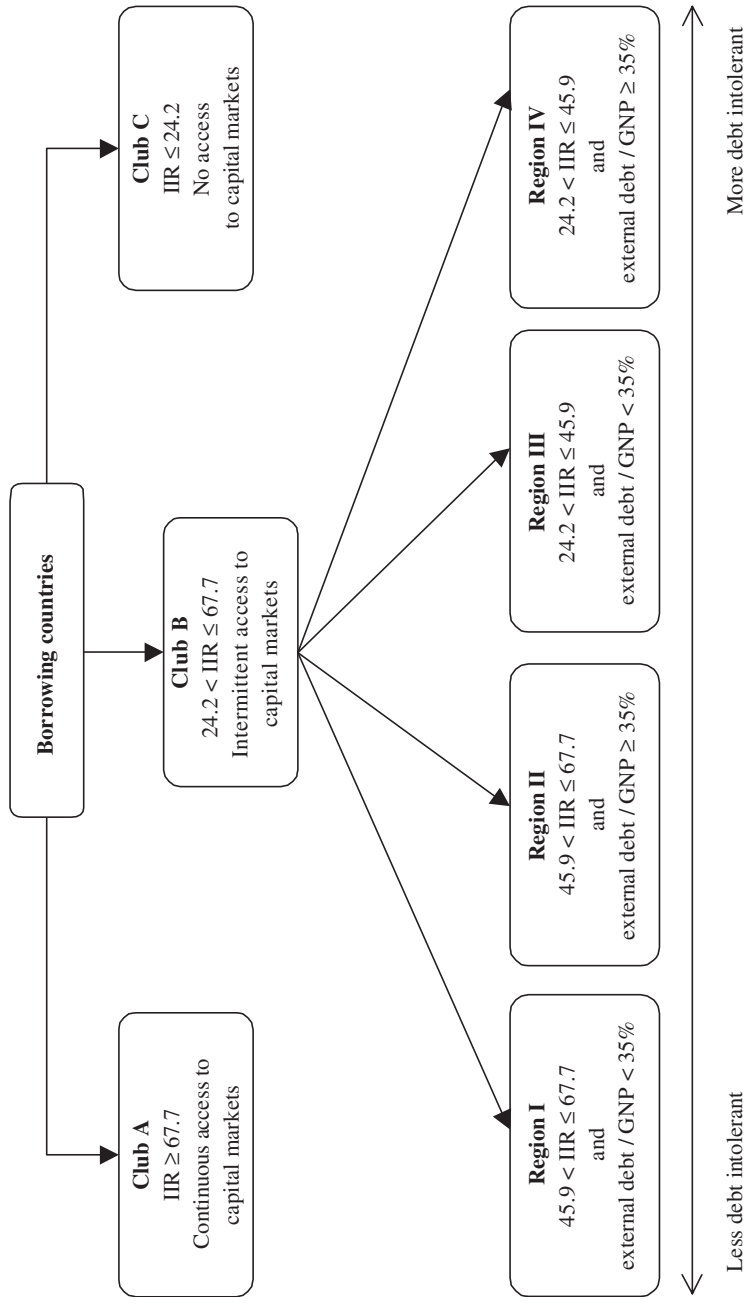
a. Defined as in table 5; excludes Russia.

external financing are grants and official loans. Club B includes the remaining countries and is the main focus of our analysis. These countries exhibit varying degrees of debt intolerance.¹⁹ They occupy the “indeterminate” region of theoretical debt models, the region where default risk is nontrivial, and where self-fulfilling debt runs may trigger a crisis. Club B is large and includes both countries that are on the cusp of graduation to club A as well as countries that may be on the brink of default. The membership of club B therefore requires further discrimination. Our preferred creditworthiness measure, $100 - \text{IIR}$, is no longer a sufficient statistic, and information on the extent of leveraging (the second component of debt intolerance) is necessary to pin down more precisely the relative degree of debt intolerance within this club.

Hence, in the second step, our algorithm further subdivides the “indeterminate” club B into four “regions,” ranging from least to most debt intolerant. The region of least debt intolerance (which we call region I) includes those countries whose average IIR over 1979–2002 was above the mean *and* whose ratio of external debt to GNP was below 35 percent. (As previously noted, countries below that threshold account for

19. One is reminded of Groucho Marx’s aphorism, “I don’t care to belong to any club that will have me as a member.” As will be shown, membership in club B is not a privilege.

Figure 4. Defining Debtors' Clubs and External Debt Intolerance Regions^a



a. IIR is the average value of the country's *Institutional Investor* rating over the period 1979–2002.

over half of the observations among nondefaulters over 1970–2001.) Region II includes countries whose average IIR is above the mean but whose external debt-to-GNP ratio is above 35 percent. Because their higher-than-average long-run creditworthiness enables them to sustain a higher-than-average debt burden, countries in this group are the second-least debt-intolerant group. More debt intolerant still are the region III countries, whose long-run creditworthiness (as measured by the average IIR) is below the mean and whose external debt is below 35 percent of GNP. Lastly, the countries with the highest debt intolerance are those in region IV, with an average IIR below the mean and external debt levels above 35 percent of GNP. Countries in region IV can easily fall into club C, losing their market access to credit. For example, in early 2000 Argentina's IIR was 43 and its external debt-to-GNP ratio was 51 percent, making it a region IV country. As of September 2002, Argentina's IIR had dropped to 15.8, indicating that the country had backslid into club C. As we will see, countries do not graduate to higher clubs easily; indeed, it can take many decades of impeccable repayment performance and low debt levels to graduate from club B to club A.

Debt Intolerance: The Role of History

We begin this section by offering some basic insights into the historical origins of country risk, which some have mislabeled “original sin.”²⁰ In particular, we focus on countries' credit and inflation histories. We then use our core results for several purposes: to illustrate how to calculate country-specific debt thresholds, in contrast to the coarse threshold (an external debt-to-GNP ratio of 35 percent) derived earlier; to show how countries in club B shift between debt intolerance regions over time; to illustrate how countries may graduate into a better club; and to show how a simple summary statistic can rank countries within club B according to their relative degree of debt intolerance.

Historical Determinants of Country Risk

To prepare to investigate econometrically the link between a country's external credit and inflation history, on the one hand, and its sovereign

20. See, for example, Eichengreen, Hausmann, and Panizza (2002).

risk, on the other, we broaden our sample from the twenty countries listed in table 5 to the fifty-three industrial and developing economies listed in appendix table B1. The IIR rating, our preferred measure of creditworthiness, is the dependent variable in all the regressions. To measure a country's credit history, we calculate the percentage of years in the sample when the country was either in default on its external debt or undergoing a restructuring of its debt. Two different periods are analyzed: 1824–1999 and 1946–1999. Another indicator of credit history we use is the number of years since the country's last default or restructuring on its external debt. We also calculate for each country the percentage of twelve-month periods during 1958–2000 when annual inflation was above 40 percent.²¹ Although it is quite reasonable to expect that debt intolerance may itself lead to a higher probability of default (because markets charge a higher premium on borrowing) or a higher probability of inflation (because often the country has no other sources of deficit financing), we are not too concerned about the potential endogeneity of these two regressors, because they are largely predetermined relative to the main sample period, which is 1979–2000.²²

However, using 1970–2000 averages of the external debt-to-GNP ratio (or the external debt-to-exports ratio) as a regressor does pose a potential endogeneity problem. Therefore we report the results of both ordinary least-squares and instrumental variable estimations, in the latter case using the average debt-to-GNP ratio during 1970–78 as an instrument. Because White's test revealed heteroskedasticity in the residuals, we correct accordingly to ensure the consistency of the standard errors. To investigate whether the differences in debt tolerance between countries in club A and the rest of the sample are systematic, we also use a dummy variable for club A in the regressions, allowing the club A countries to have a different slope coefficient on the debt-to-GNP ratio.

Table 7 presents the results of six different specifications of the cross-country regressions. The results show that few variables suffice to account for a significant portion (about 75 percent) of the cross-country

21. For a discussion of why 40 percent seems a reasonable threshold for high inflation, see Easterly (2001) and Reinhart and Rogoff (2002).

22. An obvious way of extending this analysis of credit history would be to distinguish between peacetime and wartime defaults and gather additional information about governments' violation of other contracts, such as defaults on domestic debt or forcible conversions of dollar deposits into local currency (as occurred in Bolivia in 1982, Mexico in 1982, Peru in 1985, and Argentina in 2002).

Table 7. Regressions Explaining Institutional Investor Ratings with Inflation, Default Histories, and Debt Ratios^a

Independent variable	Least-squares estimates			Instrumental variables estimates		
	7-1	7-2	7-3	7-4	7-5	7-6
Percent of 12-month periods with inflation $\geq 40\%$	-0.16 (-2.97)	-0.16 (-1.87)	-0.11 (-1.37)	-0.14 (-1.93)	-0.13 (-1.26)	-0.08 (-0.65)
Percent of years in default or restructuring since 1824	-0.21 (-2.10)			-0.12 (-1.33)		
Percent of years in default or restructuring since 1946		-0.17 (-1.53)			-0.12 (-0.86)	
No. of years since last default or restructuring			0.05 (1.93)			0.05 (1.91)
External debt-to-GNP ratio \times club B or C dummy variable ^b	-0.33 (-5.40)	-0.34 (-4.49)	-0.29 (-4.03)	-0.41 (-3.52)	-0.39 (-2.51)	-0.33 (-2.02)
Debt-to-GNP ratio \times club A dummy variable ^b	0.28 (3.63)	0.29 (3.68)	0.27 (3.62)	0.31 (2.12)	0.34 (2.30)	0.33 (2.23)
Adjusted R^2	0.77	0.76	0.79	0.74	0.74	0.77

Sources: Authors' calculations based on data in Beim and Calomiris (2001); *Institutional Investor*, various issues; International Monetary Fund, *International Financial Statistics*, various issues; Standard & Poor's *Credit Week*, various issues; Standard & Poor's (1992).

a. The dependent variable is the 1979–2000 average of the country's *Institutional Investor* rating. Numbers in parentheses are t statistics. Estimates are corrected for heteroskedasticity. The number of observations is 53.

b. Data for the external debt-to-GDP ratio are 1970–2000 averages. Clubs are as defined in figure 4; appendix table B1 lists the countries within each club.

variation in creditworthiness as measured by the IIR. As expected, a poor track record on repayment or inflation lowers the rating and increases risk. In the regressions, all but the debt-to-GNP coefficients are constrained to be the same for club A and all other countries. One common and robust result across these regressions is that the external debt-to-GNP ratio enters with a negative (and significant) coefficient for all the countries in clubs B and C, whereas it has a positive coefficient for the advanced economies in club A.²³ As we will show next, this result is robust to the addition of a time dimension to the regressions. Although not reported here, these results are equally robust to the use of the external debt-to-exports ratio in lieu of the external debt-to-GNP ratio as a regressor.

We also performed two panel regressions (estimated with fixed effects and robust standard errors) in which the IIR was regressed against the

23. The estimated coefficient for the club A countries captures both institutional and structural factors specific to those countries as well as the different concept of debt (total public debt as opposed to total external debt) used for those cases (see appendix A).

external debt-to-GNP ratio and three dummy variables representing periods roughly corresponding to the phases of the most recent debt cycle. The results are as follows:

$$\text{IIR}_{it} = \alpha_{it} - 3.01X_1 - 12.22X_2 - 7.01X_3 - 0.13X_4$$

$$(-2.06) \quad (-8.98) \quad (-5.13) \quad (-10.37)$$

Adjusted $R^2 = 0.78$; $N = 769$

$$\text{IIR}_{it} = \alpha_{it} - 3.61X_1 - 12.33X_2 - 6.62X_3 - 0.11X_4 + 0.01X_5$$

$$(-2.90) \quad (-10.69) \quad (-5.60) \quad (-9.24) \quad (0.04)$$

Adjusted $R^2 = 0.91$; $N = 1,030$ (t statistics in parentheses).

In these regressions α_{it} represents country-specific fixed effects (not reported), X_1 is a dummy variable for the period immediately before the 1980s debt crisis (1980–82), X_2 is a dummy for the period during the crisis and the Brady plan resolution (1983–93), X_3 is a dummy for the period after the crisis (1994–2000), X_4 interacts the country’s external debt-to-GNP ratio with a dummy variable for clubs B and C, and X_5 interacts the debt-to-GNP ratio with a dummy for club A; i and t index countries and years, respectively. Regressions including year-by-year dummies (reported in appendix tables D1 to D4) reveal that the IIR data naturally demarcate these three distinct subperiods. The first of the two regressions above includes thirty-eight of the fifty-three countries in the cross-sectional regressions (the countries in clubs B and C), whereas the second regression also includes the fifteen countries in club A and (as before) allows them to have a different slope coefficient on the debt-to-GNP ratio, in addition to a different intercept.

The panel regressions (including those reported in the appendix) confirm a central finding of the cross-sectional regressions: debt is significantly and negatively related to perceived creditworthiness for the debt-intolerant countries in clubs B and C. In contrast, in the regression that includes the advanced economies, which make up most of club A, the coefficient on debt is positive—although, unlike in the cross-sectional results, it is not statistically significant. The coefficients for the three subperiods are all statistically significant, and their pattern has an intuitive interpretation. Average IIRs were higher across the board before the debt

crisis of the 1980s; these ratings then plummeted as the debt crisis unfolded, and they recovered only partially in the 1990s, never quite reaching their precrisis levels. Thus debt intolerance is long lived.

Country-Specific Debt Thresholds

We now use some of our core results to illustrate that, although an external debt-to-output ratio of 35 percent is a minimal debt “safety” threshold for those countries that have not made it to club A, countries with a weak credit history may become highly vulnerable even at much lower levels of external debt. To illustrate this basic but critical point, we perform the following exercise. We use the estimated coefficients from the first regression in table 7, together with the actual values of the regressors, to predict values of the IIR for varying ratios of external debt to GNP for a given country. Table 8 illustrates the exercise for the cases of Argentina and Malaysia for levels of external debt ranging from 0 to 45 percent of GNP. Until Argentina’s default in December 2001, both countries were members of club B.

The exercise shows clearly that Argentina’s precarious debt intolerance situation is more severe than Malaysia’s. Argentina remains in the relatively safe region I only as long as its external debt remains below 15 percent of GNP, whereas Malaysia remains in region I up to a debt-to-GNP ratio of 35 percent, and it is still in the relatively safe region II with a debt of 40 percent of GNP. These contrasting patterns can be seen across a number of other cases (results not shown): Argentina is representative of the many countries with a relatively weak credit and inflation history, whereas Malaysia is representative of countries with no history of default or high inflation.

Moving between Debt Intolerance Regions

To illustrate how countries in club B can become more or less vulnerable over time, table 9 presents an exercise similar to that in table 8 for the case of Brazil. The main difference is that, this time, rather than using hypothetical debt ratios, we estimate IIRs for Brazil using the country’s actual external debt-to-GNP ratios for each year from 1979 to 2001. In addition to these estimated IIRs, we report Brazil’s actual IIR in the same year as well as the difference between the two. The last two columns show the debt intolerance region within club B in which Brazil actually

Table 8. Predicted Institutional Investor Ratings and Debt Intolerance Regions for Argentina and Malaysia

External debt-to-GDP ratio (percent)	Argentina		Malaysia	
	Predicted IIR	Region ^a	Predicted IIR	Region ^a
0	51.4	I	61.1	I
5	49.3	I	59.0	I
10	47.3	I	57.0	I
15	45.2	III	54.9	I
20	43.2	III	52.9	I
25	41.1	III	50.8	I
30	39.1	III	48.8	I
35	37.0	III	46.7	II
40	34.9	IV	44.7	IV
45	32.9	IV	42.6	IV

Source: Authors' calculations based on results of regression 7-1 in table 7.

a. Regions are as defined in figure 4.

found itself (based on its external debt and actual IIR, as described in figure 4) and the region in which it would have fallen based on its external debt and the estimated IIR. The shaded area indicates the period when Brazil's external debt was in default or undergoing a restructuring, and the characters in boldface in the last two columns indicate the years in which discrepancies are observed between the actual and the estimated region.

A pattern worth remarking is that Brazil started the estimation period in 1979 with a fairly high IIR, and although its IIR declined thereafter, it remained quite high until the default and restructuring of 1983. Also, the gap between Brazil's actual and its estimated IIR is highest in the runup to that credit event. According to its actual IIR and external debt ratio, Brazil was in the relatively safe region II on the eve of its 1983 default, whereas according to our estimated IIR it belonged in the most debt-intolerant region (region IV). After the credit event, Brazil remained in the most debt-intolerant region for a few years by both measures. It is noteworthy that, whereas the actual IIR was well *above* the estimated IIR in the years prior to default, it was *below* the estimated measure in several of the years following the initial default (although the gap was not large enough to generate a discrepancy between the actual and the predicted region). This pattern is also evident in many other episodes in our sample (not shown) and lends support to the view that ratings tend to be procyclical.

Table 9. Brazil: Actual and Predicted Institutional Investor Ratings and Regions^a

Year	Institutional Investor rating			Region	
	Actual	Predicted	Difference ^b	Actual	Predicted
1979	64.9	36.9	27.9	I	III
1980	55.4	35.5	19.9	I	III
1981	49.3	35.2	14.1	II	IV
1982	51.3	34.1	17.2	II	IV
1983	42.9	27.9	15.0	IV	IV
1984	29.9	27.7	2.2	IV	IV
1985	31.3	29.2	2.1	IV	IV
1986	33.6	31.7	1.9	IV	IV
1987	33.6	31.6	2.0	III	III
1988	28.9	33.6	-4.7	III	III
1989	28.5	37.8	-9.4	III	III
1990	26.9	37.7	-10.8	III	III
1991	26.1	36.1	-10.0	III	III
1992	27.1	34.7	-7.6	III	III
1993	27.8	34.6	-6.9	III	III
1994	29.6	36.8	-7.2	III	III
1995	34.2	38.9	-4.8	III	III
1996	37.1	38.7	-1.6	III	III
1997	39.2	38.1	1.0	IV	IV
1998	38.4	35.8	2.6	IV	IV
1999	37.0	29.5	7.4	III	III
2000	41.8	31.4	10.4	III	III
2001	42.9	28.6	14.3	III	IV

Sources: *Institutional Investor*, various issues; authors' calculations using results of regression 7-1 in table 7.

a. Shading indicates years when Brazil was in default or undergoing a restructuring of its external debt; boldface type indicates years when the actual region differs from the predicted region. Regions are as defined in figure 4.

b. Details may not sum to totals because of rounding.

Graduating from Debt Intolerance: Some Suggestive Evidence

As observed above for Brazil, in some years a country's actual IIR can be considerably higher than the estimated rating obtained from our simple model. On the whole, however, these gaps are neither persistent over time nor systematic in any one direction. Nonetheless, for some countries we do observe consistent, persistent, and sizable positive gaps between the actual and the predicted IIR. One interpretation is that these countries either have graduated, or are in the process of graduating, from club B.

To explore the countries in our sample that are plausible graduation candidates, we calculate the difference between the actual and the predicted IIR averaged over the years 1992–2000—roughly the second half of the estimation period. The five countries with the largest gaps during

Table 10. Differences in Actual and Predicted Institutional Investor Ratings for Potential Graduates from Debt Intolerance^a

<i>Country</i>	<i>Predicted region</i>	<i>Actual region</i>	<i>Actual minus estimated IIR</i>
Greece	IV	II	41.1
Portugal	IV	II	35.3
Thailand	IV	II	22.4
Malaysia	IV	II	21.2
Chile	IV	II	19.8
<i>Memoranda:</i>			
Mean of full sample, 1992–2000			6.1
Standard deviation of full sample			12.6
Mean excluding above five countries			2.5

Source: Authors' calculations based on results of regression 7-1 in table 7.

a. Regions are as defined in figure 4. Data are averages for 1992–2000.

this period are shown, in descending order, in table 10. Not surprisingly, Greece and Portugal stand out as the most obvious possible cases of graduation from club B to club A. Far back in third and fourth place are Malaysia and Thailand (their 1997–98 crises notwithstanding), both of which have no history of default or high inflation. Chile, the most consistently good performer in Latin America, ranks fifth, suggesting that it may have begun to decouple from its long history of high inflation and adverse credit events.

Ranking Debt Intolerance within Club B

We have presented evidence supporting the notion that there is a group of countries whose degree of debt intolerance is indeterminate (club B), and that the countries in this group range from relatively “safe” countries (region I) to more precarious countries (regions III and IV) where adverse credit events become increasingly likely. Table 11 presents, for the fourteen emerging markets in our core sample, two measures of debt intolerance that allow one to assess the relative degree of debt intolerance along a continuum: the average ratio of external debt to GNP over 1979–2000 divided by the average IIR, and the average ratio of external debt to exports divided by the average IIR. Regardless of which of these two summary measures one chooses, those countries with the weakest credit histories register the highest levels of debt intolerance. For example, the group average for the first measure is more than twice as high for countries with a record of past default as for those that have avoided default.

Table 11. Summary Debt Intolerance Measures in Selected Emerging Market Economies, 1979–2000

Country	<i>External debt-to-GNP ratio divided by Institutional Investor rating</i>	<i>External debt-to-exports ratio divided by Institutional Investor rating</i>
<i>Countries with at least one external default or restructuring since 1824</i>		
Argentina	1.1	10.6
Brazil	0.8	8.8
Chile	1.2	4.7
Colombia	0.8	4.3
Egypt	2.1	6.7
Mexico	0.8	4.4
Philippines	1.6	5.8
Turkey	0.9	6.0
Venezuela	1.0	3.5
Average	1.1	6.1
<i>Countries with no default history</i>		
India	0.4	4.2
Korea	0.5	1.4
Malaysia	0.6	1.0
Singapore	0.1	0.1
Thailand	0.7	2.0
Average	0.5	1.7

Source: Authors' calculations based on data from *Institutional Investor*, various issues, and World Bank, *Global Development Finance*, various issues.

The difference between the two groups is much greater, however, when one looks at the measure that uses the debt-to-exports ratio as the numerator. These simple summary statistics could therefore be useful to compare the relative degree of debt intolerance across countries (as done here), and over time for any given country.²⁴

Debt Sustainability and Debt Reversals

Thus far our analysis has focused on quantifying and explaining external debt intolerance. To reiterate, the basic premise is that, because of debt intolerance, some countries periodically have disproportionate diffi-

24. Figure 4 employs the debt-to-GDP ratio as a metric for dividing club B into regions, but the debt-exports ratio could be used alternatively.

culty repaying their debts on the original terms, even at levels of indebtedness that would be considered moderate for countries that are not debt intolerant. Here we first discuss the implications of debt intolerance for standard debt sustainability analyses, and then turn our attention to what we call debt reversals—episodes during which countries have managed to significantly reduce their external debt relative to GNP. The latter analysis will show that debt-intolerant countries very rarely achieve significant reductions in their debt burden solely through sustained growth or lower interest rates, but instead require some kind of adverse credit event (default or restructuring) to reduce their debt. In addition, the analysis will show that, following such an event, governments in emerging market countries often quickly amass debt once again, and the symptoms of debt intolerance reemerge, often leading to serial default. This evidence will uncover some critical shortcomings of standard sustainability exercises.

Implications of Debt Intolerance for Debt Sustainability Analysis

How does one square our proposed measures of debt intolerance and, more broadly, the existence of debt intolerance with standard approaches to assessing debt sustainability as practiced in both the public and the private sector? Standard debt sustainability analysis, as applied to a country's external debt, works off the following simple accounting relationship:

$$(1) \quad D(t+1) = [1 + r(t)]D(t) - TB(t),$$

where $D(t)$ is a country's external debt at time t , TB is its trade balance, and r is the interest rate paid by the country on its external debt. Simple manipulation leads to the following steady-state expression:

$$(2) \quad TB/Y = (r - g)(D/Y),$$

where TB/Y is the steady-state ratio of the trade balance to output needed to stabilize the external debt ratio at D/Y , and g is the growth rate of output. (A similar calculus applies to calculating sustainable paths for total government debt.) It is well recognized that standard debt sustainability analysis tends to be overly sanguine, in that it does not sufficiently allow for the kinds of real-world shocks that emerging market economies face (including confidence shocks, political shocks, terms-of-trade shocks,

and, not least, shocks to returns in industrial countries). Efforts have therefore been made to find ways to “stress-test” these sustainability calculations.²⁵

Such efforts are useful, but our analysis of debt intolerance suggests that it is also crucial to take other factors into account. First, it is necessary to recognize that the interest rate a country must pay on its debt is an endogenous variable, which depends, among other things, on the country’s debt-to-output (or debt-to-exports) ratio. Because the interest rate on debt to private creditors can rise very sharply with the level of debt (the rate charged by official creditors, such as the international financial institutions, typically does not change), a trajectory that may seem marginally sustainable according to standard calculations may in fact be much more problematic when debt intolerance is taken into account (not an uncommon situation, to say the least). This is particularly likely in situations where a country’s debt-to-GNP ratio is initially projected to rise in the near future, and only later projected to fall (again, a very common situation).

Second, sustainability analyses need to take into account that a country’s initial level of debt (scaled by output or exports) may already exceed, or be close to exceeding, what history suggests is that country’s tolerable debt burden. In cases where the initial level of debt or the initial rise in D/Y takes a club B country into a region of extreme debt intolerance (that is, into region IV), conventional sustainability analyses are not likely to be meaningful or useful. Once a country is in the “risk of default” region identified in sovereign debt models and approximated by our earlier analysis,²⁶ there is a risk of both dramatically higher interest rates and a sudden loss of access to market financing. And, as we will see below, the probability that a “virtuous cycle” of falling interest rates and rapid growth will take the country’s debt burden back to a safe region is, unfortunately, typically low.

25. See International Monetary Fund (2002) for a recent discussion of these approaches. As noted, the approaches sometimes focus on total government debt rather than total external debt, but the issues raised here are similar for both. See Williamson (2002) and Goldstein (2003) for recent applications of the standard framework to the case of Brazil.

26. Such models include those of Obstfeld (1994), Velasco (1996), Morris and Shin (forthcoming), and Jahjah and Montiel (2003).

Identifying Debt Reversals

To identify episodes of large debt reversals for middle- and low-income countries over the period 1970–2000, we select all episodes where the ratio of external debt to GNP fell 25 percentage points or more within any three-year period, and then ascertain whether the decline in this ratio was caused by a fall in the numerator, a rise in the denominator, or some combination of the two.²⁷ To exclude cases where the decline in the ratio was primarily driven by changes in the nominal value of dollar GNP, we consider only those episodes where either the decline in the dollar value of external debt was 10 percent or more over the three-year window, or average growth in the three-year period was 5 percent a year or higher. This two-stage approach allows us to identify the proximate causes of the debt reversal. If it is a decline in debt, it may be due to either repayment or some type of reduction in the present value of debt (that is, a restructuring); alternatively, if the decline was due primarily (or solely) to growth, it suggests that the country grew out of its debt.

We conducted the exercise for both low- and middle-income developing economies. The algorithm yielded a total of fifty-three debt reversal episodes for the period 1970–2000, twenty-six of which occurred in middle-income countries and the rest in low-income countries.

The Debt Reversal Episodes

Table 12 lists those debt reversal episodes that occurred in middle-income developing countries with populations of at least 1 million, separating those cases that involved an adverse credit event (a default or a restructuring) from those that did not.²⁸ Of the twenty-two debt reversals identified, fifteen coincided with some type of default or restructuring of external debt obligations. In five of the seven episodes that did not coincide with a credit event, the debt reversal was primarily effected through net debt repayments; in only one of these episodes (Swaziland in 1985) did the debt ratio decline strictly because the country grew out of its debt. However, growth was also the principal factor explaining the decline in the debt ratio in four of the fifteen credit event cases (Chile, Morocco,

27. Our basic results appear reasonably robust to our choice of “windows” of 25 percent decline and three years—see the analysis of Brady plan countries below, however.

28. A similar table summarizing the debt reversals of the low-income countries is available from the authors upon request.

Table 12. Episodes of Declining External Debt, 1970–2000^a

Country	Start of episode (year t)	Debt-to-GNP ratio (percent)		Cumulative change in debt (billions of dollars)	Average real GDP growth in episode (percent a year)	Primary (secondary) reason for fall in debt-to-GNP ratio ^b	Debt-to-GNP ratio, end-2000 (percent)
		Year t	Year t+3				
<i>Countries experiencing default or restructuring during episode</i>							
Russia	1999	96	67	-14.1	5.9	Debt reduction (output growth)	67
Egypt	1987	110	79	-11.1	3.4	Debt reduction (output growth)	29
Iran	1993	42	16	-6.8	3.1	Net repayments	8
Jordan	1991	249	129	-1.8	6.9	Debt reduction (output growth)	99
Bulgaria	1992	116	81	-1.6	-6.3	Debt reduction	86
Costa Rica	1987	111	69	-1.0	4.3	Debt reduction (output growth)	31
Bolivia	1988	113	80	-0.8	4.3	Debt reduction (output growth)	72
Chile	1985	142	88	-0.8	5.7	Output growth	54
Jamaica	1990	125	93	-0.6	2.3	Debt reduction (output growth)	61
Paraguay	1987	69	39	-0.4	4.9	Debt reduction (output growth)	41
Gabon	1978	70	32	-0.4	-8.0	Net repayments	94
Albania	1992	98	18	-0.2	2.7	Debt reduction	20
Panama	1989	135	100	0.03	6.8	Output growth	75
Philippines	1986	96	68	0.5	5.2	Output growth	63
Morocco	1985	129	98	5.0	5.6	Output growth	55
<i>Countries experiencing no default or restructuring during episode</i>							
Thailand	1998	97	66	-25.2	0.1	Net repayments	66
Korea	1985	52	20	-11.4	9.7	Net repayments (output growth)	30
Malaysia	1986	83	44	-5.6	6.4	Net repayments (output growth)	51
Papua N.G.	1992	93	56	-1.3	8.7	Net repayments (output growth)	71
Lebanon	1990	51	17	-0.4	9.1	Net repayments (output growth)	59
Botswana	1976	42	16	-0.03	13.5	Output growth (net repayments)	8
Swaziland	1985	68	40	0.02	9.3	Output growth	17

Sources: World Bank, *Debt Tables and Global Development Finance*, various issues; International Monetary Fund, *World Economic Outlook*, various issues; Standard & Poor's *Credit Week*, various issues; Bein and Calomiris (2001).

a. In middle-income economies with populations of more than 1 million.

b. Economic factors that contributed at least 20 percent of the decline in the debt-to-GNP ratio during each episode are listed. Changes in the dollar value of nominal GNP (which were often sizable) and changes in the valuation of the debt stock are not listed.

Panama, and the Philippines) and a lesser factor in seven of those episodes, as well as in four episodes that did not coincide with a credit event. Overall, this exercise shows that growth alone is typically not sufficient to allow countries to substantially reduce their debt burden—yet another reason to be skeptical of overly sanguine standard sustainability calculations for debt-intolerant countries.

Of those cases involving credit events, Russia and Egypt obtained by far the largest reductions in their nominal debt burden in their restructuring deals: \$14 billion and \$11 billion, respectively. Two countries involved in the 1997–98 Asian crisis—Thailand and Korea—engineered the largest debt repayments among those episodes where a credit event was avoided.

Conspicuously absent from the large debt reversal episodes shown in table 12 are the well-known Brady restructuring deals of the 1990s. Although our algorithm does place Bulgaria, Costa Rica, Jordan, Nigeria, and Vietnam in the debt reversal category, larger countries such as Brazil, Mexico, and Poland do not register. The reasons for this apparent puzzle are examined below.

The Missing Brady Bunch: Episodes of Rapid Releveraging

Table 13 traces the evolution of external debt in the seventeen developing countries whose external obligations were restructured under the umbrella of the Brady Plan deals pioneered by Mexico and Costa Rica in the late 1980s.²⁹ It is clear from the table why our debt reversal algorithm failed to pick up twelve of these seventeen countries. In ten of those twelve cases, the reason is that the decline in the external debt-to-GNP ratio produced by the Brady restructuring was less than 25 percentage points. But this is only part of the story. Argentina, Nigeria, and Peru had higher debt-to-GNP ratios just three years after their Brady deals than in the year before the restructuring. Moreover, by the end of 2000, seven of the seventeen countries that had undertaken a Brady-type restructuring (Argentina, Brazil, Ecuador, Peru, the Philippines, Poland, and Uruguay) had ratios of external debt to GNP that were higher than they were three years after the Brady deal, and four of those countries (Argentina, Brazil, Ecuador, and Peru) had higher debt ratios by the end of 2000 than just before the Brady

29. For details on the Brady debt restructurings of the 1990s, see Cline (1995) and International Monetary Fund (1995). For a survey of the debate prior to the Brady Plan see Williamson (1988).

Table 13. The Missing Brady Bunch

Billions of dollars except where noted otherwise

<i>Country and year of Brady deal</i>	<i>Year t - 1</i>			<i>Year t + 3</i>			<i>End of 2000</i>	
	<i>Debt-to- GNP ratio (%)</i>	<i>External debt</i>	<i>Debt covered by deal</i>	<i>Size of debt reduction</i>	<i>Debt-to- GNP ratio (%)</i>	<i>External debt</i>	<i>Debt-to- GNP ratio (%)</i>	<i>External debt</i>
Mexico, 1989	56.4	99.2	48.23	6.80	31.7	112.3	26.8	150.3
Costa Rica, 1989	105.9	4.5	1.46	0.99	47.1	3.9	30.5	4.5
Venezuela, 1990	77.5	32.4	19.70	1.92	64.4	37.5	32.0	38.2
Nigeria, 1991	130.7	33.4	5.81	3.39	155.3	33.1	92.9	34.1
Uruguay, 1991	49.3	4.4	1.61	0.63	31.6	5.1	42.3	8.2
Argentina, 1992	35.6	65.4	19.40	2.36	39.0	98.8	52.6	146.2
Brazil, 1992	30.4	121.0	40.60	4.97	23.2	160.5	41.8	238.0
Philippines, 1992	71.1	32.5	4.47	1.26	49.7	37.8	63.1	50.1
Bulgaria, 1993	116.0	11.8	6.19	2.66	105.7	10.0	85.9	10.0
Dominican Republic, 1993	54.7	4.6	0.78	0.45	34.4	4.3	24.7	4.6
Jordan, 1993	155.8	7.8	0.74	0.08	119.4	8.0	99.0	8.2
Ecuador, 1994	104.4	14.1	4.52	1.18	81.8	15.4	107.3	13.3
Poland, 1994	53.3	45.2	9.99	4.85	28.3	40.4	40.5	63.6
Panama, 1996	80.9	6.1	3.77	0.96	77.5	6.8	75.3	7.1
Peru, 1997	53.3	29.0	8.50	3.90	55.0	28.6	55.0	28.6
Côte d'Ivoire, 1998	158.1	15.6	6.90	4.40	n.a.	n.a.	140.9	12.1
Vietnam, 1998	78.9	21.8	0.92	0.41	n.a.	n.a.	40.8	12.8

Sources: International Monetary Fund (1995) and IMF staff estimates.

deal. By 2002 three members of the Brady bunch had once again defaulted on their external debt (Argentina, Côte d'Ivoire, and Ecuador), and a few others were teetering on the brink. The evidence clearly suggests that, when assessing debt restructuring programs for highly debt-intolerant countries, it is critical to ask whether measures can be taken to reduce the likelihood of the problem reemerging in the near term.

Domestic Debt, Dollarization, and Liberalization

Up to this point, our analysis of debt intolerance has focused on a country's total external debt. The reasons for this are twofold. First, until recently, the theoretical literature on public debt in emerging market economies focused primarily on external debt rather than on total government debt. This common practice was grounded in the observation that governments in most emerging markets had little scope for financing their fiscal deficits by resorting to the domestic placement of marketable debt. Second, a key point of our empirical analysis has been to show that the external debt burdens that countries are able, *and have been able*, to tolerate are systematically related to their own credit and inflation histories. We have investigated this proposition using time series for countries' level of external indebtedness dating back to the 1970s. Unfortunately, there is not a sufficient past record to allow a comparable empirical analysis of domestic government debt. That said, an early read of the available evidence suggests that a history of external debt intolerance is probably a good predictor of domestic debt intolerance today.

Domestically issued, market-based government debt has become increasingly important for emerging market economies, both as a source of government financing and as a trigger for generalized debt and financial crises. Domestically issued foreign currency debt (the infamous *tesobonos*) was at the center of the Mexican crisis of December 1994. Such debt also contributed to the costly collapse of the convertibility regime in Argentina in late 2001. And that debt presently accounts for the lion's share of public debt in Brazil and Turkey and will ultimately determine the fate of those countries' efforts at financial stabilization. Argentina, Brazil, Mexico, and Turkey, of course, all exhibit high external debt intolerance by our historical measures.

Recognizing this fact, in this section we discuss some conceptual issues related to the role of domestic government debt in emerging market

economies, and we document and explain some related manifestations of debt intolerance—such as dollarization—and offer some explanations for the rapid growth of domestic government debt in recent years. The growth of such debt turns out to be a widespread phenomenon in these economies. We conjecture that, in the future, the same historical factors that explain external debt intolerance will extend to domestic debt intolerance, as will the conclusions we have drawn about how rare it is for countries to grow their way out of heavy indebtedness.

There is no easy way to aggregate domestically issued and externally issued government debt for the purpose of assessing financial vulnerability or the likelihood of a debt crisis, and views differ on how to do so.³⁰ To be sure, the view that external debt is completely separable from domestically issued debt is dead wrong. As a by-product of capital mobility and financial integration, foreigners hold increasingly large amounts of the domestically issued debt of governments of emerging markets, and their residents increasingly hold instruments issued by governments in advanced economies. Financial integration and open capital accounts encourage active arbitrage across the two markets. In such a setting, a default on domestic government debt can easily trigger a default on foreign debt, first for reputational reasons, and second because induced output and exchange rate effects can easily affect a country's prospects for servicing its foreign debt, not least through the havoc that domestic default wreaks on the banking system.

That said, it is also clearly wrong to assume that domestically issued and foreign-issued debt are perfect substitutes. First, foreigners typically do hold a large share of externally issued debt, whereas domestic residents typically hold most domestically issued debt. Second, the risks of a cutoff of international trade credits and the risks to future international borrowing are undeniably greater following a default on foreign-issued debt. Thus the default calculus simply cannot be the same for the two classes of debt instruments, and they will not, in general, be equivalent. (The fundamental distinction between them is clearly reflected in the fact that, at times, rating agencies give the sovereign foreign-issued debt of a country a significantly higher grade than its domestically issued debt.)

30. The recent IMF study on debt sustainability, for example, proposes to undertake *parallel* assessments of external and public (domestic and external) debt burdens (International Monetary Fund, 2002).

Given the lack of theoretical clarity on the distinction between foreign-issued and domestically issued government debt, our objective in this section is to present some basic facts and explore whether the symptoms of debt intolerance seem broadly similar for both types of instrument. We leave it to future research to delineate more clearly the dividing lines between domestic and external debt in a global economy.

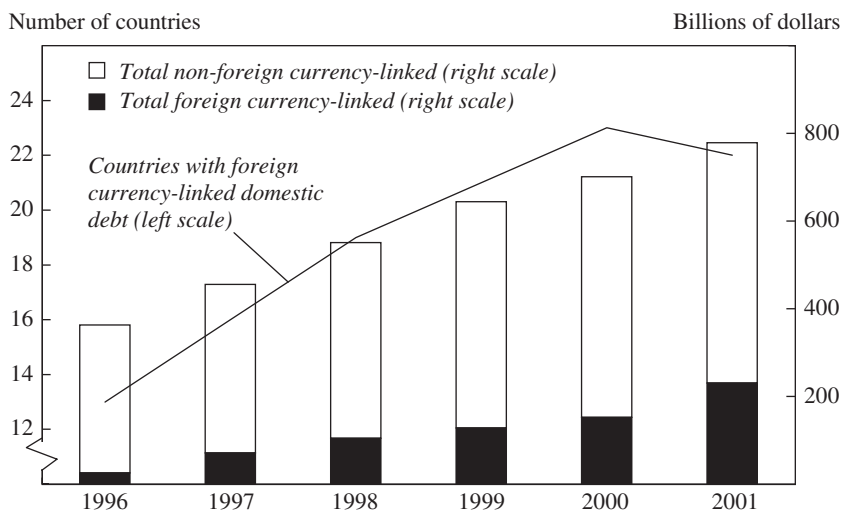
The Growth of Domestic Government Debt: New Data

Figure 5 illustrates the rapid growth of marketable domestic government debt in emerging market economies in the late 1990s. By the end of 2001, the stock of domestic government debt of the twenty-four countries represented in the figure amounted to approximately \$800 billion. More than 25 percent of that stock consisted of debt linked to a foreign currency, and the bulk of the rest was often indexed to some other market variable (for example, as of the end of 2002, about 45 percent of Brazil's domestic government debt was linked to the overnight interest rate). The fraction of domestic government debt that is not indexed to a market variable is typically of very short maturity. Indeed, the successful issuance of nonindexed domestic currency bonds for long-term financing remains as elusive today for the majority of emerging market economies as it was two or three decades ago.

These trends suggest that domestic debt intolerance can manifest itself in a manner similar to external debt intolerance. Indeed, as we will later show for dollarization, many of the variables typically linked to the vulnerability of a country's debt position (maturity structure, indexation, and the like) are manifestations of debt intolerance and may be viewed as linked to a common set of factors.

The surge in domestic government debt is also apparent in the emerging market economies that formed the core sample of our analysis of external debt intolerance. Table 14 shows that the stock of domestic government debt in this group of countries has increased markedly over the last two decades. The rise has been particularly large in the Asian countries—both in those with no default history and in the Philippines, which has defaulted only once in its modern history. But domestic government debt has also risen significantly in a number of Latin American countries, as well as in Turkey.

Figure 5. Domestically Issued Government Debt in Emerging Market Economies, 1996–2001^a



Source: IMF staff estimates.

a. The value of domestic debt denominated in local currency is measured in dollars at the end-of-period exchange rate. The twenty-four countries used to construct this figure are: Kazakhstan, Mexico, Ukraine, Indonesia, Pakistan, Costa Rica, Russia, Bulgaria, Paraguay, El Salvador, Ecuador, Chile, Peru, Bolivia, Egypt, Romania, Lebanon, Turkey, Uruguay, Argentina, Belarus, Brazil, Colombia, and Guatemala.

In all of the Asian countries in the core sample except India, the buildup of domestic government debt was propelled by the recapitalization of domestic financial systems that governments engineered in the aftermath of the 1997–98 crisis. Financial system bailouts also contributed to the rise of domestic government debt in Mexico and Turkey. In the other cases, including India, the buildup of domestic public debt has primarily reflected fiscal profligacy. More precisely, as we will show later, governments' inability (or unwillingness) to offset the revenue losses stemming from trade and financial reform, and from disinflation, with new taxes or lower spending sets them up for a fall.

Regardless of its origins, and notwithstanding the positive effects that government debt may have for domestic financial markets, the rise of domestic public debt in many emerging market economies arguably overshadows the progress that many of them have made in containing their external debt burden, raising complex questions about their ability to overcome longstanding debt intolerance. Barring a relatively rapid over-

Table 14. Domestic and External Government Debt in Selected Emerging Market Economies, 1980s and 1990s

Percent of GDP

Country	Early 1980s ^a			Late 1990s ^b		
	Domestic ^c	External ^d	Total	Domestic ^c	External ^d	Total
<i>Countries with at least one external default or restructuring since 1824</i>						
Argentina	13.2	38.4	51.6	15.4	36.4	51.8
Brazil	15.9	31.4	47.3	35.8	18.5	54.3
Chile	10.8	45.9	56.7	27.3	8.8	36.1
Colombia	4.4	25.8	30.2	12.4	24.5	36.9
Mexico	2.3	37.7	40.0	9.5	26.8	36.3
Philippines	13.6	60.3	73.9	43.0	48.8	91.8
Turkey	12.9	28.8	41.7	24.4	36.5	60.9
Venezuela	11.6	38.5	50.1	7.4	32.6	40.0
Average	10.6	38.4	48.9	21.9	29.1	51.0
<i>Countries with no history of external default</i>						
India	7.1	12.3	19.4	64.9	20.6	85.5
Korea	9.4	41.9	51.3	41.6	21.1	62.7
Malaysia	20.8	39.0	59.8	35.1	30.7	65.8
Thailand	6.1	25.2	31.3	34.6	41.5	76.1
Average	10.9	29.6	40.5	44.1	28.5	72.5

Sources: International Monetary Fund, *Government Finance Statistics*, various issues; *World Economic Outlook*, various issues; World Bank, *Debt Tables* and *Global Development Finance*, various issues; IMF staff estimates; national sources.

a. Average for 1980–85, except for domestic debt in Argentina (1981–86), Brazil (1981–85), Mexico (1982–85), and Turkey (1981–86).

b. Average for 1996–2000, except for domestic debt in Korea (1997–2000).

c. Data for the 1980s are for general-government debt in all countries except Brazil, Chile, Colombia, and Mexico, for which coverage of the public sector is broader. Data for the 1990s are for nonfinancial public sector debt.

d. External debt of the nonfinancial public sector.

haul of their tax and legal systems or determined efforts to reduce their spending, it seems unreasonable to expect that the governments of all these countries will refrain from doing to their domestically issued debt what so many of them in the past have done so often to their external obligations. Indeed, table 14 suggests that a wave of restructuring or outright default on domestic government debts looms large on the horizon for many emerging market economies in the early part of the twenty-first century.

Dollarization as a Manifestation of Debt Intolerance

The external debts of emerging market economies are, almost without exception, denominated in foreign currency. As discussed in the preceding section, however, governments in many emerging markets today also

issue domestic debt linked to a foreign currency. Even more countries, including many that have experienced very high or chronic inflation, have highly dollarized banking systems. Table 15 provides a few summary indicators of the degree of domestic dollarization in the emerging market economies in our core sample for the period 1996–2001. The last column of the table reports the average value for the period of a composite dollarization index, which ranges from zero when there is no domestic dollarization of any form to a maximum of 20 when the domestic financial system is highly dollarized.³¹

The table shows considerable variation in the degree of domestic dollarization among countries with a history of default, with Argentina scoring very high on the index but Colombia and Venezuela very low. On the whole, however, countries with a patchier credit history have more domestic dollarization on any of these measures than do countries with no default history. Thus, for example, according to the composite index, countries with a history of external debt default are about four times more dollarized than the most dollarized nondefaulting country (Malaysia). The likely reason is that, by and large, debt-intolerant countries tend to have a history of high (and often chronic) inflation.

We performed a cross-country regression of the domestic dollarization index shown in table 15 against the same independent variables used in the previous section to explain countries' average *Institutional Investor* ratings (that is, their long-run creditworthiness), namely, credit and inflation histories and debt-to-output ratios. The results are as follows:

$$\text{Index}_i = 0.04 - 2.30X_1 + 0.08X_2 + 0.05X_3 + 0.04X_4$$

$$(0.03) \quad (1.59) \quad (2.67) \quad (1.67) \quad (2.00)$$

Adjusted $R_2 = 0.31$; $N = 62$ (t statistics in parentheses).

In this regression, X_1 is an intercept dummy for club A countries; X_2 is the percentage of twelve-month periods since 1948 when inflation in country i was at least 40 percent; X_3 is the percentage of years since 1824 during

31. The composite index consists of the sum of the ratio of foreign currency deposits to broad money and the ratio of foreign currency-denominated domestic government debt to total domestic debt (both ratios normalized to indexes ranging from 0 to 10; see Reinhart, Rogoff, and Savastano (2003) for details.

Table 15. Measures of Domestic Dollarization in Selected Emerging Market Economies, 1996–2001

<i>Country</i>	<i>Ratio of foreign currency deposits to broad money (percent)</i>	<i>Share of domestic government debt denominated in foreign currency (percent)</i>	<i>Composite domestic dollarization index^a</i>
<i>Countries with at least one default or restructuring since 1824</i>			
Argentina	52.5	81.8	15
Brazil	0.0	19.9	2
Chile	8.3	8.4	2
Colombia	0.0	6.7	1
Egypt	26.0	5.7	4
Mexico	5.5	0.0	2
Philippines	27.6	0.0	3
Turkey	45.9	21.9	8
Venezuela	0.1	0.0	1
Average	18.4	16.0	4.2
<i>Countries with no default history</i>			
India	0.0	0.0	0
Korea	0.0	0.0	0
Malaysia	1.8	1.7	1
Singapore	0.0	0.0	0
Thailand	0.8	0.0	0
Average	0.5	0.3	0.2

Source: Reinhart, Rogoff, and Savastano (2003) and sources cited therein.

a. Index ranges from 0 to 20, where 20 is the most dollarized.

which the country was in default or restructuring its debt; and X_4 is the external debt-to-GNP ratio. Considering that dollarization is a form of indexation, it is not surprising that a country's inflation history is the most important variable in explaining it. The external debt-to-GNP ratio is also significant and has a positive coefficient. Although the interpretation of the role of external debt is less obvious, a reasonable conjecture is that, when the external debt burden is high, governments are more likely to resort to inflationary financing of their fiscal imbalances and, in the process, to suffocate the development of a market for nominal government debt in domestic currency. Indeed, this has clearly happened in many of the highly dollarized economies.

Liberalization, Stabilization, and Its Consequences for Debt

Many factors contributed to the alarming rise in domestic government debt reported in table 14. Key among these have been the revenue losses

Table 16. Changes in Government Revenue and Expenditure in Selected Emerging Market Economies, 1980–2000^a

Percent of GDP				
<i>Item</i>	<i>1980–85 to 1986–90</i>	<i>1986–90 to 1991–95</i>	<i>1990–95 to 1996–2000</i>	<i>1980–85 to 1996–2000</i>
<i>Countries with at least one default or restructuring since 1824^b</i>				
Total expenditure	-1.0	-0.7	0.4	-1.3
Interest payments	3.4	-1.1	-0.5	1.8
Total revenue	-2.9	1.7	0.0	-1.2
Tax revenue	-2.0	1.0	0.5	-0.5
Trade taxes	-0.3	-0.2	-0.4	-0.9
Government balance	2.4	-2.3	0.5	0.6
Seigniorage revenue	-0.8	-0.3	-1.2	-2.3
<i>Countries with no default history^c</i>				
Total expenditure	-1.2	-2.7	0.5	-3.4
Interest payments	0.8	-1.2	-0.6	-1.0
Total revenue	0.7	0.5	0.5	1.7
Tax revenue	-1.2	0.8	-0.7	-1.1
Trade taxes	-0.5	-0.6	-0.5	-1.6
Government balance	-1.8	-3.2	0.0	-5.0
Seigniorage revenue	0.5	0.3	-0.8	0.0

Source: Appendix table D5.

a. Data are simple averages of the countries in each group.

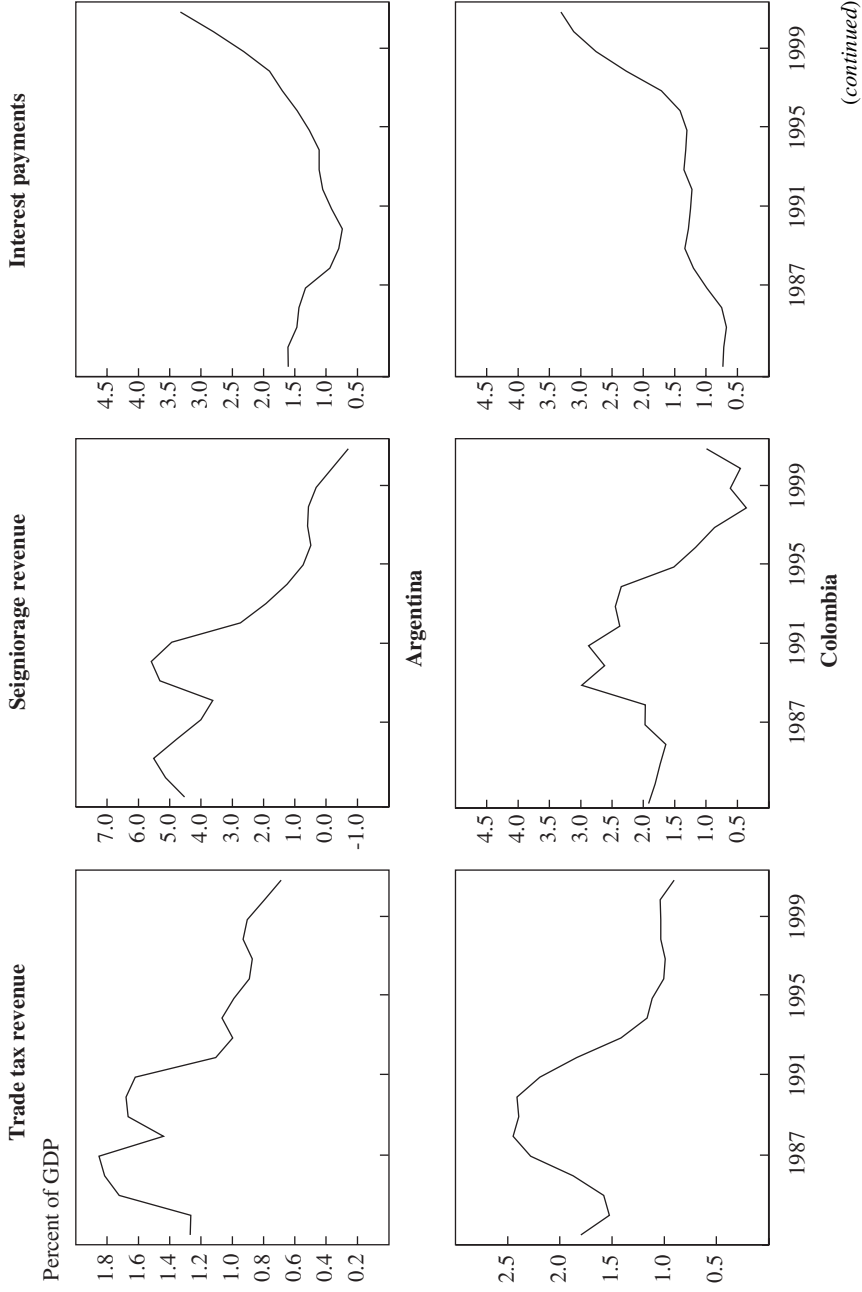
b. Argentina, Brazil, Chile, Colombia, Egypt, Mexico, the Philippines, Turkey, and Venezuela.

c. India, Korea, Malaysia, Singapore, and Thailand.

from the wide-ranging liberalizations undertaken by emerging markets since the late 1980s. The last column of table 16 shows that trade liberalization typically entailed revenue losses for the emerging markets in our core sample. A similar pattern is discernible in figure 6. The left-hand panels show a steady decline in trade tax revenue as a share of GDP in four countries from our core sample during that period. In some cases this revenue loss was offset by higher revenue from other sources (such as value added taxes). However, the estimates in table 16 show that, for the group as a whole, total tax revenue as a share of GDP also experienced a cumulative decline over the last two decades.

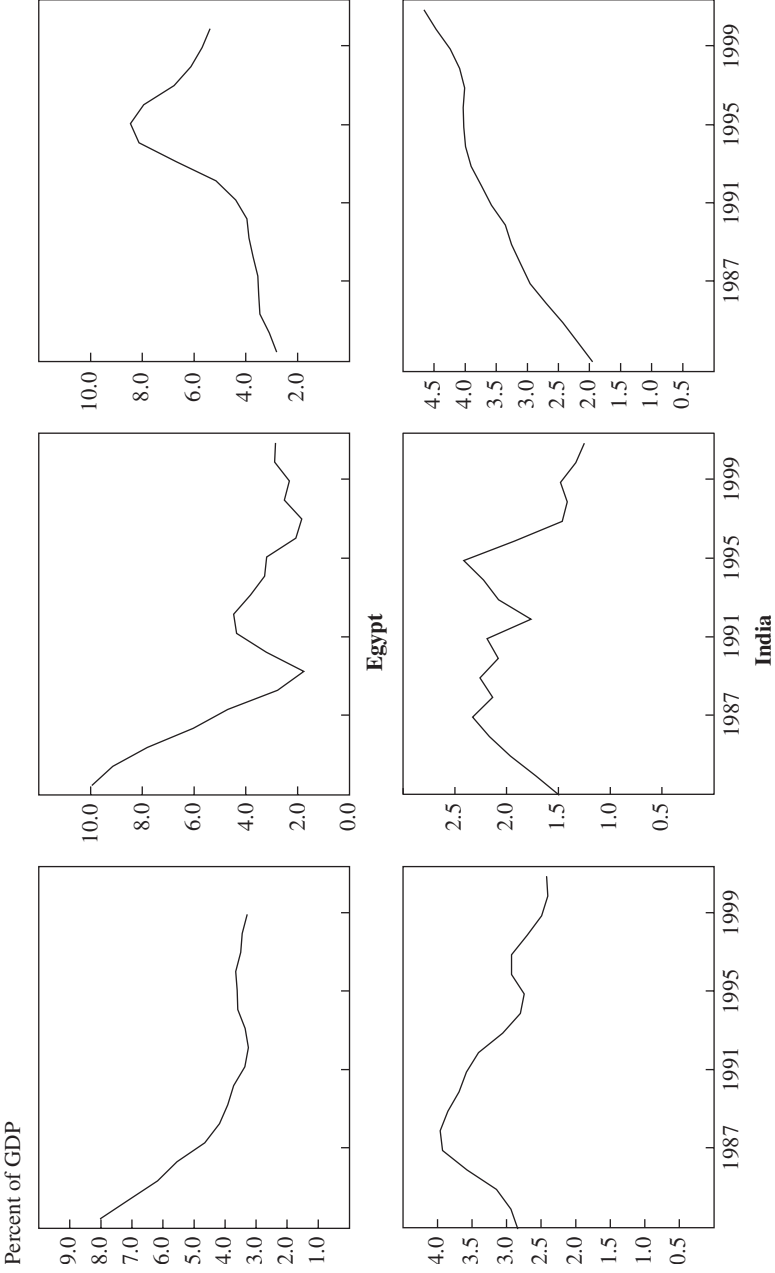
Declining trade taxes were not the only cause of erosion of the traditional sources of revenue in emerging market economies. In the wake of financial liberalization, revenue from financial repression also vanished, as table 17 shows. Interest rate ceilings were lifted, and bank loans to the government at subsidized interest rates gave way to market-based domestic public debt at high interest rates. As presciently noted by Ronald

Figure 6. Trade Tax Revenue, Seigniorage Revenue, and Interest Payments, Selected Emerging Market Economies, 1983–2000*



(continued)

Figure 6. Trade Tax Revenue, Seigniorage Revenue, and Interest Payments, Selected Emerging Market Economies, 1983–2000^a
(continued)



Sources: International Monetary Fund, *International Financial Statistics*, various issues, and *Government Finance Statistics*, various issues.
 a. Three-year moving averages.

Table 17. Revenue from Financial Repression in Selected Emerging Market Economies, Early 1980s and Late 1990s

Percent of GDP

Country	Early 1980s ^a			Late 1990s ^b	
	Measure 1 ^c	Measure 2 ^d	Measure 3 ^e	Measure 2 ^d	Measure 3 ^e
<i>Countries with at least one default or restructuring since 1824</i>					
Argentina	n.a.	0.0	2.1	-0.6	-1.6
Brazil	0.5	n.a.	n.a.	-4.5	-3.6
Chile	n.a.	0.4	-1.6	-1.7	-1.7
Colombia	0.3	-0.3	-0.2	-0.6	-0.7
Mexico	5.8	2.0	1.5	-0.4	-0.2
Philippines	0.8	n.a.	n.a.	-2.7	-0.8
Turkey	2.7	n.a.	n.a.	0.4	0.5
<i>Countries with no history of external default</i>					
Thailand	0.8	-0.6	-2.5	-1.4	-2.1
India	2.9	n.a.	n.a.	-0.6	-0.5
Korea	0.6	n.a.	n.a.	-1.9	-2.1
Malaysia	1.0	n.a.	n.a.	-0.7	-2.3

Sources: Giovannini and de Melo (1993), Easterly (1989), and Easterly and Schmidt-Hebbel (1994), and authors' calculations.

a. Average for 1980–85, except for Giovannini and de Melo (1993) estimates for Brazil (1983–87), Malaysia (1979–81), and Mexico (1984–87).

b. Average for 1996–2000, except for Korea, Thailand, and Malaysia, where averages are for 1997–2000.

c. Estimates from measure proposed by Giovannini and de Melo (1993). Revenue is calculated as the difference between the foreign and the domestic effective interest rate times the ratio of domestic government debt to GDP.

d. Estimates from measure proposed by Easterly (1989). Revenue is calculated as the negative of the domestic real interest rate times the ratio of government domestic debt (in domestic currency) to GDP.

e. Estimates from measure proposed by Easterly and Schmidt-Hebbel (1994). Revenue is calculated as the difference between the average real interest rate in OECD countries and the domestic real interest rate, times the ratio of bank deposits in domestic currency to GDP.

McKinnon in the early 1990s (see footnote 5), the outcome was often a significant increase in domestic interest outlays by the government, a trend that is clearly captured in the right-hand panels of figure 6 and in table 16 (for countries with a history of default). Simply put, much of the debt that governments had long crammed down the throats of financial intermediaries at below-market interest rates suddenly became part of those governments' market debt burden. Debt intolerance symptoms rose accordingly.

In addition to revenue losses and higher debt servicing costs, many of the emerging market economies in our core sample—particularly the group with a default history—had traditionally relied on revenue from seigniorage to finance a nontrivial fraction of their fiscal deficits. As those countries succeeded in reducing inflation, revenue from seigniorage became much less important. As table 16 shows, the cumulative decline was over 2 percent of GDP, and for some countries (such as Argentina

and Egypt, as shown in the middle panels of figure 6) the decline was even greater. All in all, for those governments that did not manage to bring expenditure in line with the new realities, one outcome of liberalization and inflation stabilization has been a heavier reliance on domestic or foreign debt financing, or both.

Reflections on Policies for Debt-Intolerant Countries

The sad fact that our analysis reveals is that once a country slips into being a serial defaulter, it retains a high level of debt intolerance that is difficult to shed. Countries can and do graduate to greater creditworthiness, but the process is seldom fast or easy. Absent the pull of an outside political anchor, such as the European Union or, one hopes, the North American Free Trade Agreement for Mexico, recovery may take decades or even centuries. The implications are certainly sobering for sustainability exercises that ignore debt intolerance, and even for debt restructuring plans that pretend to cure the problem permanently, simply through a one-time reduction in the face value of a country's debt.

How serious are the consequences of debt intolerance? Is a country with weak internal structures that make it intolerant to debt doomed to follow a trajectory of slower growth and higher macroeconomic volatility? At some level, the answer has to be yes, but constrained access to international capital markets is best viewed as a symptom, not a cause, of the disease.

Rather, the institutional failings that make a country intolerant to debt pose the real impediment. The basic problem is threefold. First, the modern empirical growth literature increasingly points to "soft" factors, such as institutions, corruption, and governance, as far more important than differences in capital-labor ratios in explaining cross-country differences in income per capita. Simply equalizing the marginal product of physical capital across countries (the sine qua non of capital market integration in a deterministic world) only goes a limited way toward equalizing marginal labor products.³² Second, quantitative methods have similarly suggested that the risk-sharing benefits of capital market integration (that is, the lowering of consumption volatility as opposed to the acceleration of

32. For a broader discussion, see International Monetary Fund, *World Economic Outlook*, April 2003, chapter 3.

consumption growth) may also be relatively modest. Moreover, these results pertain to an idealized world where one does not have to worry about gratuitous, policy-induced macroeconomic instability, poor domestic bank regulation, corruption, and (not least) policies that distort capital inflows toward short-term debt.³³ Third, there is evidence to suggest that capital flows to emerging markets are markedly procyclical, and that this may make macroeconomic policies in these countries procyclical as well, as, for instance, when capital outflows force a tightening of fiscal policy and the raising of interest rates.³⁴ Arguably, more limited, but also more stable, access to capital markets may do more to improve welfare than the boom-bust pattern so often observed in the past. The deeply entrenched idea that an emerging market economy's growth trajectory will be hampered by limited access to debt markets is no longer as compelling as was once thought.

The modern empirical growth literature does not actually paint sharp distinctions between different types of capital flows, whether it be debt versus equity, portfolio versus direct investment, or long-term versus short-term. Practical policymakers, of course, are justifiably quite concerned with the form that cross-border flows take. For example, foreign direct investment (FDI) is generally thought to have properties that make it preferable to debt: it is less volatile, it is often associated with technology transfer, and so on.³⁵ We generally share the view that FDI and other forms of equity investment are somewhat less problematic than debt, but one wants to avoid overstating the case. In practice, the three main types of capital inflows—FDI, portfolio equity, and loans—are often interlinked: for example, foreign firms often bring cash into a country in advance of building or acquiring plant facilities. Moreover, derivative

33. Prasad and others (2003) find that, during the 1990s, economies whose financial sectors were de facto relatively open experienced, on average, a rise in consumption volatility relative to output volatility, contrary to the premise that capital market integration spreads country-specific output risk. The same authors also argue that the cross-country empirical evidence on the effects of capital market integration on growth shows only weak positive effects at best, and arguably none.

34. See Kaminsky, Reinhart, and Végh (2003) on this issue.

35. Of course, it was not always so. Before the 1980s, many governments viewed allowing FDI as equivalent to mortgaging their countries' future, and therefore they preferred borrowing in order to retain full ownership of the country's assets. And, of course, where FDI was more dominant (for example, in investment in oil and other natural resources in the 1950s and 1960s), pressure for nationalization increased. Thus FDI should not be regarded as a panacea for poor growth performance.

contracts often blur the three categories, and even the most diligent statistical authorities can find it hard to distinguish accurately among different types of foreign capital inflows (not to mention that, when in doubt, some countries prefer to label a given investment as FDI, to lower their apparent vulnerability). Even with these qualifications, however, we believe that governments in advanced economies can do more to discourage emerging market economies from excessive dependence on risky nonindexed debt relative to other forms of capital flows.³⁶

Lastly, short-term debt, although typically identified as the main culprit in precipitating debt crises, also helps facilitate trade in goods and is necessary in some measure to allow private agents to execute hedging strategies. Of course, one would imagine that most of the essential benefits to having access to capital markets could be enjoyed with relatively modest debt-to-GNP ratios.

All in all, debt intolerance need not be fatal to growth and macroeconomic stability. However, the evidence presented here suggests that, to overcome debt intolerance, policymakers need to be prepared to keep debt levels—especially government debt levels—low for extended periods while undertaking more basic structural reforms to ensure that the country can eventually digest a heavier debt burden. This applies not only to external debt but also to the very immediate and growing problem of domestic government debt. Policymakers who face tremendous short-term pressures will still choose to engage in high-risk borrowing, and, at the right price, markets will let them. But an understanding of the basic problem, at least, should guide the citizens of such countries, not to mention the international lending institutions and the broader international community, in making their own decisions.

In our view, developing a better understanding of the problem of serial default on external debt obligations is essential to designing better domestic and international economic policies aimed at crisis prevention and resolution. As we have shown, debt intolerance can be captured systematically by a relatively small number of variables, principally a country's own history of default and high inflation. Debt-intolerant countries face surprisingly low thresholds for external borrowing, beyond which the risks of default or restructuring become significant. With the recent explo-

36. Rogoff (1999) and Bulow and Rogoff (1990) argue that creditor countries' legal systems should be amended so that they no longer tilt capital flows toward debt.

sion of domestic borrowing, as documented by the new data presented in this paper, these thresholds for external debt are now clearly even lower, although it remains an open question to what extent domestic and external debt can be aggregated for purposes of analysis. This question needs urgently to be addressed, in part because many questions involving bailouts by the international community surround it. Our initial results suggest that the same factors that determine external debt intolerance (not to mention other manifestations of debt intolerance, such as dollarization) are also likely to impinge heavily on domestic debt intolerance. We have also shown that whereas debt-intolerant countries need badly to find ways to bring their debt-GNP ratios down to safer ground, doing so is not easy. Historically, those countries that have escaped high external debt-GNP ratios, through rapid growth or through sizable repayments over many years, are very much the exception. Most large reductions in the external debt of emerging markets have instead been achieved primarily through restructuring or default. The challenge today is to find ways other than still more debt to channel capital to debt-intolerant countries, to prevent the cycle from repeating itself for yet another century to come.

Conclusions

Cycles in capital flows to emerging market economies have been with us now for nearly 200 years. Some of the players, both borrowers and lenders, may change, but the patterns that the cycles follow have remained quite similar over time. When interest rates are low, when liquidity is ample, and when the prospects for equity markets dim in the world's financial centers, investors will seek higher returns elsewhere. During these periods, it is easier for governments in emerging markets to borrow abroad—and borrow they do. But history has shown that, for many of these countries, to borrow is to brook default. As the track record of serial default highlights, many of these booms ended in tears. The policy challenge for these countries is to address a chronic long-term problem—their own debt intolerance—rather than take remedial measures that will allow them to regain the favor of international capital markets for a few brief months or years.

This paper has taken a first step toward making the concept of debt intolerance operational. We have conjectured that, beyond reputational

factors, serial default may owe to a vicious cycle in which default weakens a country's institutions, in turn making subsequent default more likely. We have also stressed that safe debt thresholds vary from country to country and depend importantly on history. Clearly, much more research is needed to shed light on what other factors—economic, political, institutional—figure in the calculus of what debt levels, external and domestic, are sustainable and what are the true long-term costs of default.

APPENDIX A

Definitions

External debt: the total liabilities of a country with foreign creditors, both official (public) and private. Creditors often determine all the terms of the debt contracts, which are normally subject to the jurisdiction of the foreign creditors or (for multilateral credits) to international law.

Total government (or public) debt: the total debt liabilities of a government with both domestic and foreign creditors, where “government” normally comprises the central administration, provincial and local governments, and all entities that borrow with an explicit government guarantee.

Government domestic debt: all debt liabilities of a government that are issued under—and subject to—national jurisdiction, regardless of the nationality of the creditor. Terms of the debt contracts may be market determined or set unilaterally by the government.

Government foreign currency domestic debt: debt liabilities of a government that are issued under national jurisdiction but expressed in (or linked to) a currency different from the national currency.

APPENDIX B

Sample Description

TO ILLUSTRATE THE extent to which modern-day debt intolerance arises from countries' own external credit histories (because of persistence in certain economic and social characteristics as well as reputational factors), we use throughout the paper a core sample comprising three groups

of countries: emerging market economies with a history of default or restructuring of external debt, emerging market economies without a history of default or restructuring, and advanced economies, which mostly have no history of default except during wartime (for instance, in the case of Japan and Italy during World War II). Included in the first group are countries with a history of default or restructuring that involved concessional terms: Argentina, Brazil, Chile, Colombia, Egypt, Mexico, the Philippines, Turkey, and Venezuela. Both of the other two groups consist of countries that have no history of external debt default or restructuring, but we consider it important to distinguish developing from advanced economies. Emerging market economies with an unblemished credit record belong to a different debtor “club” from their more advanced counterparts. The core emerging market economies with no history of default are India, Korea, Malaysia, Singapore, and Thailand. The core sample of advanced industrial countries consists of Australia, Canada, Italy, New Zealand, Norway, and the United States.

Appendix table B1 provides a complete list of the countries used in the empirical analysis and their individual *Institutional Investor* ratings averaged across 1979–2002.

Table B1. Countries in the Sample and Average Institutional Investor Ratings, 1979–2002

<i>Country</i>	<i>Average Institutional Investor rating</i>	<i>Country</i>	<i>Average Institutional Investor rating</i>
<i>Club A: Institutional Investor rating ≥ 67.7</i>			
United States	92.8	Finland	77.2
Japan	92.5	Denmark	76.9
Canada	86.0	Italy	76.4
Norway	84.3	Spain	73.8
Singapore	79.9	Ireland	71.4
Sweden	79.7	New Zealand	70.7
Australia	77.3	Hong Kong	68.0
<i>Club B: Institutional Investor rating between 24.1 and 67.7</i>			
Malaysia	63.5	Turkey	34.9
South Korea	63.4	Philippines	34.7
Portugal	63.3	Argentina	34.7
Saudi Arabia	62.8	Morocco	34.6
Thailand	55.7	Jordan	34.0
Greece	54.5	Egypt	33.7
Czech Republic	54.5	Paraguay	32.7
Hungary	50.5	Panama	32.5
Chile	47.5	Poland	32.2
South Africa	46.8	Romania	31.4
India	46.5	Kenya	29.2
Indonesia	46.0	Costa Rica	28.3
Mexico	45.8	Sri Lanka	28.2
Colombia	44.6	Ecuador	27.7
Israel	42.8	Nigeria	26.0
Venezuela	41.5	Peru	25.9
Algeria	39.2	Pakistan	25.7
Ghana	37.6	Swaziland	25.4
Brazil	37.4	Zimbabwe	24.9
Uruguay	37.1	Nepal	24.5
Papua New Guinea	35.5		
<i>Club C: Institutional Investor rating ≤ 24.1</i>			
Dominican Republic	22.7	Mali	16.6
Jamaica	21.5	Tanzania	14.7
Bolivia	19.0	Ethiopia	11.5
El Salvador	18.0		

Source: *Institutional Investor*, various issues.

APPENDIX C

*Data Sources***Table C1. Data Sources**

<i>Series</i>	<i>Description and sources</i>	<i>Sample period</i>
<i>Institutional Investor</i> country credit ratings	<i>Institutional Investor</i> , various issues	1979–2002
Secondary market prices of debt	Salomon Brothers, Inc.; ANZ Bank <i>Secondary Market Price Report</i>	1986–1992
EMBI (Emerging Markets Bond Index) spread	JP Morgan Chase	1992–2002
External debt-to-GNP ratio	World Bank, <i>Global Development Finance</i>	1970–2000
External debt-to-exports ratio	World Bank, <i>Global Development Finance</i>	1970–2000
Interest payments on external debt	World Bank, <i>Global Development Finance</i>	1970–2000
General-government debt-to-GNP ratio (OECD countries)	OECD data	1970–2002
General-government debt-to-exports ratio (OECD countries)	OECD data	1970–2002
Domestic government debt	International Monetary Fund, <i>Government Finance Statistics</i> ; IMF staff estimates	1980–1986 1996–2001
Probability of inflation above 40 percent	International Monetary Fund, <i>International Financial Statistics</i> ; Reinhart and Rogoff (2002)	1958–2001
Probability of being in a state of default or restructuring	Beim and Calomiris (2001), Standard & Poor's <i>Credit Week</i> , Standard & Poor's (1992), Reinhart (2002), authors' calculations	1824–1999
Domestic dollarization index	Reinhart, Rogoff, and Savastano (2003)	1996–2001
Ratio of foreign currency deposits to broad money	International Monetary Fund, <i>International Financial Statistics</i> ; various central banks	1996–2001
Share of domestic government debt denominated in foreign currency	IMF staff estimates	1996–2001
Ratio of central government expenditure to GDP	International Monetary Fund, <i>Government Finance Statistics</i>	1980–2000
Ratio of interest payments to GDP	International Monetary Fund, <i>Government Finance Statistics</i>	1980–2000
Ratio of central government revenue to GDP	International Monetary Fund, <i>Government Finance Statistics</i>	1980–2000

(continued)

Table C1. Data Sources (continued)

<i>Series</i>	<i>Description and sources</i>	<i>Sample period</i>
Ratio of tax revenue to GDP	International Monetary Fund, <i>Government Finance Statistics</i>	1980–2000
Ratio of trade taxes to GDP	International Monetary Fund, <i>Government Finance Statistics</i>	1980–2000
Ratio of seigniorage to GDP	International Monetary Fund, <i>International Financial Statistics</i> ; authors' calculations.	1980–2000

APPENDIX D

*Supplemental Analyses***Table D1. Coefficient on Year Dummy Variable in Panel Regressions, Emerging Markets Sample, 1979–2000^a**

<i>Year</i>	<i>Coefficient</i>	<i>Standard error</i>	<i>t Statistic</i>	<i>Probability</i>
Debt/GNP	-0.13	0.01	-9.93	0.00
1980	-1.59	1.78	-0.90	0.37
1981	-2.31	1.76	-1.31	0.19
1982	-5.17	1.77	-2.92	0.00
1983	-9.39	1.77	-5.32	0.00
1984	-12.60	1.77	-7.11	0.00
1985	-12.32	1.78	-6.91	0.00
1986	-11.91	1.79	-6.65	0.00
1987	-12.23	1.78	-6.84	0.00
1988	-12.74	1.78	-7.15	0.00
1989	-12.69	1.78	-7.12	0.00
1990	-13.17	1.77	-7.46	0.00
1991	-13.19	1.77	-7.47	0.00
1992	-13.48	1.74	-7.76	0.00
1993	-11.78	1.74	-6.79	0.00
1994	-9.97	1.72	-5.79	0.00
1995	-8.53	1.72	-4.97	0.00
1996	-7.85	1.71	-4.58	0.00
1997	-6.56	1.71	-3.83	0.00
1998	-5.94	1.72	-3.45	0.00
1999	-6.64	1.72	-3.86	0.00
2000	-4.26	1.72	-2.48	0.01

Source: Authors' regressions.

a. The dependent variable is the country's *Institutional Investor* rating.

Table D2. Country-Specific Fixed Effects Coefficients in Panel Regressions, Emerging Markets Sample, 1979–2000

<i>Country</i>	<i>Coefficient</i>	<i>Country</i>	<i>Coefficient</i>
Malaysia	79.18	Jordan	56.38
Portugal	77.24	Panama	51.82
Korea	76.19	Philippines	51.06
Saudi Arabia	72.04	Brazil	50.26
Greece	70.81	Uruguay	50.17
Thailand	70.81	Argentina	49.89
Czech Rep.	68.79	Turkey	48.47
Hungary	65.91	Costa Rica	45.04
Indonesia	64.78	Ghana	48.45
Chile	63.11	Ecuador	48.15
Israel	60.18	Nigeria	47.56
Mexico	59.23	Kenya	47.52
Colombia	58.48	Paraguay	46.42
India	57.89	Sri Lanka	45.64
Venezuela	57.67	Peru	42.20
South Africa	54.86	Romania	41.68
Poland	53.98	Pakistan	40.89
Morocco	52.42	Zimbabwe	40.32
Egypt	51.95		

Source: Authors' regressions.

Table D3. Coefficient on Year Dummy Variable in Panel Regressions, Full Sample, 1979–2000^a

<i>Year</i>	<i>Coefficient</i>	<i>Standard error</i>	<i>t Statistic</i>	<i>Probability</i>
Debt/GNP, club A	-0.00	0.03	0.20	0.85
Debt/GNP, non-club A	-0.10	0.01	-8.79	0.00
1980	-1.76	1.51	-1.17	0.24
1981	-3.10	1.49	-2.08	0.04
1982	-5.96	1.49	-3.99	0.00
1983	-10.10	1.48	-6.81	0.00
1984	-12.77	1.48	-8.64	0.00
1985	-12.60	1.48	-8.49	0.00
1986	-12.16	1.49	-8.16	0.00
1987	-12.59	1.49	-8.47	0.00
1988	-13.02	1.48	-8.77	0.00
1989	-12.91	1.48	-8.74	0.00
1990	-12.98	1.47	-8.83	0.00
1991	-13.08	1.47	-8.92	0.00
1992	-13.10	1.46	-9.00	0.00
1993	-11.60	1.46	-7.95	0.00
1994	-9.76	1.46	-6.71	0.00
1995	-8.47	1.45	-5.83	0.00
1996	-7.70	1.45	-5.31	0.00
1997	-6.41	1.44	-4.46	0.00
1998	-5.72	1.44	-3.96	0.00
1999	-5.92	1.44	-4.10	0.00
2000	-3.32	1.44	-2.30	0.02

Source: Authors' regressions.

a. The dependent variable is the country's *Institutional Investor* rating.

Table D4. Country-Specific Fixed Effects Coefficients in Panel Regressions, Full Sample, 1979–2000

<i>Country</i>	<i>Coefficient</i>	<i>Country</i>	<i>Coefficient</i>
Japan	101.70	Israel	50.26
United States	101.50	Morocco	50.11
Canada	94.32	Egypt	49.50
Norway	92.29	Brazil	49.26
Singapore	90.87	Philippines	49.15
Denmark	87.48	Panama	49.11
Finland	86.61	Uruguay	48.97
Italy	84.16	Argentina	48.56
Australia	80.68	Turkey	47.36
Ireland	79.56	Ecuador	45.61
Malaysia	77.74	Ghana	45.41
Korea	75.31	Kenya	45.49
Saudi Arabia	72.07	Paraguay	45.37
Portugal	70.16	Nigeria	44.78
Thailand	69.49	Sri Lanka	43.78
Czech Rep.	67.42	Costa Rica	42.86
Hungary	64.11	Romania	41.06
Indonesia	62.98	Peru	40.25
Greece	61.32	Pakistan	39.56
Chile	61.18	Zimbabwe	39.05
Mexico	57.94	Jamaica	38.72
Colombia	57.44	Tanzania	37.83
India	57.29	Bolivia	36.32
Venezuela	56.17	Dominican Rep.	34.12
South Africa	53.99	El Salvador	28.61
Jordan	53.15		
Poland	52.26		

Source: Authors' regressions.

Table D5. Changes in Government Revenue and Expenditure in Emerging Market Economies, 1980–2000

Percent of GDP

<i>Item</i>	<i>1980–85 to 1986–90</i>	<i>1986–90 to 1991–95</i>	<i>1990–95 to 1996–2000</i>	<i>1980–85 to 1996–2000</i>
<i>Countries with at least one default or restructuring since 1824</i>				
<i>Argentina</i>				
Total expenditure	n.a.	n.a.	0.5	0.5
Interest payments	-0.5	0.3	1.2	1.1
Total revenue	-0.2	3.1	6.7	9.7
Tax revenue	1.2	0.4	0.9	2.5
Trade taxes	0.4	-0.7	-0.1	-0.4
Government balance	n.a.	n.a.	-6.2	-6.2
Seigniorage revenue	-0.3	-3.4	-1.1	-4.7
<i>Brazil</i>				
Total expenditure	9.7	-0.4	-6.6	2.7
Interest payments	12.7	-3.8	-8.5	0.4
Total revenue	1.4	2.1	-4.0	-0.6
Tax revenue	-0.9	0.6	1.6	1.3
Trade taxes	-0.3	-0.1	0.2	-0.2
Government balance	8.3	-2.4	-2.6	3.3
Seigniorage revenue	4.1	1.0	-6.7	-1.6
<i>Chile</i>				
Total expenditure	-7.5	-2.8	-0.1	-10.4
Interest payments	0.9	-0.6	-0.8	-0.6
Total revenue	-6.3	-0.9	-1.3	-8.5
Tax revenue	-5.1	0.5	-1.2	-5.7
Trade taxes	0.3	-0.1	-0.5	-0.3
Government balance	-1.2	-2.0	1.2	-2.0
Seigniorage revenue	0.4	-0.1	-0.7	-0.3
<i>Colombia</i>				
Total expenditure	n.a.	n.a.	4.3	4.3
Interest payments	0.6	0.1	1.2	1.9
Total revenue	n.a.	n.a.	1.3	1.3
Tax revenue	1.7	1.8	-0.8	2.7
Trade taxes	0.6	-1.2	-0.3	-0.8
Government balance	n.a.	n.a.	3.0	3.0
Seigniorage revenue	0.5	-0.5	-1.3	-1.3
<i>Egypt</i>				
Total expenditure	-10.3	1.4	-5.9	-14.8
Interest payments	0.6	3.6	-1.3	2.9
Total revenue	-10.7	5.2	-8.2	-13.7
Tax revenue	-7.2	3.2	-0.8	-4.8
Trade taxes	-3.4	-0.4	0.0	-3.9
Government balance	0.4	-3.8	2.3	-1.1
Seigniorage revenue	-6.1	0.0	-0.9	-7.1

Table D5. Changes in Government Revenue and Expenditure in Emerging Market Economies, 1980–2000 (continued)

Percent of GDP

<i>Item</i>	<i>1980–85 to 1986–90</i>	<i>1986–90 to 1991–95</i>	<i>1990–95 to 1996–2000</i>	<i>1980–85 to 1996–2000</i>
<i>Mexico</i>				
Total expenditure	1.9	–9.5	–0.2	–7.7
Interest payments	7.9	–10.5	–0.8	–3.4
Total revenue	0.4	–0.6	–1.5	–1.7
Tax revenue	0.1	–1.1	–0.6	–1.6
Trade taxes	0.0	0.2	–0.4	–0.2
Government balance	1.5	–8.9	1.3	–6.1
Seigniorage revenue	–3.8	–1.2	0.2	–4.7
<i>Philippines</i>				
Total expenditure	4.4	2.1	0.5	6.9
Interest payments	3.9	–0.3	–1.5	2.2
Total revenue	2.7	3.4	–0.9	5.1
Tax revenue	1.5	3.2	0.0	4.7
Trade taxes	0.3	1.6	–1.5	0.4
Government balance	1.7	–1.3	1.4	1.8
Seigniorage revenue	–1.7	0.4	–0.3	–1.7
<i>Turkey</i>				
Total expenditure	n.a.	5.1	10.9	15.9
Interest payments	n.a.	0.4	7.4	7.9
Total revenue	n.a.	3.2	6.5	9.7
Tax revenue	n.a.	1.9	6.0	7.9
Trade taxes	n.a.	–0.2	–0.3	–0.5
Government balance	n.a.	1.9	4.3	6.3
Seigniorage revenue	0.4	–0.4	0.3	0.4
<i>Venezuela</i>				
Total expenditure	–4.2	–1.1	0.6	–4.6
Interest payments	1.0	0.8	–1.1	0.7
Total revenue	–7.8	–1.8	1.1	–8.5
Tax revenue	–7.4	–1.4	–0.4	–9.1
Trade taxes	–0.6	–0.8	–0.2	–1.6
Government balance	3.6	0.6	–0.5	3.8
Seigniorage revenue	–0.3	1.1	–0.2	0.5
<i>Countries with no default history</i>				
<i>India</i>				
Total expenditure	2.8	–1.4	–0.2	1.2
Interest payments	1.1	0.7	0.3	2.2
Total revenue	1.1	–0.9	–0.5	–0.3
Tax revenue	0.6	–1.3	–0.5	–1.1
Trade taxes	0.9	–0.9	–0.4	–0.4
Government balance	1.7	–0.5	0.4	1.5
Seigniorage revenue	0.3	0.0	–0.8	–0.4

(continued)

Table D5. Changes in Government Revenue and Expenditure in Emerging Market Economies, 1980–2000 (continued)

Percent of GDP

<i>Item</i>	<i>1980–85 to 1986–90</i>	<i>1986–90 to 1991–95</i>	<i>1990–95 to 1996–2000</i>	<i>1980–85 to 1996–2000</i>
<i>Korea</i>				
Total expenditure	-1.5	0.9	0.9	0.3
Interest payments	-0.3	-0.3	-0.1	-0.7
Total revenue	-0.6	1.0	2.0	2.4
Tax revenue	-0.5	-0.1	0.7	0.0
Trade taxes	-0.2	-1.1	0.0	-1.3
Government balance	-0.9	-0.1	-1.1	-2.0
Seigniorage revenue	1.3	-0.4	-1.2	-0.3
<i>Malaysia</i>				
Total expenditure	-6.8	-5.4	-2.8	-15.0
Interest payments	2.2	-2.6	-1.7	-2.1
Total revenue	-2.3	0.3	-3.3	-5.2
Tax revenue	-4.0	1.7	-0.8	-3.1
Trade taxes	-2.4	-0.7	-0.9	-4.0
Government balance	-4.6	-5.7	0.5	-9.8
Seigniorage revenue	0.5	1.8	-0.8	1.6
<i>Singapore</i>				
Total expenditure	2.6	-7.7	2.2	-2.9
Interest payments	0.6	-2.2	-1.2	-2.8
Total revenue	3.1	0.4	6.3	9.8
Tax revenue	-3.6	2.1	-1.2	-2.8
Trade taxes	-0.7	-0.3	-0.1	-1.1
Government balance	-0.4	-8.2	-4.0	-12.7
Seigniorage revenue	0.0	-0.3	-1.0	-1.3
<i>Thailand</i>				
Total expenditure	-3.0	0.2	2.4	-0.3
Interest payments	0.4	-1.7	-0.3	-1.6
Total revenue	1.9	1.7	-1.9	1.7
Tax revenue	1.6	1.7	-1.5	1.7
Trade taxes	0.2	-0.3	-1.3	-1.4
Government balance	-4.9	-1.5	4.3	-2.1
Seigniorage revenue	0.5	0.1	-0.1	0.5

Source: Authors' calculations using data from International Monetary Fund, *Government Finance Statistics* and *International Financial Statistics*, various issues.

Comments and Discussion

Christopher A. Sims: We learn from this paper that repeated defaults on sovereign debt are by no means a new problem, that countries with a history of repeated default tend to persist in this behavior over long periods, and that such countries sometimes default with ratios of debt to national output or to exports that are low by the standards of advanced countries with long default-free histories. These are facts well worth bringing out, and they support the paper's most important policy implication: that the difficulties defaulting countries have in gaining access to international credit are not exogenous imperfections in the market, but instead probably reflect in large measure the risks of lending to these countries. Indeed, the paper suggests by its language, without actually supporting in detail, the hypothesis that international capital markets are imperfect mainly in lending too freely to countries with a history of default.

But the paper merely asserts that debt and serial default involve important deadweight losses. It is plausible that, as the paper suggests, default injures financial institutions and drives countries toward inefficient fiscal systems. But these assertions are only plausible, not obvious, and they are not supported in this paper by any evidence. This leaves it an open question whether, in countries with a default history, policymakers and international agencies should focus directly on reducing, eliminating, or avoiding debt. Debt and default might instead be regarded merely as symptoms of underlying problems, and possibly even as responses that alleviate the effects of these underlying problems.

If default occurred cleanly, without costs other than the direct costs to investors who do not receive promised returns and to the borrower who may face higher future borrowing costs, it would be hard to argue that

default is in itself a problem. Default in such a world is a way to make debt a contingent claim, and contingent debt is a useful financing tool. In an earlier paper (which the authors cite),¹ I presented a highly stylized model of such cost-free default that predicts many of the statistical associations uncovered in this paper: that poorer countries will default more often; that default is consistent with fairly prompt renewal of borrowing and indeed with real debt quickly exceeding predefault levels; that highly variable inflation rates are associated with high default probabilities; that real debt burdens are seldom reduced rapidly except by sudden defaults or episodes of inflation; and that rich countries will have both higher levels of real debt relative to GDP and lower probabilities of default. These predictions emerge as implications of *optimal* government behavior in a model in which governments can make firm commitments about their future fiscal behavior.

The logic behind these predictions is that governments whose only sources of revenue are distorting taxes should use debt to smooth tax rates, keeping taxes and real debt near constant except in times of fiscal crisis. These ideas were first worked out in papers by Robert Barro and by Robert Lucas and Nancy Stokey.² Barro showed that if a government can issue only indexed debt, the expected path of future taxes and debt should be approximately constant. Lucas and Stokey showed that if debt can be made contingent on exogenous events, taxes and debt should be approximately constant. My paper considers debt that is contingent only through inflation and studies the optimal time path of defaults under commitment.

The model that makes these predictions is not meant as a complete description of the real world—there are in fact deadweight costs to default of the kinds listed in this paper. But in order to make policy recommendations, we need to assess how great the deadweight costs of default are. This is difficult to sort out, because the wealth redistributions and recognitions of losses that are enforced by default understandably cause widespread anguish and complaint but are not in themselves deadweight losses. I am prepared to believe, if presented with evidence, that the deadweight losses are indeed large. But this paper presents no evidence to this effect.

1. Sims (2001).

2. Barro (1979); Lucas and Stokey (1983).

This paper makes the case that lending to “debt-intolerant” countries tends to expand in boom times and then contract, with accompanying defaults, when the boom tails off. Does this mean that poorer countries should not borrow in boom times? Not obviously. It appears that they may be borrowing and financing substantial investment when capital is cheap in world markets, then having to cut back when it becomes more expensive. These countries would certainly be better off with a steadier flow of capital, but episodic flows of foreign investment may be better than none, particularly if default frees them from having to make excessive real transfers to creditors when the flow of new credit slows.

The authors’ table 12 presents evidence that there have been few episodes of middle-income countries substantially reducing their debt over a three-year span, except through some form of default. This is presented as evidence for how heavy the burden of debt is. But, of course, this is also exactly the result predicted by the simple theory of optimal tax smoothing. The paper argues that there is a recognizable class of debt-intolerant countries, that these countries have a “threshold” ratio of debt to GNP or to exports above which default becomes likely, and that this threshold is low by the standards of rich-country borrowers. The evidence for the existence of such a threshold is not very convincing. The authors’ figure 1 shows the distributions of debt-to-GNP and debt-to-exports ratios for developing defaulters and developing nondefaulters. It is clear that very few defaulters have debt-to-GNP ratios below 15 percent, whereas quite a few nondefaulters have such low debt ratios. But the upper tails of the two distributions are quite similarly fat. In other words, there is no clear threshold ratio of debt to GNP above which there are many more defaulters than nondefaulters. For the debt-to-exports ratio there is such a threshold, but it is very high (around 400 percent) and thus captures only a small fraction of all defaulters. Looking at these distributions does not suggest the existence of any sharp threshold that separates defaulters from nondefaulters. Figure 3 yields a somewhat similar conclusion. If we tried to predict a country’s IIR from its debt ratios, we would do extremely poorly, unless we concentrated on debt-to-GNP ratios above about 70 percent and debt-to-export ratios above about 400 percent.

The authors correctly observe that it is not uncommon for developing countries with a history of default to default at debt ratios that other countries, even other developing countries, manage to carry without

defaulting. This is an observation worth making, but it does not amount to identification of a low critical threshold for debt ratios.

Thus the paper is valuable in focusing attention on important patterns in the data on external borrowing and default, but it does not deliver convincing policy conclusions. Instead it opens up research questions. Can we document that debt and default are not just correlated with but importantly contribute to weak fiscal, financial, and political institutions? Are there large deadweight costs from the reorganization of financial arrangements and redistributions of wealth that accompany a default episode? Do capital markets systematically fail to charge developing countries interest rates that reflect actual default risks? When we have answers to these questions, we can proceed to make recommendations about whether reducing debt should be a direct focus of reform.

John Williamson: In the early days of the debt crisis of the 1980s, my colleague William Cline repeatedly argued that it was against the interests of the debtor countries to secure debt relief, because this would blemish their record as debtors and preclude their returning to the international capital market.¹ Eventually they did achieve a measure of debt relief, through the Brady Plan. This was soon followed by a resurgence of capital flows, as this paper by Reinhart, Rogoff, and Savastano recalls. Many of us concluded that Cline had been mistaken, because capital markets have short memories (a plausible conclusion because most of those in the trade seem to be under thirty). One of the basic messages of this paper is that Cline's concerns had far more substance than his critics conceded. History does matter: a history of default (or of what the authors label "debt intolerance") undermines a country's ability to borrow large sums on reasonable terms. A market perception of debt intolerance may then breed a sudden stop of capital inflows, which makes large debts intolerably expensive to continue servicing, resulting in a vicious circle.

What is "debt intolerance"? The term suggests that it is a reluctance to make sacrifices to maintain debt service when times are difficult, and the discussion in the paper is consistent with this. But that is not how the authors measure debt intolerance; instead they measure it as the ratio of debt to GNP (or to exports) divided by the country's sovereign debt rating from *Institutional Investor*. This is a measure of how burdensome a coun-

1. See, for example, Cline (1984, p. 88).

try's debt is: of whether a country *needs* to sacrifice in order to maintain debt service, not of whether it is *willing* to do so. The two concepts should have been kept separate, and then the hypothesis that a history of default undermines a country's creditworthiness long into the future could have been explicitly tested, but in most of the paper this is assumed rather than investigated. The most notable exception is their table 8, which shows that Argentina (a frequent defaulter) needs to keep its debt-to-GNP ratio about 20 percentage points lower than Malaysia (which has a perfect record of avoiding default and restructuring) in order to achieve any given *Institutional Investor* rating. Other findings could be cited that tend to support their core idea, but one may nevertheless regret that it was not presented as a hypothesis to be investigated rather than built into a terminology that suggests that the blame for precipitating "credit events" is completely one-sided.

The paper argues that countries can be classified into distinct "clubs," as measured by their *Institutional Investor* ratings. Club A consists primarily of advanced countries that have never defaulted (at least not in recent history); these countries enjoy continuous access to the international capital market. Club C consists of countries that enjoy only sporadic access to the international capital market. Club B is an intermediate group of countries where default risk is nontrivial and self-fulfilling runs are a possible trigger to a crisis. This club is further subdivided into countries with above- and below-average ratings and with high and low indebtedness. Ratings are explained by the country's history of high inflation and of past default and by the level of debt (deflated by GNP or exports). The key finding is that the coefficient on the level of debt is positive for club A countries and negative for those in club B. Club B countries with a default history have low creditworthiness and therefore have to pay high interest rates for what they borrow, which is not much relative to what club A countries borrow, but more than developing countries without a history of default typically choose to borrow.

Unfortunately, borrowing by the industrial countries is measured by a different concept of debt than is used for the nonindustrial countries: the measure for nonindustrial countries is external debt, public and private, whereas that for industrial countries is external and domestic public sector debt. The authors make a worthy effort in table 14 to provide data on internal public sector debt in emerging markets, and they emphasize the growing importance of this phenomenon and the increasing need to

introduce it into analysis, but their own basic analysis sidesteps the problem, as they concede.

Because interest rates are much higher in emerging markets with a history of default than in industrial countries, and because those interest spreads widen when their debt situation deteriorates (or, worse, lending comes to a sudden stop), it is difficult for such countries to avoid defaulting again when hit by a severe negative shock. Countries in these circumstances are caught in a vicious circle. The exit strategy the authors offer is to borrow less in the first place, so that they will become invulnerable to adverse shocks. This policy recommendation happens to be similar to one offered in a new book that I co-edited with Pedro-Pablo Kuczynski.² Indeed, the present authors suggest that the maximum prudent debt-to-GNP ratio for emerging market economies may be around 35 percent, quite close to the 30 percent recommended by Daniel Artana, Ricardo López Murphy, and Fernando Navajas in our book. Nevertheless, my endorsement of the authors' recommendation is not meant to condone their attack on Barry Eichengreen, Ricardo Hausmann, and Ugo Panizza. I agree that the use of the term "original sin" by Eichengreen and his coauthors to explain developing countries' borrowing difficulties is silly, since there is no evidence that these countries would be unable to borrow in domestic currency if they tried. But their suggestion that the multilateral development banks should restructure the composition of their balance sheets so as to better match the shocks faced by their borrowers, and their demonstration that this could be done without taking on additional risk themselves and while offering attractive assets to the public, are brilliant. True, borrowers might abuse the leeway such an innovation would offer them by increasing their borrowing (as the present authors seem to assume they would), but they might also use it appropriately to reduce their risk. The same may be said of the authors' expressed preference for equity over debt finance.

The distinction between countries subject to sudden stops of capital flows and those that can borrow even in the face of severe negative shocks is fundamental. It is an issue that I first grappled with when I visited Chile in 1991 to discuss the problems for economic policy posed by an inflow of capital that the authorities judged to be excessive. The Chileans I talked to were adamant that a steep fall in the price of copper would pro-

2. Kuczynski and Williamson (2003).

voke a sudden stop of private capital inflows, rather than allow an increase in borrowing to finance a countercyclical policy—a prediction that proved all too correct in 1998. Given the situation as they perceived it, we agreed that it made sense to restrain capital inflows: hence the *encaje*.³ Complete capital account liberalization was for that perhaps-distant day when the capital markets would treat Chile as a developed country. Ricardo Ffrench-Davis summarized my advice as “first join the OECD, then liberalize the capital account” (although subsequent history—first in Mexico, then in Korea—showed all too clearly that simply joining the OECD is not enough). It is important to note that sudden stops are not confined to countries with a history of default: three of the five countries classified as “Emerging market countries with no external default history” in the authors’ table 1 suffered from sudden stops in 1997, namely, Korea, Malaysia, and Thailand.

The most profound question raised by this paper is how countries can graduate from one club to a higher one, with graduation to club A (where sudden stops no longer happen) being the really important event. We do know that Chile and Mexico have attained investment-grade ratings on their debt in recent years, and it is interesting to see in table 9 that Brazil had a rating from *Institutional Investor* very close to that needed for admission to club A in 1979, before the debt crisis. And of course a lot of today’s advanced countries defaulted as late as the nineteenth century. These facts give some reason to hope that default in 1824 does not imply permanent exclusion from club A. But what is needed to win acceptance there? Is it the attainment of industrial country living standards (in which case Singapore ought already to be in the club)? Is it a long track record of servicing debt, such as can be achieved by restraining borrowing and so reducing debt vulnerability (which seems to be the approach favored by Reinhart and colleagues)?⁴ Is it a network of institutions that will support continued debt service—such as an efficient tax system to raise the needed revenue, and pension funds dependent on continued receipt of

3. The *encaje* was a capital control in the form of an unremunerated reserve requirement for one year on all foreign loans.

4. Incidentally, I do not regard their table 12 as compelling evidence that countries are incapable of outgrowing debt: the bar (growth sufficient to reduce the debt-to-GNP ratio by 25 percentage points in three years) has simply been set too high. One would expect output growth to have played a far more important role in slower reductions in debt vulnerability than those shown in the table (and even there it plays a role in seventeen of the twenty-three instances cited).

interest income in order to maintain a decent standard of living for the retired? Can perhaps the long process of investment in demonstrating “debt tolerance” be accelerated by not defaulting when the pressure is on? If so, one has to be thankful that IMF policy toward Brazil in 2002 was not guided by the argument of this paper!

General discussion: Mark Gertler drew a parallel between the differences in leverage ratios observed across countries and the differences in leverage ratios observed across U.S. firms. In a given industry, larger and more mature firms typically have higher leverage ratios than younger and smaller firms, which also exhibit higher default rates. Theories based on asymmetric information and imperfect contract enforceability provide a rationale for these outcomes. Furthermore, default rates and leverage are positively correlated across small firms, although this relation is endogenous. When hit by a negative shock, small firms do not default right away but rather build up debt while trying to smooth production in the presence of low cash flows. They default only when their capacity to borrow more is exhausted.

William Brainard agreed that such endogeneity would be important in country data, because sovereign debt crises have large effects on countries’ incomes. Because of this, the importance of the variability of income for the leverage ratio cannot be inferred using data for the whole sample, but rather from only those observations that are not subject to this endogeneity. Brainard also stressed that the paper does not go far enough in accounting for fundamentals that might help explain when countries are likely to default. For firms, one traditionally computes various kinds of coverage ratios in order to assess the relationship between debt-to-equity ratios and default rates, taking into account the variance of earnings and other fundamentals. By comparison, measures such as the export coverage ratio are very crude indicators of a country’s position. Some countries’ exports may be largely manufactured goods tied to imports of intermediate materials, whereas for others they may consist mainly of raw materials. Export coverage ratios should be interpreted quite differently in these two cases.

Shang-Jin Wei considered a main message of the paper to be that the first default is very costly, because it increases the cost of future debt, apparently forever. He noted that this view conflicts with the idea that capital markets have very short memories, a point that Barry Eichengreen

and William Cline, among others, have stressed. Wei suggested that investors want to forgive past behavior and even look for excuses to do so after some years have passed since the last crisis. He noted that a change in government often provides such an excuse and suggested that the country time series in the paper could be used to investigate this idea. Carol Graham questioned whether reforms in developing countries are necessarily associated with large revenue losses. Although the authors note that revenue losses from trade and tariff reforms have increased debt in many such countries, other reforms, such as the privatization of unprofitable state enterprises, would be expected to increase revenue. She suggested that analyzing revenue by individual country or by group of countries might illuminate the effect of different reforms and the net effect of reform generally.

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