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FROM FINANCIAL CRASH TO DEBT CRISIS

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**ABSTRACT**

Newly developed long historical time series on public debt, along with modern data on external debts, allow a deeper analysis of the cycles underlying serial debt and banking crises. The evidence confirms a strong link between banking crises and sovereign default across the economic history of great many countries, advanced and emerging alike. The focus of the analysis is on three related hypotheses tested with both “world” aggregate levels and on an individual country basis. First, private debt surges are a recurring antecedent to banking crises; governments quite contribute to this stage of the borrowing boom. Second, banking crises (both domestic ones and those emanating from international financial centers) often precede or accompany sovereign debt crises. Indeed, we find they help predict them. Third, public borrowing accelerates markedly ahead of a sovereign debt crisis; governments often have “hidden debts” that far exceed the better documented levels of external debt. These hidden debts encompass domestic public debts (which prior to our data were largely undocumented).

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## I. Introduction

The economics profession has an unfortunate tendency to view recent experience in the narrow window provided by standard datasets.<sup>1</sup> It is particularly distressing that so many cross-country analyses of financial crisis are based on debt and default data going back only to 1980, when the underlying cycles can be half centuries and more, not just thirty years.<sup>2</sup>

This paper attempts to address this deficiency by employing a comprehensive new long-term historical database for studying debt and banking crises, inflation, and currency crashes.<sup>3</sup> The data covers seventy countries in Africa, Asia, Europe, Latin America, North America, and Oceania.<sup>4</sup> The range of variables encompasses external and domestic debt, trade, GNP, inflation, exchange rates, interest rates, and commodity prices.<sup>5</sup> Our analysis spans over two centuries, going back to the date of independence or well into the colonial period for some countries. The construction of our dataset builds on the work of many scholars; it also includes a considerable amount of new material from diverse primary and secondary sources.

Exploiting the multi-century span of the data, we study role of *repeated* extended debt cycles in explaining the observed patterns of *serial* default and banking crises that characterize the economic history of so many countries—advanced and emerging alike. The focus of the analysis is on three related hypotheses that we document and formally

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<sup>1</sup> That is why an exception such as Friedman and Schwartz's (1963) monumental monetary history of the United States still resonates almost one-half century after publication .

<sup>2</sup> For a longer perspective on crises, see the work of Bordo, Eichengreen, Lindert and Morton, and Taylor.

<sup>3</sup> This is the first formal application of the core dataset described in Reinhart and Rogoff (2009), and the scope of the dataset has been expanded significantly as well.

<sup>4</sup> See Appendix Table 1 for the full list of countries.

<sup>5</sup> External debt refers to debt that is legally governed by foreign law, in contrast to debt governed by the law of the issuing country. This is not the only way to parse the data, but it is a useful one empirically.

test at both “world” aggregate levels and on an individual country basis. *First*, private debt surges—fueled by both domestic banking credit growth and external borrowing are a recurring antecedent to domestic banking crises; governments quite often contribute to this stage of the borrowing boom. (Banking crises in financial centers have also historically helped predict domestic banking crises elsewhere). *Second*, banking crises (domestic ones and those in international financial centers) often precede or accompany sovereign debt crises. *Third*, public borrowing accelerates markedly and systematically ahead of a sovereign debt crisis (be it outright default or restructuring); the government often has “hidden debts” that far exceed the better documented levels of external debt. These hidden debts include domestic public debt (which prior to our data were largely undocumented) and private debt that become public (and “publicly” known) as the crisis unfolds. Quantifying public contingent liabilities is beyond the scope of this paper. A *fourth* related hypothesis (which we document but do not test) is that during the final stages of the private and public borrowing frenzy on the eve of banking and debt crises and (most notoriously) bursts of hyperinflation, the composition of debt shifts distinctly toward short-term maturities.<sup>6</sup>

The paper is organized as follows. Section II describes our approach toward cataloging, dating, and connecting the various manifestations of economic crises. The concepts of serial default, debt intolerance, and the “this time is different syndrome,” which all play a central role in our analysis, are defined. In Section III, we present the “big picture” on global cycles of debt, financial crises and sovereign debt crises. We use representative country histories to elaborate and complement some of the patterns seen in the global aggregates. The robustness of the descriptive analysis is grounded in a related

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<sup>6</sup> This is closely related to the themes in Rodrik and Velasco (2000).

Chartbook that spans more than two centuries of data and documents the crisis experience and debt history of *each and every one* of the seventy countries that make up our sample.<sup>7</sup> The emphasis is on describing the broad phases of the debt cycle, the sequencing of crises, and some of their features—such as the duration and frequency of default spells. History suggests that policymakers should not be overly cheered by the absence of major external defaults from 2003 to 2009 after the wave of defaults in the preceding two decades. Given that international waves of defaults are typically separated by many years, if not decades, there is no reason to suppose that serial default is dead.

Section IV discusses some alternative theoretical frameworks that might help explain the observed patterns discussed in the preceding section with a special emphasis on serial default and the “*This time is different*” syndrome. Section V complements the descriptive “big picture” analysis in Section III by exploiting the rich panel dimension of our data to test for temporal causal patterns across crises and the role of public and private debts in the runup to sovereign debt and financial crises. In the concluding section, we take up the issue of how countries can graduate from the perennial problem of serial default.

## **II. Crisis Definitions and Other Concepts**

We begin by developing working definitions of what constitutes a financial crisis, as well as the methods—quantitative where possible—to date the beginning and end of a crisis. The boundaries drawn are generally consistent with the existing empirical economics literature, which by and large is segmented across the various types of crises

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<sup>7</sup> See Reinhart (2010), This “Time is Different Chartbook: Country Histories on Debt, Default, and Financial Crises” which will be henceforth referred to as the Chartbook.

considered (e.g., sovereign debt, exchange rate). Two approaches are used to identify crisis episodes. One is quantitative in nature and is discussed, while the other is based on a chronology of events. The crisis markers discussed in this section refer to individual countries as opposed to global events.

### ***1. Inflation, Hyperinflation, and Currency Crises***

Expropriation takes various forms, beyond outright default, repudiation, or restructuring of domestic or external debts. Indirect routes to achieving the same end, inflation and currency debasement, can also erode the value of some types of existing debts. Thus, we date both the beginning of an inflation or currency crisis episode and its duration. Many of the high-inflation spells can be best described as chronic, in that they last many years.

Reinhart and Rogoff (2004), which classified exchange rate arrangements for the post–World War II period, used a twelve-month inflation threshold of 40 or higher percent to define a “freely falling” episode. Our current work spans a much longer period, before the widespread creation of fiat currency. Median inflation rates before World War I were well below those of the more recent period: 0.5 percent for 1500–1799 and 0.7 percent for 1800–1913 versus about 5 percent for 1914–2009. Accordingly, we define an *inflation crisis* using a threshold of **20 percent per annum**.

*Hyperinflations*, which are defined as episodes where the annual inflation rate exceeds **500 percent**, are of modern vintage.<sup>8</sup> Hungary 1946 holds the sample record despite the recent challenge from Zimbabwe, which comes in second.<sup>9</sup>

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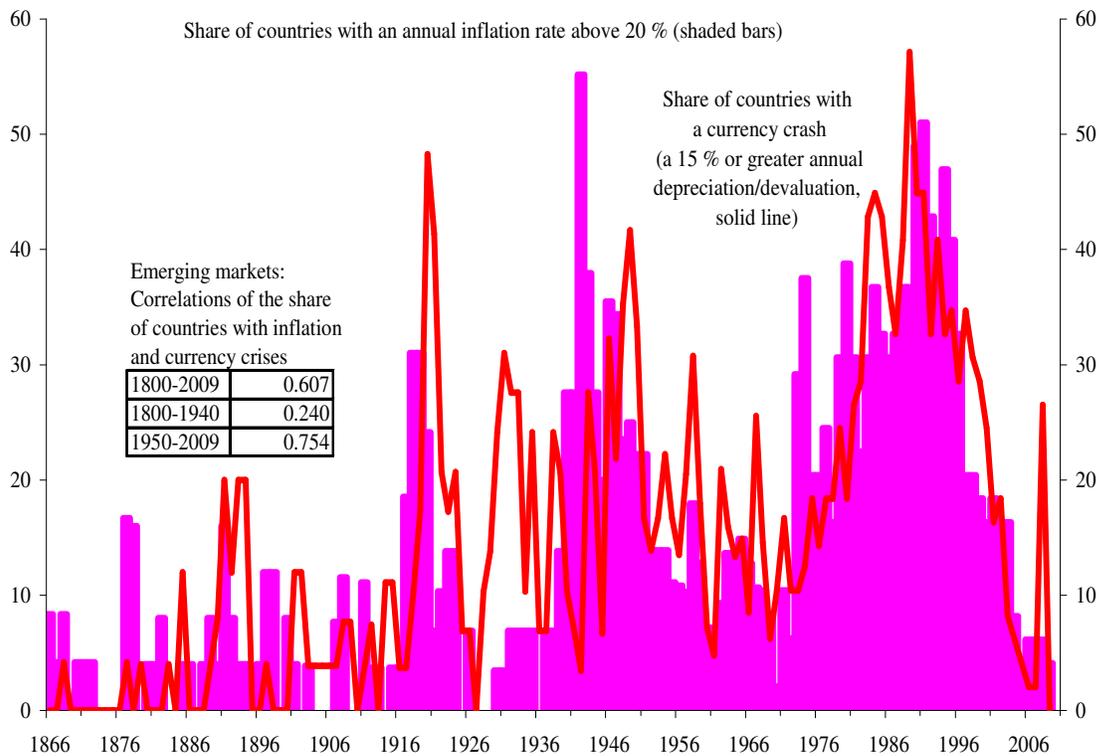
<sup>8</sup> Note that this definition of hyperinflation (unlike Cagan’s classic definition of a monthly inflation rate that is 50 percent or greater) does not require monthly readings of inflation—which are scarce prior to the 20<sup>th</sup> century.

<sup>9</sup> See Figure 70 (Zimbabwe) in the Chartbook for a comparison of hyperinflation episodes.

To date currency crashes, we follow a variant of Frankel and Rose (1996) and focus exclusively on exchange rate depreciation. This definition is the most parsimonious, as it does not rely on other variables, such as reserve losses (data that many central banks guard jealously) and interest rate hikes.<sup>10</sup> Mirroring our treatment of inflation episodes, an episode is counted for the entire period in which annual depreciations exceed the threshold of 15 percent per annum.

Hardly surprising, currency crashes and inflation crises go hand in hand. Figure 1

**FIGURE 1.** The Tight Connection Between Currency Crashes and Inflation Crises: Emerging Markets, 1865-2009



*Sources:* Reinhart and Rogoff (2009), sources cited therein and authors' calculations.

*Notes:* An inflation crisis is defined as a year where inflation exceeds 20 percent, while a currency crash is an annual depreciation (devaluation) greater than or equal to 15 percent per annum. The correlations of inflation and exchange rate crises are contemporaneous.

<sup>10</sup> See Kaminsky and Reinhart (1999) for a more detailed discussion of indices that measure “exchange market turbulence.”

plots the incidence of the two “monetary” or “fiat-money” varieties crises—exchange rate and inflation. The “honor” for the record annual currency crash goes to Greece in 1944, also a year of hyperinflation (see Reinhart and Rogoff, 2009).

## ***2. Debt Categories and Debt Crises***

External debt crises involve outright *default* on payment of debt obligations incurred under foreign legal jurisdiction, *repudiation*, or the *restructuring* of debt into terms less favorable to the lender than in the original.<sup>11</sup>

These events have received considerable attention in the academic literature from leading modern-day economic historians, such as Michael Bordo, Barry Eichengreen, Marc Flandreau, Lindert and Morton, and Alan Taylor.<sup>12</sup> Relative to early banking crises, much is known about the causes and consequences of these rather dramatic episodes. For post-1824, the dates come from several Standard and Poor’s studies. However, these are incomplete, missing numerous post-war restructurings and early defaults. This source has been supplemented with additional information from Lindert and Morton (1989), Suter (1992) and Tomz (2006). Of course, required reading in this field includes Winkler (1933) and Wynne (1951).

While the time of default is accurately classified as a crisis year, there are a large number of cases where the final resolution with the creditors (if it ever did take place) seems interminable. Russia’s default following the revolution holds the record, lasting 69 years. Greece’s default in 1826 shut it out from international capital markets for 53

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<sup>11</sup> Appendix Table 1 provides a brief glossary of the major categories of debt studied in this paper.

<sup>12</sup> This is not meant to be an exhaustive list of the scholars that have worked on historical sovereign defaults.

consecutive years, while Honduras's 1873 default had a comparable duration. Looking at the full default episode is, of course, useful for characterizing the borrowing/default cycles, calculating hazard rates, etc. But it is hardly credible that a spell of 53 years could be considered a crisis. Thus, in addition to constructing the country-specific dummy variables to cover the entire episode, we also employ one where only the first year of default enters as a crisis.

Information on domestic debt crises is scarce but it is not because these crises do not take place. Indeed, as Reinhart and Rogoff (2008) show, domestic debt crises typically occur against much worse economic conditions than the average external default. Domestic debt crises do not usually involve external creditors, which may help explain why so many episodes go unnoticed. Another feature that characterizes domestic defaults is that references to arrears or suspension of payments on domestic debt are often relegated to footnotes. Lastly, some of the domestic defaults that involved the forcible conversion of foreign currency deposits into local currency have occurred during banking crises, hyperinflations, or a combination of the two; deposit freezes are also numerous. The approach toward constructing categorical variables follows that previously described for external debt default. Like banking crises and unlike external debt defaults, the endpoint of domestic default is not always known.

### ***3. Banking crises***

In dating banking crises, our analysis stresses events given the paucity of quantitative information. For example, the relative price of bank stocks (or financial institutions relative to the market) would be a logical indicator to examine, but such time

series are not readily available, particularly for the earlier part of our sample as well as for developing countries (where many banks are not publicly traded).

If the beginning of a banking crisis is marked by bank runs and withdrawals, then changes in bank deposits could be used to date the crises. This indicator would have certainly done well in dating the numerous banking panics of the 1800s. Often, however, the banking problems do not arise from the liability side, but from a protracted deterioration in asset quality, be it from a collapse in real estate prices or increased bankruptcies in the nonfinancial sector. In this case, a large increase in bankruptcies or nonperforming loans could be used to mark the onset of the crisis. Indicators of business failures and nonperforming loans are also usually available sporadically; the latter are also made less informative by banks' desire to hide their problems for as long as possible.

Given these data limitations, we mark a banking crisis by two types of events: (1) bank runs that lead to the closure, merging, or takeover by the public sector of one or more financial institutions; or (2) if there are no runs, the closure, merging, takeover, or large-scale government assistance of an important financial institution (or group of institutions), that marks the start of a string of similar outcomes for other financial institutions.

The main sources for cross-country dating of crises are as follows: For post-1970, the comprehensive and well-known study by Caprio and Klingebiel—which the authors updated through 2003—is authoritative, especially when it comes to classifying banking crises into systemic or more benign categories. For pre-World War II, Kindleberger (1989), Bordo et al. (2001), among others provide multi-country coverage on banking.

For many of the early episodes it is difficult to ascertain how long the crisis lasted. Many country-specific studies pick up banking crisis episodes not covered by the multicountry literature and contribute importantly to this chronology.

#### ***4. The “this time is different syndrome” and other concepts***

***Serial default*** refers to countries which experience multiple sovereign defaults (on external or domestic public or publicly-guaranteed debt—or both). These defaults may occur five or fifty years apart; these may be wholesale default (or repudiation) or a partial default through rescheduling.

***Debt intolerance*** manifests itself in the extreme duress many emerging markets experience at debt levels that would seem quite manageable by advanced country standards. “Safe” debt thresholds for highly debt intolerant emerging markets turn out to be surprisingly low, perhaps as low as fifteen to twenty percent in many cases, and these thresholds depend heavily on a country’s record of default and inflation. Debt intolerance likely owes to weak institutional structures and a problematic political system that makes external borrowing a useful device for developing country governments to avoid hard decisions about spending and taxing and global investors rightly suspicious about the government’s motives. Simply put, the upper limit to market access is lower when governments suffer from an intolerance to repayment but not to borrowing.

The essence of the ***This time is different syndrome*** is simple. It is rooted in the firmly-held belief that financial crises are something that happen to other people in other countries at other times; crises do not happen here and now to us. We are doing things better, we are smarter, we have learned from the past mistakes. The old rules of valuation no longer apply. The current boom, unlike the many previous booms that preceded

catastrophic collapses (even in our country), is built on sound fundamentals, structural reforms, technological innovation, and good policy. Or so the story goes...

### III. The Big Picture and Country Histories

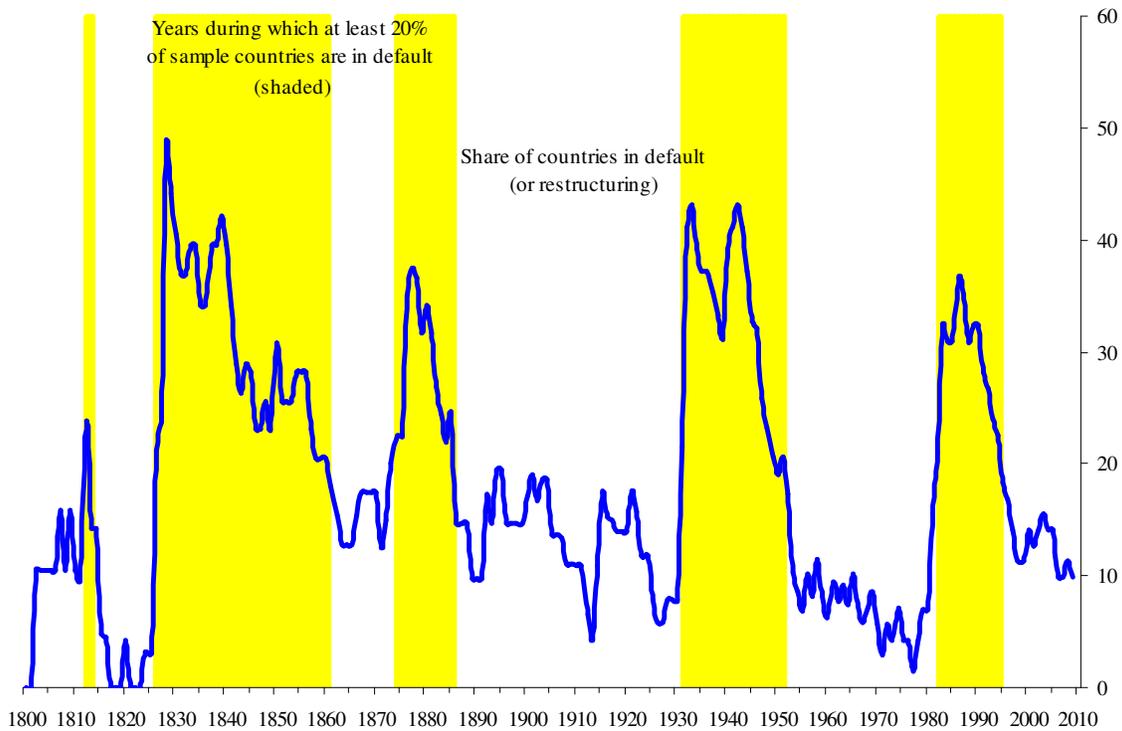
What are some basic insights one gains from this panoramic view of the history of financial crises? Our approach throughout this section is to illustrate each of our main findings with both a “big picture” based on cross-country aggregation and a “representative country case study (or case studies)” from country histories. Each of the main points highlighted in the figures is complimented by the pertinent debt/GDP-crisis indicator regressions reported at the bottom of each figure. We begin by discussing sovereign default on external debt (that is, when a government defaults on its own external or private-sector debts that were publicly guaranteed.)

#### *1. Sovereign Debt Crises*

For the world as a whole (more than 90 percent of global GDP represented by our dataset), the current period can be seen as a typical lull that follows large global financial crises. Figure 2 plots for the years 1800 to 2009 (where our dataset is most complete) the percentage of all independent countries in a state of default or restructuring during any given year. Aside from the current lull, *there are long periods where a high percentage of all countries are in a state of default or restructuring. Indeed, there are five pronounced peaks or default cycles in the figure.* The first is during the Napoleonic War. The second runs from the 1820s through the late 1840s, when, at times, nearly half the countries in the world were in default (including all of Latin America). The third episode begins in the early 1870s and lasts for two decades. The fourth episode begins in the Great Depression of the 1930s and extends through the 1950s, when nearly half of all

countries stood in default.<sup>13</sup> The most recent default cycle encompasses the emerging market debt crises of the 1980s and 1990s.

**FIGURE 2.** Global Sovereign External Default Cycles: 1800-2009  
Share of countries in default or restructuring



Sources: Lindert and Morton (1989), Macdonald (2003), Purcell and Kaufman (1993), Reinhart, Rogoff, and Savastano (2003), Suter (1992), and Standard and Poor's (various years).

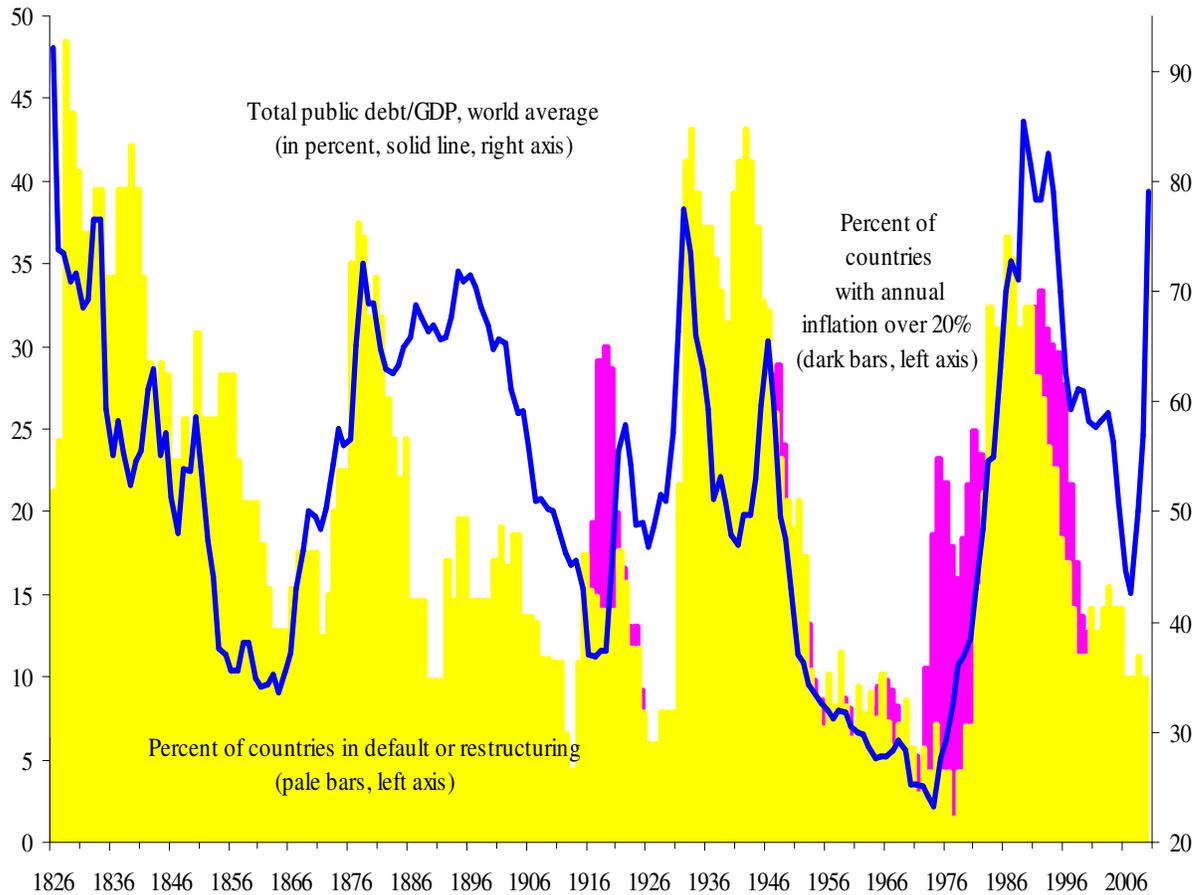
Notes: Sample includes all countries, out of a total of 70 listed in Appendix Table 1, that were independent states in the given year. Specifically, the number of countries increases from 19 in 1800 to 32 in 1826, as Latin American colonies gained independence; following World War II, newly-independent Asian states swell the number to 58 and in the following decades as African nation-states are born the number of sovereign increases to a total of 70—the full sample.

***Public debt follows a lengthy and repeated boom-bust cycle; the bust phase involves a markedly higher incidence of sovereign debt crises. Public sector borrowing surges as the crisis nears.*** In the aggregate, debts continue to rise after default, as arrears

<sup>13</sup> Kindleberger (1988) is among the few scholars who emphasize that the 1950s can be viewed as a financial crisis era.

accumulate and GDP contracts markedly.<sup>14</sup> Figure 3 plots the incidence of default shown in Figure 2 (now shaded bars) from 1824, when the newly independent Latin

**FIGURE 3.** Sovereign Default on External Debt, Total (domestic plus external) Public Debt, and Inflation Crises: World Aggregates, 1826-2010 (debt as a percent of GDP)



Dependent variable	World: Share of countries in default or restructuring	
Sample	1824-2009	
Independent variables	<i>OLS</i> (robust errors)	<i>Logit</i> (robust errors)
World: Public debt/GDP (t-1)	<b>0.346</b>	<b>0.008</b>
<i>p</i> -value	<b>0.000</b>	<b>0.000</b>
Number of observations	184	184
R <sup>2</sup>	0.224	0.246

*Sources:* Reinhart and Rogoff (2009), sources cited therein and authors' calculations.

*Notes:* The debt aggregate for the world is a simple arithmetic average of individual countries' debt/GDP ratios. For a few countries the time series on debt and exports are much longer dating back to the first half of the 19<sup>th</sup> century than for nominal GDP. In these cases (Brazil, Canada, Egypt, India, Nicaragua, Thailand, Turkey and Uruguay) the debt/GDP series was spliced (with appropriate scaling) with the to the available debt/GDP data. The split between advanced and emerging economies is made along the present-day IMF classification.

<sup>14</sup> See Reinhart and Rogoff (2008) on evidence on output behavior before during and after debt crises.

American economies first entered the global capital market, through 2009 against an unweighted average debt/GDP ratio for all the countries for which such data is available. Upturns in the debt ratio usually precede the rise in default rates, as the regressions for the world aggregates shown at the bottom of Figure 3 confirm. The evident positive correlation between rising debt burdens and higher incidence of default will be investigated more systematically in Section V. Periods of higher indebtedness are also associated with a higher incidence of inflation crises (a more indirect form of default, highlighted as a darker shaded bar where the incidence of inflation exceeds that of default). Default through inflation is more prevalent since World War I, as fiat money became the norm and links to gold eroded.

Figure 4 presents the comparable time series and regression analysis for emerging markets. The pattern between debt and default are along the lines already discussed in the context of the world aggregate shown in Figure 3.<sup>15</sup>

***Serial default is a widespread phenomenon across emerging markets and several advanced economies.*** Figure 1 anticipates this point by the numerous episodes (shaded) in which at least 20 percent of the independent nations were in default. The most compelling evidence on serial default comes from the individual country histories, shown here for Brazil and Greece in Figures 5 and 6, respectively. The 70 country histories presented in the Chartbook provide broad-based evidence that serial default cut across regions and across time.

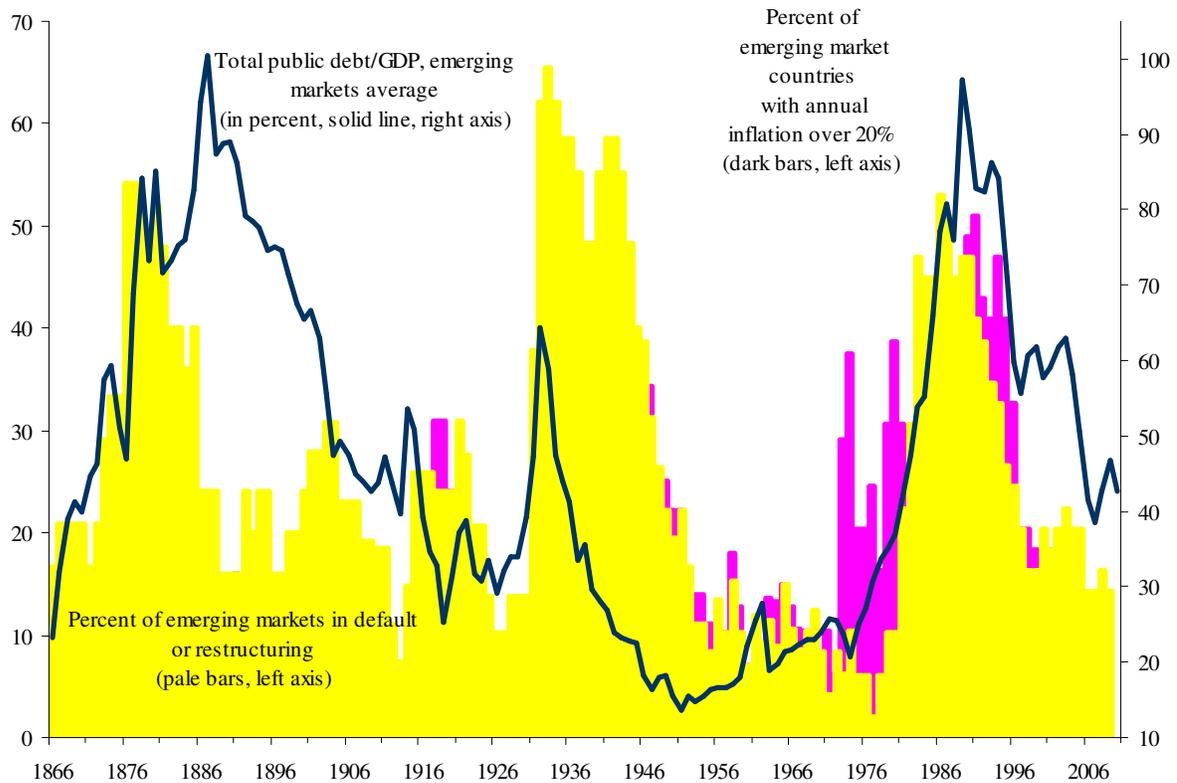
The “hallmark” surge in debt on the eve of a debt crisis, banking crisis or both are quite evident in most of the episodes in the timeline for Brazil and Greece’s last two

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<sup>15</sup> See Reinhart and Rogoff (2010b), for evidence on the debt thresholds that are associated with higher inflation outcomes.

defaults in 1894 and in 1932—the latter default spell lasting about 33 years from beginning to its eventual resolution in 1964.

**FIGURE 4.** Sovereign Default on External Debt, Total (domestic plus external) Public Debt, and Inflation Crises: Emerging Markets, 1866-2010 (debt as a percent of GDP)

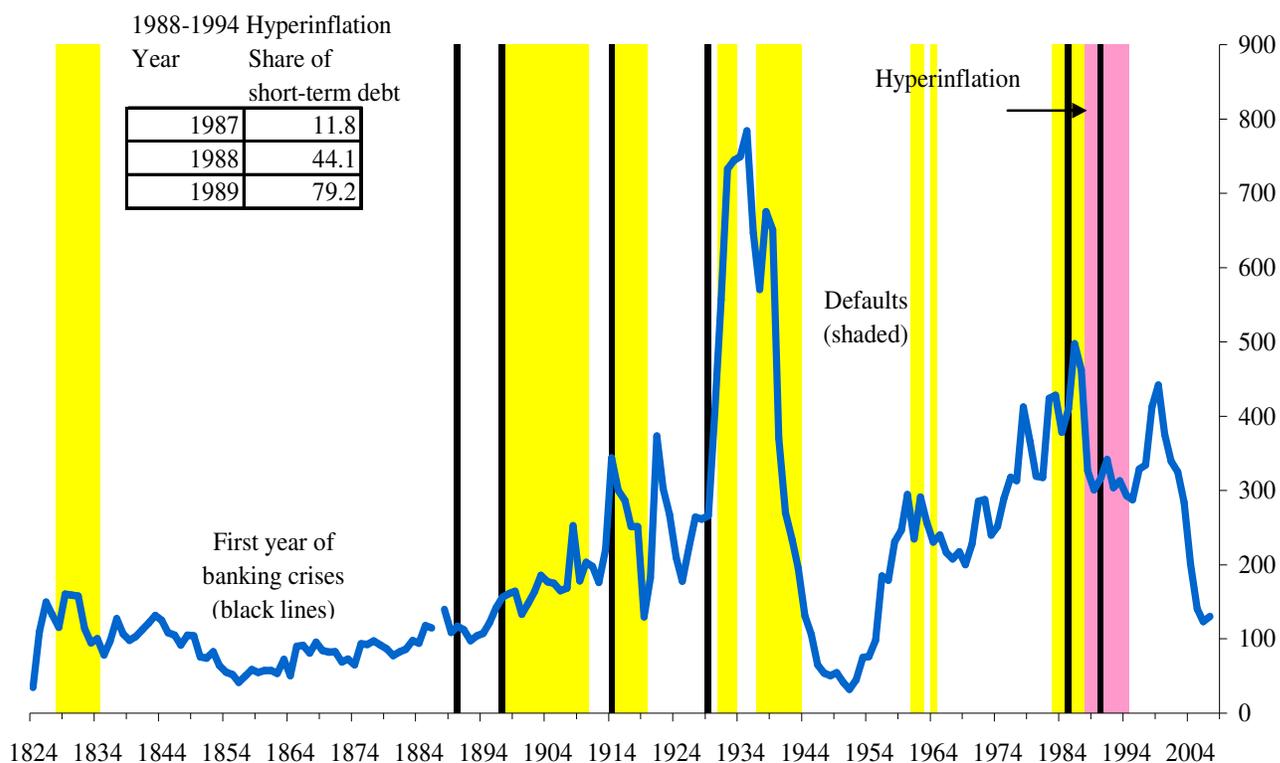


Dependent variable	Emerging Markets: Share of countries in default or restructuring	
Sample	1866-2009	
Independent variables	<i>OLS</i> (robusterrors)	<i>Logit</i> (robusterrors)
Emerging Markets: Public debt/GDP (t-1)	<b>0.232</b>	<b>0.007</b>
<i>p</i> -value	<b>0.000</b>	<b>0.000</b>
Number of observations	144	144
R <sup>2</sup>	0.120	0.133

*Sources:* Reinhart and Rogoff (2009), sources cited therein and authors' calculations.

*Notes:* The debt aggregates for the emerging economies is the simple arithmetic average of individual countries' debt/GDP ratios. See additional notes to Figure 3.

**FIGURE 5. Brazil: External Debt, Default, Hyperinflation and Banking Crises, 1824-2009**  
(debt as a percent of exports)

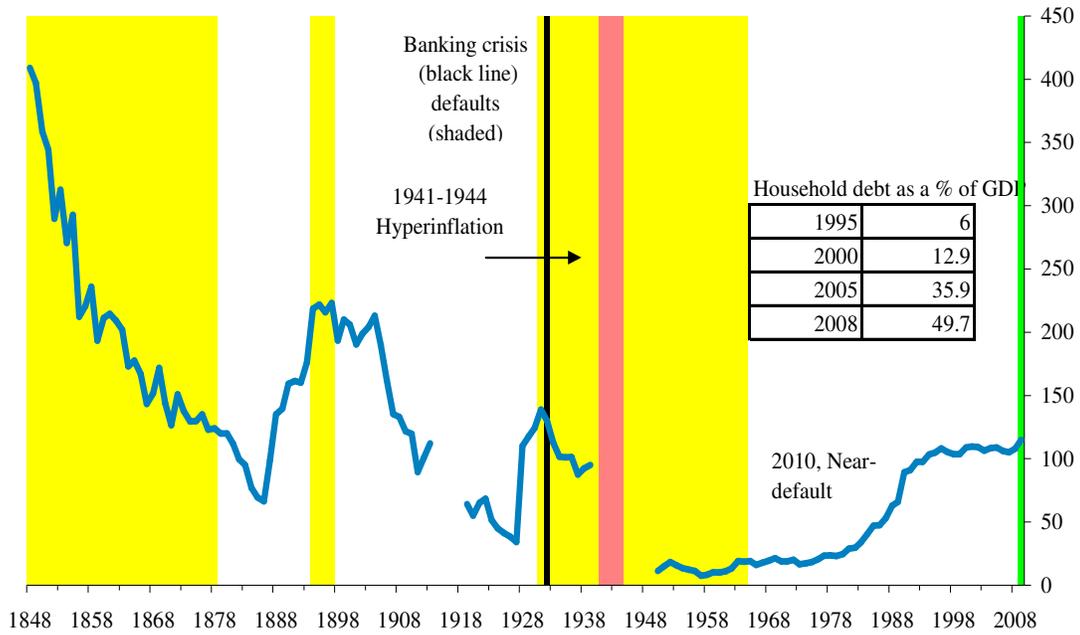


Sources: Reinhart and Rogoff (2009) and sources cited therein.

Notes: For 1824-1945, public external debt; for 1946-2009 external debt is the aggregate of public and private debts. Only the major banking crises are shown. There are a total of 9 default episodes but only 8 shaded regions, as two episodes occur in consecutive years (see table below). Only systemic banking crises are shown.

Domestic and External Default, Banking Crises, and Hyperinflation: Brazil, 1822-2009						
External default Dates	Duration (in years)	Domestic default dates	Banking crisis dates (first year)	Hyper-inflation dates	Share of years in external default	Share of years in inflation crisis
1828-1834	7	1986-1987	1890	1988-1990	26.6	26.1
1898-1901	4	1990	1897	1992-1994		
1902-1910	9		1900	<i>or</i>		
1914-1919	6		1914	<i>single episode</i>		
1931-1933	3		1923			
1937-1943	7		1926	1988-1994		
1961	1		1929			
1964	1		1963			
1983-1990	8		1985			
			1990			
			1994			
Number of episodes:						
9		2	11	2(1)		

**FIGURE 6.** Greece: Central Government (domestic plus external) Debt, Default, Hyperinflation, and Banking Crises, 1848-2009 (debt as a percent of GDP)



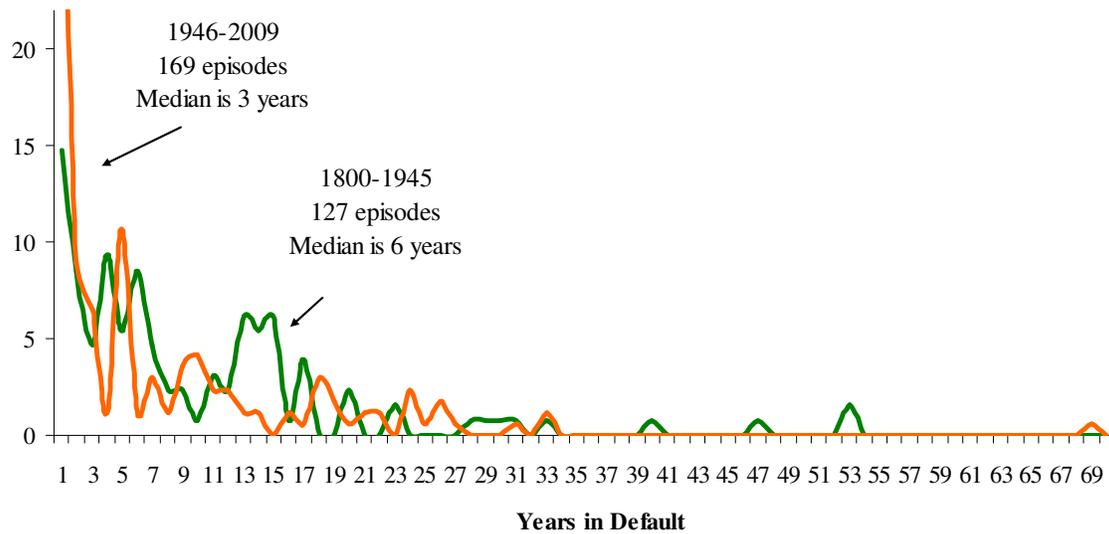
Sources: Lazaretou (2005), Reinhart and Rogoff (2009) and sources cited therein

**Domestic and External Default, Banking Crises, and Hyperinflation: Greece, 1829-2009**

External default dates	Duration (in years)	Domestic default dates	Banking crisis dates (first year)	Hyper-inflation dates	Share of years in external default	Share of years in inflation crisis
1826-1842	17	1932-1951	1931	1941-1944	48.1	12.7
1843-1859	17		1991			
1860-1878	19					
1894-1897	4					
1932-1964	33					
Number of episodes:						
5		1	2	1		

Another noteworthy insight from the “panoramic view” *is that the median duration of default spells in the post–World War II period is one-half the length of what it was during 1800–1945* (3 years versus 6 years, as shown in Figure 7).

**FIGURE 7.** Duration of Default Episodes: 1800-2009  
(frequency of occurrence, percent)



Sources: Lindert and Morton (1989), Macdonald (2003), Purcell and Kaufman (1993), Reinhart, Rogoff, and Savastano (2003), Suter (1992), Standard and Poor’s (various years) and authors’ calculations.  
Notes: The duration of a default spell is the number of years from the year of default to the year of resolution, be it through restructuring, repayment, or debt forgiveness. The Kolmogorov–Smirnov test for comparing the equality of two distributions rejects the null hypothesis of equal distributions at the one percent significance level.

A charitable interpretation is that crisis resolution mechanisms have improved since the bygone days of gun-boat diplomacy. After all, Newfoundland lost nothing less than her sovereignty when it defaulted on its external debts in 1936 and ultimately became a Canadian province; Egypt, among others, became a British “protectorate” following its 1876 default. A more cynical explanation points to the possibility that,

when bail-outs are facilitated by the likes of the International Monetary Fund, creditors are willing to cut more slack to their serial-defaulting clients.

The fact remains that, as Bordo and Eichengreen (2001) observe, the number of years separating default episodes in the more recent period is much lower. Once debt is restructured, countries are quick to releverage (see Reinhart, Rogoff, and Savastano, 2003, for empirical evidence on this pattern).

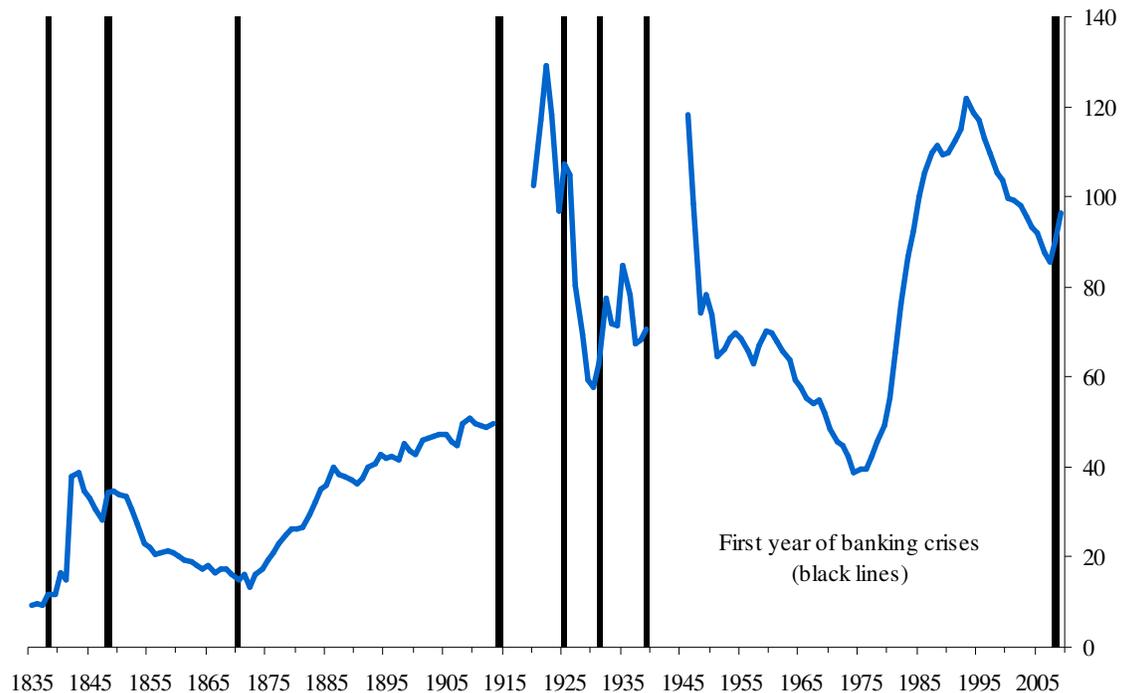
## **2. Banking crises**

***Prior to World War II, serial banking crises in the advanced economies were the norm; as the larger emerging markets developed a financial sector in the late 1800s—these economies joined the “serial banking” crisis club.*** This pattern of frequent banking crises during the 19<sup>th</sup> and early 20<sup>th</sup> centuries is illustrated with Belgium’s chronology since 1800, but is systematically documented in Reinhart and Rogoff (2009), the Chartbook.

The world’s financial centers, the United Kingdom, the United States and France stand out in this regard, with 12, 13, and 15 banking crisis episodes, respectively. The frequency of banking crises drops off markedly for both the advanced economies and the larger emerging markets post–WWII. However, all except Portugal experienced at least one post-War crisis prior to the current episode. When the present wave of crises is fully factored in, the apparent drop will likely be even less pronounced. Indeed, as discussed in Reinhart and Rogoff (2009), despite dramatic differences in recent sovereign default performance, the incidence of banking crises is about the same for advanced economies

as for emerging markets. It also should be noted that as financial markets have developed in the smaller, poorer economies, the frequency of banking crises has increased.<sup>16</sup>

**FIGURE 8.** Belgium: Central Government (domestic plus external) Debt and Banking Crises, 1835-2009 (debt as a percent of GDP)



Sources: Reinhart and Rogoff (2009) and sources cited therein.

Notes: Only systemic banking crises are shown.

*Ahead of banking crises, private debts (external debt, broader private capital inflows, domestic bank debt) also display a repeated cycle of boom and bust—the run-up in debts accelerates as the crisis nears.*

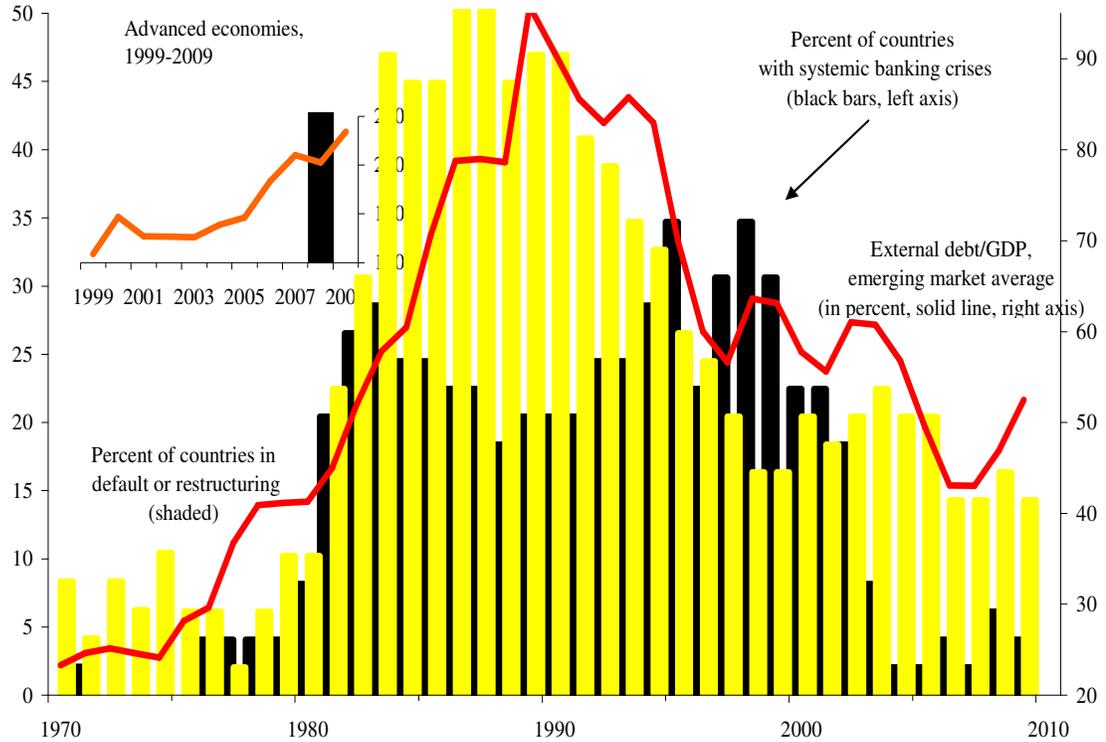
It is certainly true that having debts (public or private) is a prerequisite to default. However, what we are describing here is not a tautology. The pattern that emerges is not indicative of a gradual (linear) accumulation in debt in advance of a banking crisis or a sovereign default. Specifically, when we discuss rising debts ahead of the crisis we are

<sup>16</sup> As already acknowledged, our accounting of financial crises in poorer countries may be incomplete, especially for earlier periods, despite our best efforts.

referring to *surges* in capital inflow (bonanzas as defined in Reinhart and Reinhart, 2008) or, more generally, in any kind of debt (domestic or external). This nonlinear pattern in borrowing ahead banking and debt crises (as these often overlap) is documented in its multiple manifestations in Figures 9 through 13.

Total external debt (public plus private) of emerging markets over 1970-2009 is presented in Figure 9. The shading indicates the incidence of default while the black bars represent the incidence of systemic banking crises. The regressions (shown at the bottom of Figure 9) confirm what the visual inspection of the time series plotted in the figure suggest. Increases in external debt systematically help predict increases in the share of countries in default and the comparable share of emerging markets with systemic banking crises. The small inset in Figure 9 also depicts a similar surge in public and private external debts (comparably defined) for the 22 advanced economies in our sample over the decade leading to the global financial crisis which began with the subprime debacle in the United States in 2007. In effect, the average external debt/GDP ratio doubles during this period. The year 2008 is the advanced-economy counterpart to the years 1981 and 1998 for emerging markets, that is the years. An extensive number of episodes that are documented in the Chartbook display this “prototype” pattern. One of the most dramatic external debt buildups recorded since World War II is that of Iceland, shown in Figure 10 for the 1922-2009 period.

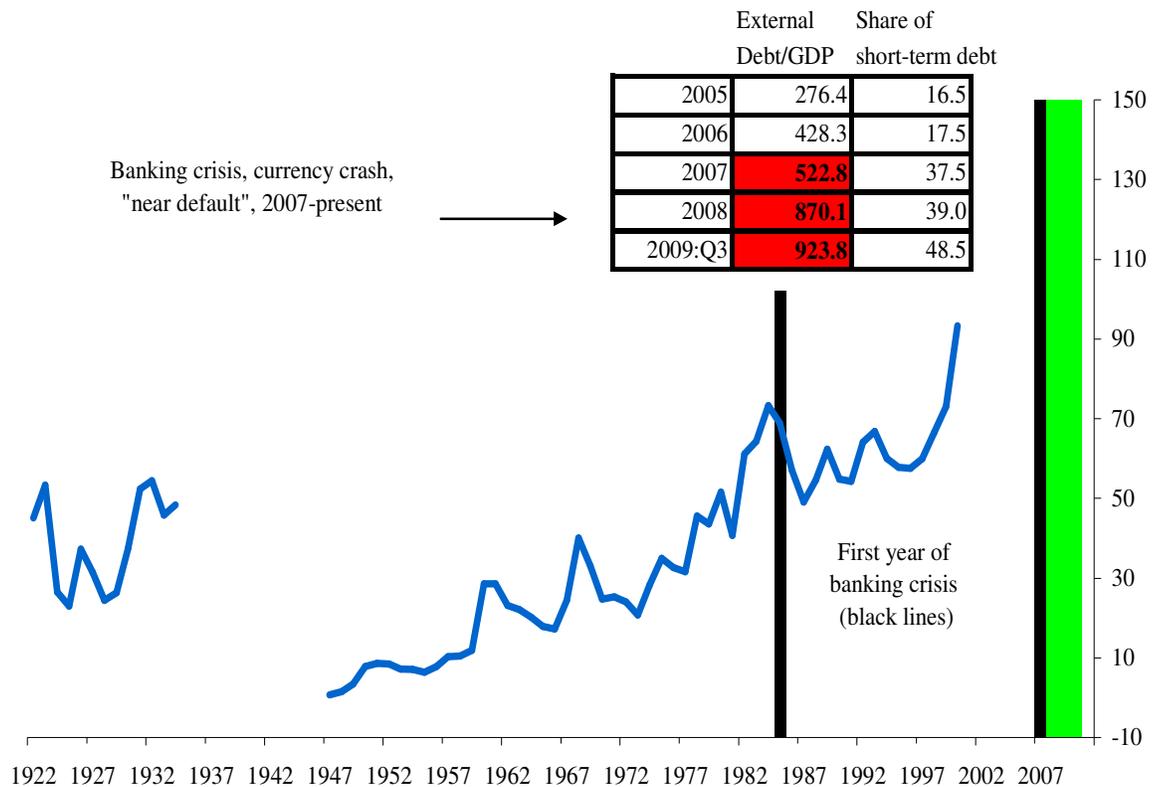
**FIGURE 9.** Gross External Debts (public and private), Sovereign Default and Systemic Banking Crises: Advanced Economies (inset only) and Emerging Markets, 1970-2009 (debt as a percent of GDP)



Dependent variable	Emerging Markets: Share of countries in default or restructuring	
Sample	1971-2009	
Independent variables	<i>OLS</i> (robusterrors)	<i>Logit</i> (robusterrors)
Emerging Markets:		
External debt/GDP (t-1)	<b>0.574</b>	<b>0.013</b>
<i>p</i> -value	<b>0.000</b>	<b>0.000</b>
Number of observations	39	39
R <sup>2</sup>	0.615	0.595
Dependent variable	Emerging Markets: Share of countries in systemic banking crises	
Sample	1971-2009	
Independent variables	<i>OLS</i> (robusterrors)	<i>Logit</i> (robusterrors)
Emerging Markets:		
External debt/GDP (t-1)	<b>0.383</b>	<b>0.007</b>
<i>p</i> -value	<b>0.000</b>	<b>0.000</b>
Number of observations	39	39
R <sup>2</sup>	0.479	0.514

Sources: Reinhart and Rogoff (2009), sources cited therein and authors' calculations.

**FIGURE 10.** Iceland: External (public plus private) Debt and Banking Crises, 1922-2009 (debt as a percent of GDP)



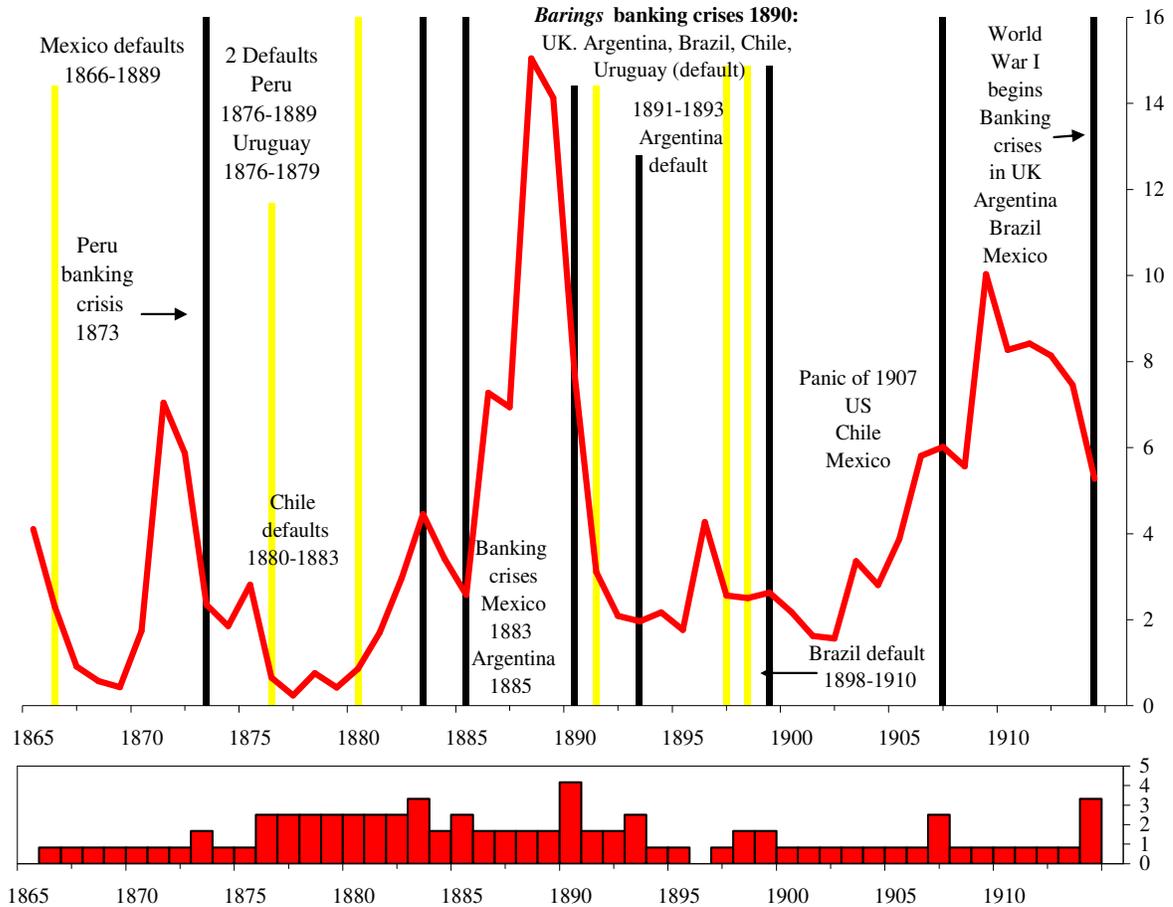
Sources: Reinhart and Rogoff (2009) and sources cited therein

In light of the preceding discussion of the time profile of external debt before, during and following debt and banking crisis, it is hardly surprising that capital flows display the boom-bonanza phase in the years prior to the crisis and the Dornbusch-Calvo-type sudden stop syndrome just before or during the year of the crisis (even in crises episodes of an earlier century and in advanced economies).<sup>17</sup> Figures 11 and 12 show public and private capital flows from the United Kingdom to Latin America and the United States, respectively, for 1865-1914. As before, the first year of a banking crisis is marked by a

<sup>17</sup>That is, capital inflows to an emerging market economy suddenly dry up as global investors shun the country, as explained in Calvo, Izquierdo, and Loo-Kung (2006), for example.

black line (bar); in the The US experience during 1865-1913, shown in Figure 12, exemplifies this behavior.

**FIGURE 11. Latin America: Private and Public Capital Inflows from the United Kingdom, Default and Banking Crises, 1865-1914**  
(capital flows as a percent of UK exports)

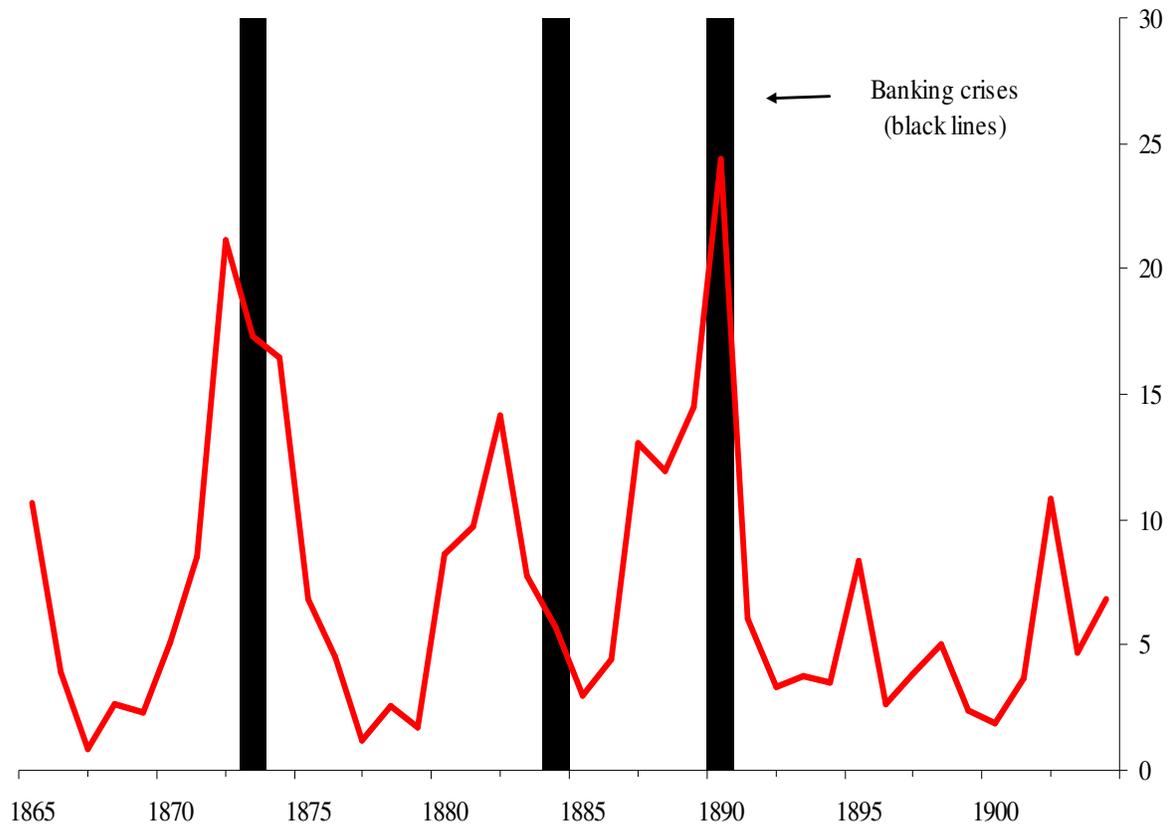


Number of new banking crises and new or ongoing defaults for:  
Argentina, Brazil, Chile, Mexico, Peru, and Uruguay, 1865-1914

Sources: Stone (1999), Reinhart and Rogoff (2009) and sources cited therein.

Notes: Only the first year of banking crises (black lines) and defaults (light line) are shown in the top panel of the figure. The bottom panel tallies the number of banking and currency crises for the six countries that are capital inflow recipients. If each of the six countries had both a banking crisis and default (new or ongoing) the sum of these would be 12; the year with the largest number of crises is 1890 during the Barings episode. Exchange rate crashes and inflation crises (which often coincide with default and banking crises) are not included in these calculations.

**FIGURE 12.** United States: Private Capital Inflows from the United Kingdom and Banking Crises, 1865-1914  
(capital flows as a percent of exports)

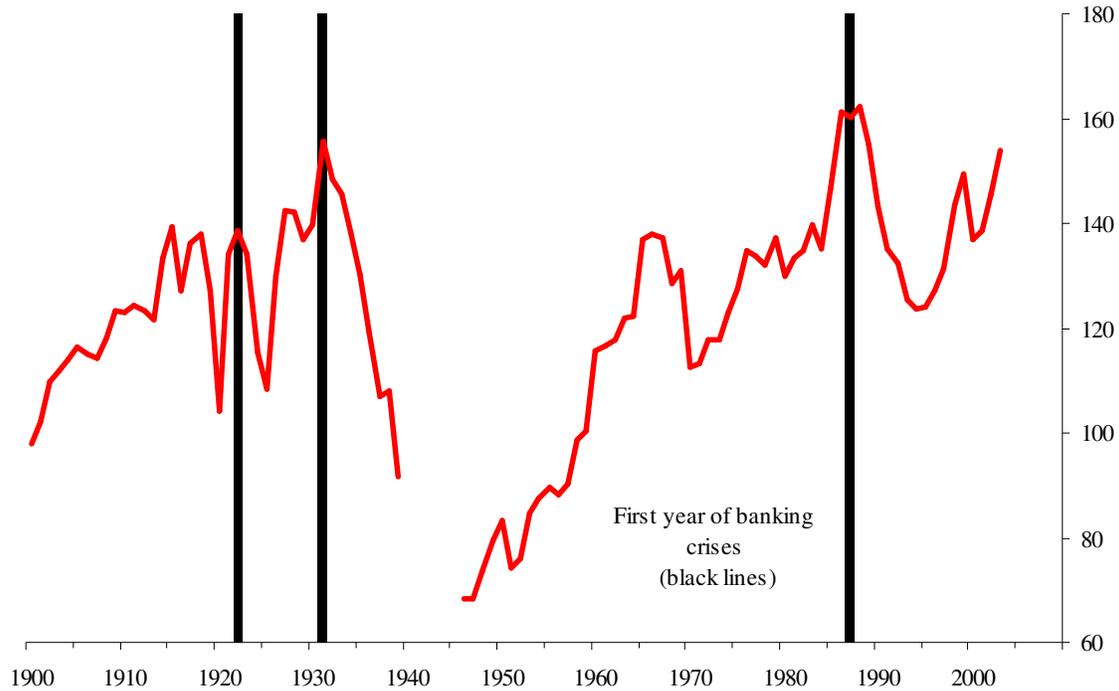


Sources: Stone (1999), Reinhart and Rogoff (2009) and sources cited therein.

Like every other measure of indebtedness that we could find, domestic credit climbs sharply prior to the banking crisis and unwinds afterward. Figure 13 provides more than one example from Norway’s banking crises. Other comparable examples populate country histories in Reinhart and Rogoff (2010a), including the buildup of household debts almost across the board in OECD countries in the years immediately prior to the eruption of the global crisis in 2007-2008. Kaminsky and Reinhart (1999) investigated the pre-banking crisis (and currency crash) runup and subsequent contraction in the domestic credit aggregates (as a percent of GDP). The most comprehensive in terms of country coverage is Mendoza and Terrones (2008), who find most booms are followed by

currency crises, banking crises or both. Their results are along the lines of the observations made here.

**FIGURE 13.** Norway: Domestic Private Credit, 1900-2004  
(Amount outstanding at year-end as a percent of GDP)



Sources: Eitrheim, Ø., K. Gerdrup and J.T. Klovland (2004), Reinhart and Rogoff (2009) and sources cited therein.

### 3. Banking and debt crises

*Banking crises most often either precede or coincide with sovereign debt crises.*

The reasons for this temporal sequence may be the contingent liability story emphasized by Diaz Alejandro (1985) and formalized in Velasco (1986), in which the government takes on massive debts from the private banks, thus undermining its own solvency.<sup>18</sup> The currency crashes that are an integral part of the “twin crisis” phenomenon documented by Kaminsky and Reinhart (1999) would also be consistent with this temporal pattern. If, as they suggest, banking crises precede currency crashes, the collapsing value of the

<sup>18</sup> See Arellano and Kocherlakota (2008) for a framework that is consistent with these dynamics.

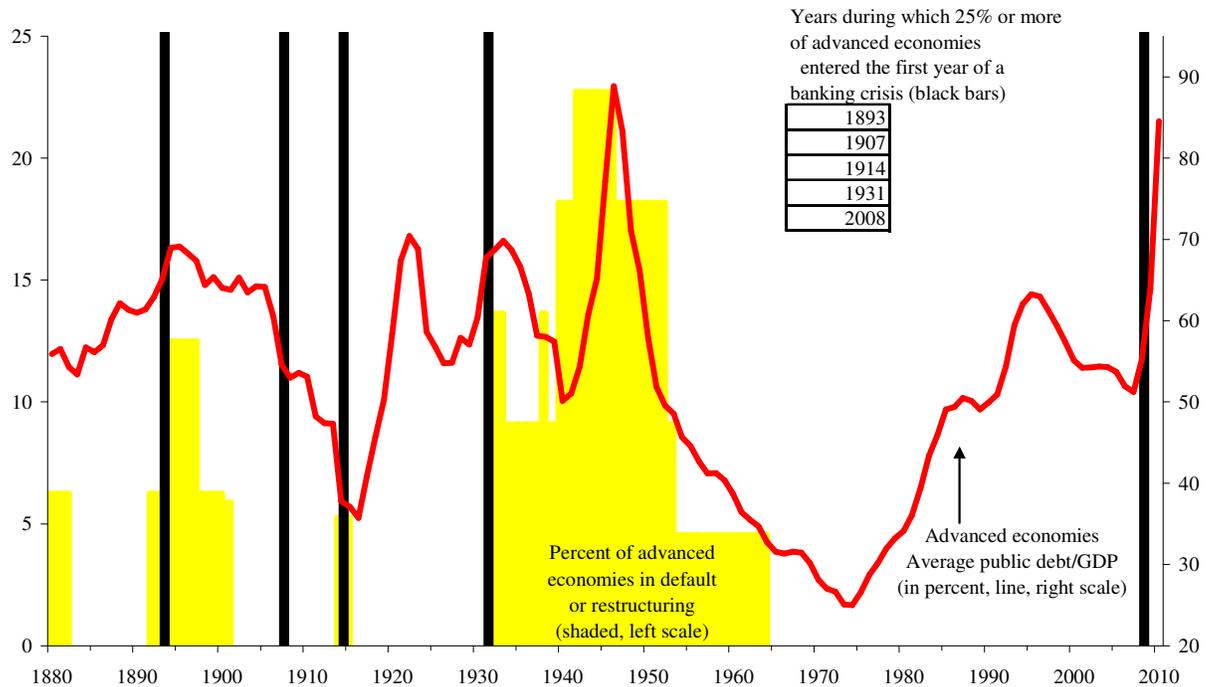
domestic currency that comes after the banking crisis begins may undermine the solvency of both private and sovereign borrower who are unfortunate enough to have important amounts of foreign currency debts.

Even absent large scale bailouts (and without counting the post-crisis new government guarantees), Reinhart and Rogoff (2009a and b) argue that, largely owing to collapsing revenues, government debts typically rise about 86 percent in the three years following a systemic financial crisis, setting the stage for rating downgrades and, in the worst scenario, default. Other possible explanations are contemplated in the next section, which reviews the theoretical literature on crises with an eye to emphasizing frameworks that are most helpful in shedding light on some of the empirical regularities described in this section.

A causal chain from sovereign debt crisis to banking crisis, perhaps obscured in these simple graphs, cannot be dismissed lightly. Financial repression and international capital controls may give the government scope to coerce otherwise healthy banks to buy government debt in significant quantities. A government default, in those circumstances, would directly impact the banks' balance sheet. The two crises may be more or less simultaneous. But even if banks are not overly exposed to government paper, the "sovereign ceiling" in which corporate borrowers are rated no higher than their national governments may make banks' offshore borrowing very costly or altogether impossible. The result would be sudden stop that could give rise to bank insolvencies either immediately or subsequently.

Ultimately, the issue of temporal precedence is an empirical one that will be discussed in more detail in Section V.

**FIGURE 14.** Sovereign Default on External Debt, Total (domestic plus external) Public Debt, and Systemic Banking Crises: Advanced Economies, 1880-2010 (debt as a percent of GDP)

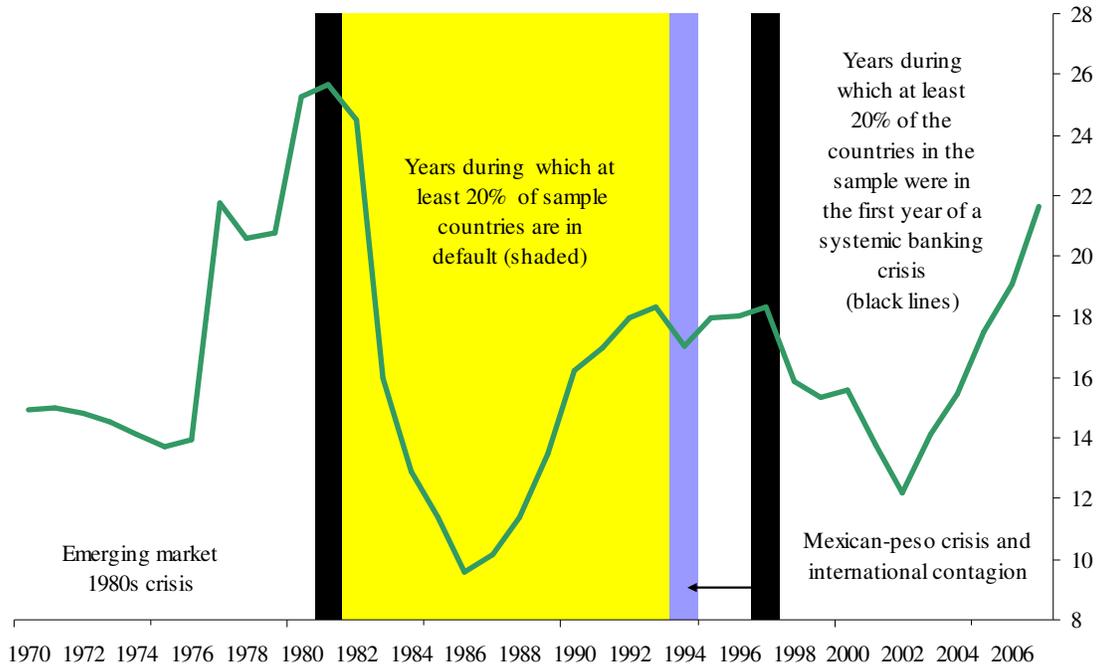


Dependent variable	Advanced Economies: Share of countries in default or restructuring	
Sample	1880-2009	
Independent variables	<i>OLS</i> (robusterrors)	<i>Logit</i> (robusterrors)
Advanced Economies:		
Public debt/GDP (t-1)	<b>0.209</b>	<b>0.002</b>
<i>p</i> -value	<b>0.000</b>	<b>0.000</b>
Number of observations	130	130
R <sup>2</sup>	0.176	0.167
Dependent variable	Advanced Economies: Share of countries in systemic banking crises	
Sample	1880-2009	
Independent variables	<i>OLS</i> (robusterrors)	<i>Logit</i> (robusterrors)
Advanced Economies:		
Public debt/GDP (t-1)	<b>0.057</b>	<b>0.002</b>
<i>p</i> -value	<b>0.002</b>	<b>0.006</b>
Number of observations	130	130
R <sup>2</sup>	0.047	0.050

*Sources:* Reinhart and Rogoff (2009), sources cited therein and authors' calculations.

*Notes:* The debt aggregates for the advanced economies and the world are simple arithmetic averages (not weighted by a country's share in world GDP) of individual countries' debt/GDP ratios. For a few countries the time series on debt and exports are much longer dating back to the first half of the 19<sup>th</sup> century than for nominal GDP. In these cases (Brazil, Canada, Egypt, India, Nicaragua, Thailand, Turkey and Uruguay) the debt/GDP series was spliced (with appropriate scaling) with the to the available debt/GDP data. The split between advanced and emerging economies is made along the present-day IMF classification, even though several countries, such as New Zealand, were "emerging markets" during most of the pre-World War I period.

**FIGURE 15.** Share of Short-term Gross External Debt (public plus private): Emerging Markets, 1970-2009 (in percent)



Sources: Reinhart and Rogoff (2009) and sources cited therein

#### 4. Observations on the composition of debts

To shed light on the maturity composition of external debt (public and private) around financial crisis in aggregate, Figure 15 plots the share of short-term debt during 1970-2009 for emerging markets, where our external debt data is most complete. The vertical lines single out years in which the incidence of banking crises (black lines) and sovereign defaults (shaded) was highest (20 percent or more of all countries were engulfed in crisis). Consistent with Diamond and Dybvig’s (1983) famous model of banking crises, *short-term debts escalate on the eve of banking crisis*; the ratio of short-term to total debt about doubles from 12 to 24 percent. A similar pattern emerges in the runup to sovereign defaults (which in this particular exercise immediately follows banking crises). Many individual crises episodes are equally, or possibly even more,

compelling; see Figure 16 on Indonesia. The small table inset in Figure 10, which shows external debt for Iceland over 1922-2009, also reveals striking increase in the share of short-term debts as the crisis approaches, rising from about 17 to 49 percent. In the march toward hyperinflation, it is not unusual to see long-term debts disappear altogether. Several episodes from the country histories (including the famous German hyperinflation of 1923-1924) corroborate this pattern. The inset to Figure 5 on the eve to hyperinflation in the late 1980s Brazil is yet another entry in this long list.

*Private debts become public debts-after the crisis.* Several examples from the debt crisis that engulfed Latin America in the early 1980s and lasted a decade are documented in various figures in the Chartbook.<sup>19</sup> Along the lines shown in Figure 15 (inset), the pre-crisis surge in indebtedness is in private sectors.

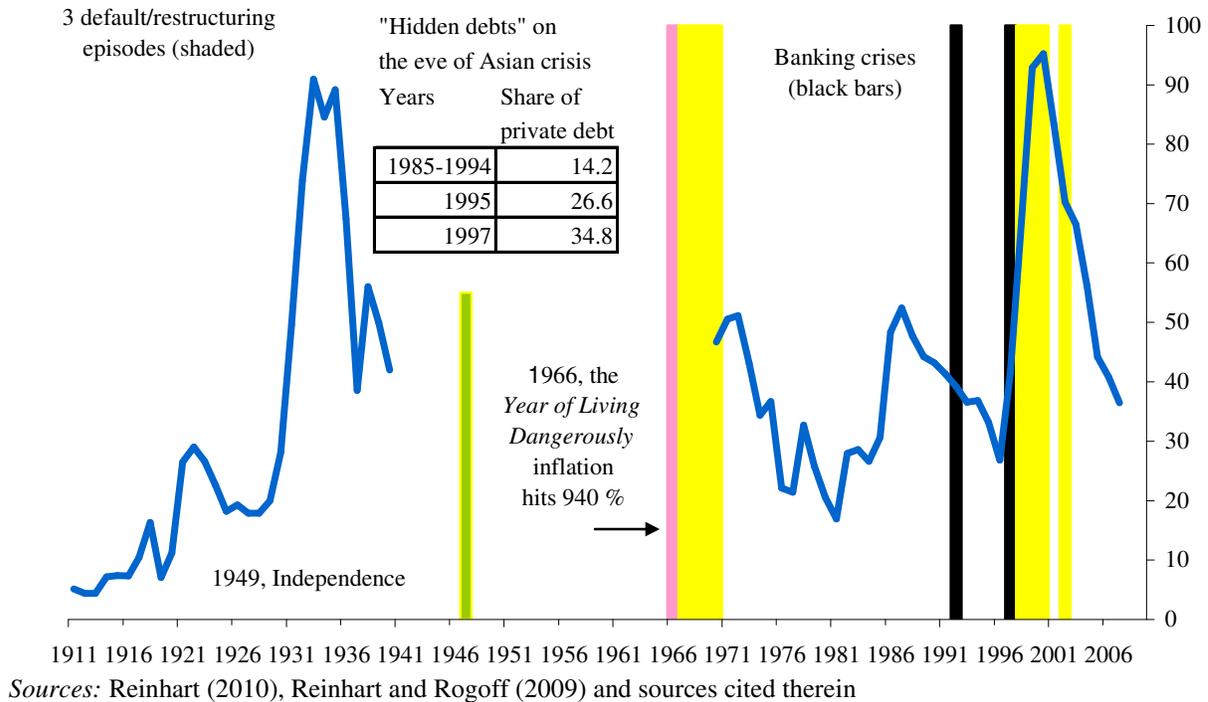
#### **IV. Theoretical Underpinnings of “This Time is Different” Syndrome**

Our results beg the question of how to explain the remarkable universality of serial default and serial financial crises across time, place, cultures, institutions and political systems. As such, the roots are almost surely buried deep in human and social behavior, in areas where modern economics has only scratched the surface. Nevertheless, existing economic theory provides important suggestive results.

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<sup>19</sup> See for instance, the experiences of El Salvador and Ecuador, in which nearly all post crisis debts were public.

**FIGURE 16.** Indonesia: Central Government (domestic plus external) Debt, Default, and Banking Crises, 1911-2009 (debt as a percent of GDP)



### 1. Multiple Equilibria Rationales

Multiple equilibrium models, and related refinements, would appear to offer an explanation of one central feature of the “This Time is Different” syndrome: it is typically much easier to identify when an economy is vulnerable to a financial crisis than to assess the probability or the timing of the collapse. The generic multiple equilibrium model is a variant of Diamond and Dybvig’s (1983) analysis of bank runs. Their analysis suggests that any entity that uses short-term borrowing to fund holdings of illiquid assets (from construction loans to future tax revenues) can be vulnerable to crises of confidence (runs). Models that explain government debt crises as arising from multiple equilibria include Sachs (1984), Calvo (1988), and Obstfeld and Rogoff (1995, ch. 6), among others. In addition to bank runs and sovereign debt crises, there is also a large literature

suggesting multiple equilibria models of inflation and exchange rate crises (e.g., Obstfeld, 1994.)

At one level, the multiple equilibria explanation of the “This Time is Different” syndrome has some very attractive features. Multiple equilibria in financial markets, especially debt markets, is fairly generic, and therefore consistent with the near universality of crises. The buildup in short term debt we observe on the eve of financial crises (perhaps to economize on interest rate costs as debt rise) is certainly consistent with a multiple equilibrium story. During the boom, politicians and investors could misinterpret a “high-trade” outcome among a set of potential equilibria as evidence of permanently changed circumstances. With such a “This Time is Different” mentality, they would not recognize that the economy has its back to a proverbial cliff, until it is too late. Moreover, sunspot triggers to such crises, as they may be related to investor confidence, could potentially hit many countries at once.

Unfortunately, multiple equilibria models have their limitations. Absent a model of the underlying sunspots, it is difficult to assess the degree of risks across different economies. True, there have been important efforts to refine multiple equilibria models to strengthen their explanatory power starting with Morris and Shin (2001), but the results can be sensitive to difficult-to-confirm underlying assumptions, such as the importance of public relative to private information.

## ***2. Short term biases the allow crisis risks to build up***

But even setting aside the difficulty of testing or applying multiple equilibrium models of financial crises, they beg the deeper question of why politicians, regulators, and indeed voters, do not take steps to reduce their economy’s vulnerability. Why don’t

the politicians who take on huge foreign debt burdens better incorporate the long-term risks to stability and growth? Why, as debt burdens grow, do politicians prefer to shift borrowing to shorter maturities (to save on interest payments) rather than promote early adjustment to reduce risk of catastrophe? Why is regulation so often pro-cyclical when towards the end of a boom when it should be obvious that financial regulation typically needs to become stricter not easier? If economies with high levels of short-term debt are particularly vulnerable, why do governments sometimes seem to adopt tax and financial policies that seem to promote it?

Although it does not address the exact question here, there is certainly an important political economy literature on debt bias. For example, Alesina and Tabellini (1989) as well as Persson and Tabellini (1990) develop models where incumbents tend to run large deficits essentially because the temporary nature of their term in office raises their effective discount rate. In a related approach, Amador (2008) argues that contemporaneous competition by different interest groups can lead to a “tragedy of the commons” situation in which short term expenditures are favored at the expense of longer term fiscal sustainability. Amador (2002), building on Laibson (1997), shows how politicians’ limited horizons can fundamentally change the market for sovereign debt. Recent quantitative analyses of sovereign default, including for example Aguiar and Gopinath (2006), suggest that high discount rates for governments are a key element of any cogent explanation of the borrowing and default cycle.

Other political economy factors can also be important in explaining short-termism in financial governance, as we argued in Reinhart and Rogoff (2009). During a boom, the financial sector becomes richer and more influential. Often the result is reduced

regulation that raises the financial sector's profitability at the expense of greater crisis risk for society as a whole.

### ***3. Hidden debt***

Our results here, as well a plethora of vivid examples from the accompanying chartbook suggest that more attention needs to be paid to “hidden debt and liabilities.” In a crisis, government debt burdens often come pouring of out the woodwork, exposing solvency issues about which the public seemed blissfully unaware. One important example is the way governments routinely guarantee the debt of quasi-government agencies that may be taking on a great deal of risk, most notably as was the case of the mortgage giants Fannie Mae and Freddie Mac in the United States. Indeed, in many economies, the range of implicit government guarantees is breathtaking. As we emphasize in Reinhart and Rogoff (2009 and 2010), many governments find in a crisis that they are forced to deal not only with their external debts (owed to foreigners) but those of private domestic borrowers as well. Famously, Thailand (1997), just prior to its financial crisis, kept hidden its massive forward exchange market interventions that ultimately led to huge losses. Even for plain vanilla government debt, governments rarely make it easy to obtain the kind of time series data one would require to meaningfully assess vulnerability (Reinhart and Rogoff, 2009). Hidden debt has loomed large in many sovereign defaults over history. At the time of this writing one only has to read the debacle in the financial press concerning Greece's hidden debts conveniently facilitated by its underwriter Goldman Sachs. For many more comparable examples, the interested reader is referred to Winkler (1933).

In principle, of course, lenders should realize the huge temptation for borrowers to hide the true nature of their balance sheet. Private information on debt can, in principle, be incorporated into models.<sup>20</sup> However, the many different margins on which governments can cheat are a significant complicating factor. In any event, the importance of hidden debt in many financial crises suggests further work is need to better understand its role in the “This time is different” syndrome.

#### ***4. Further models of leverage and behavior***

Our list of potential crisis models is far from complete. For example, Fostel and Geanakoplos’s (2008) analysis of leverage cycles is another potentially promising avenue of research.

Even taking together all these promising strands of the political economy and financial crisis literature, one suspects there are still large gaps in our understanding of the arrogance and ignorance that underlie most financial crises—to reiterate a reading of Winkler (1933) is highly recommended. The ignorance, of course, stems from the belief that financial crises happen to other people at other times in other places. Outside a small number of experts, few people fully appreciate the universality of financial crises. The arrogance is of those who believe they have figured out how to do things better and smarter so that the boom can long continue without a crisis.<sup>21</sup> Here modern behavioral economics can hopefully contribute new perspectives. For example, Kahneman, Slovic and Tversky (1982) provides examples of overconfidence in the sense of underestimating the variability of future shocks. Such false confidence could lead agents to hold insufficient buffer stocks of assets, or equivalently, to hold too much debt. Alternatively,

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<sup>20</sup> An early attempt to model borrowing when lenders do not know aggregate debt is Kletzer (1984).

<sup>21</sup> See Reinhart and Rogoff (2009), ch. 1 for examples of “This Time is Different” mentality over the ages.

leaders and votes may simply be overconfident (for example, as suggested by Camerer and Lovallo, 1999.)<sup>22</sup> We do not pretend to be able to synthesize all these diverse literatures, but clearly the “This Time is Different Syndrome” is an extremely important phenomenon (a “hardy perennial,” as Kindelberger would remark about financial crises) that needs further clarification and study.

### **V. Debt, Banking Crises and Default: Cross-country Evidence**

In Section III, we presented evidence based on both cross-country aggregates and individual country histories that suggested a strong connection between debt cycles and economic crises. Specifically, we noted that: (i) public debts rise markedly as a sovereign debt crisis draws near; (ii) private debts exhibit a similar nonlinear build-up ahead of banking crises; and (iii) public debts may or may not contribute to the pre-crisis surge in indebtedness on the eve of banking crises. Furthermore, banking and debt crises often occur simultaneously (or in close proximity of one another) and, more often than not, banking crises anticipate (temporally preceded) debt crises.

In this section, we investigate these postulated relationships more systematically. We also test the hypothesis that systemic financial crises in global financial centers (the United Kingdom and the United States) potentially increase the odds of a banking crisis, debt crisis, or both in other countries. Our rich panel data spans 70 advanced and emerging economies over a period of more than 200 years (1800-2009). The full sample includes 290 banking crises and 209 sovereign default episodes; there are a total of about 14,700 observations. Recognizing that a sample that stretches over such a long horizon is

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<sup>22</sup> The authors are grateful to David Laibson for suggesting these references.

bound to be riddled with structural change, we are careful to reexamine the relationships of interest over several subperiods.

### ***1. Banking and debt crises: Temporal patterns***

The causal direction between banking and debt crises can potentially run in either or both directions. As noted earlier, the prevalent pattern emerging from the country histories appears to suggest that banking crises come before the debt crisis. The causality tests employed here mimic the spirit of the standard vector autoregression (VAR) setup. Both variables (banking and debt crises dummies) are treated as potentially endogenous, which can be explained (or not) by its own lagged values and the lagged values of the second variable. We include as additional (exogenous) regressors the financial crisis dummy for the global financial center and allow the intercept to vary depending on whether the country is advanced or an emerging market.

The first twist to the standard VAR is that both variables are dichotomous, so our preferred method of estimation is a multinomial logit; the second twist is that to reduce collinearity rather than include multiple lagged terms, we use a single lag of a three-year backward looking moving average. Hence, our simple two-equation system is given by,

$$(1) \quad DC_t = \beta_k + \beta_{11} DC_{t-1 \text{ to } t-3} + \beta_{12} BC_{t-1 \text{ to } t-3} + \beta_{13} FC_t + u_{1t}$$

$$(2) \quad BC_t = \beta_k + \beta_{21} DC_{t-1 \text{ to } t-3} + \beta_{22} BC_{t-1 \text{ to } t-3} + \beta_{23} FC_t + u_{2t}$$

where  $BC_t$ , and  $DC_t$  are dummy variables that take on a value of one in the *first year* of a domestic banking crisis and the first year of a sovereign debt crisis, respectively.

$BC_{t-1 \text{ to } t-3}$ , and  $DC_{t-1 \text{ to } t-3}$  are three-year moving averages of the two crises variables,

$\beta_k$ ,  $k = AE, EM$  is the intercept term for advanced economies (*AE*) and emerging markets (*EM*). The financial center crisis is given by  $FC_t$  and  $u_{1t}$  and  $u_{2t}$  are the error terms.

Variations of the model presented in (2) that restrict the intercept to be the same for all countries, that allow the intercept to vary by region, incorporate a fixed effect for all 70 countries were also estimated but were not reported to conserve space.<sup>23</sup> In addition to logit, (1)-(2) were estimated using OLS and OLS with robust errors. The results described in what follows were consistent across specifications and estimation strategies.

Table 4 reports the results for the specification given by (1)-(2) for the full sample (1804-2009), 1900-2009, and 1947-2009.<sup>24</sup> Significant coefficients are shown in bold italics (*p*-values) are reported in all cases. The main results, irrespective of which sample period or estimation strategy is selected, is that systemic banking crises in financial centers help explain domestic banking crises and domestic banking crises help explain sovereign default.

## ***2. Public and external debt, default and banking crises***

Beyond the causal pattern between the three dichotomous events considered, we now include as a regressor in equations (1) and (2) a debt/GDP measure. For the longer sample, it is total public debt (domestic plus external)  $PD_{Y_t}$ ; for the post-1970 period we also consider external (public plus private debt) for the emerging market sub-group,

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<sup>23</sup> We also estimated the same model for the full crisis period—rather than the first year only. The main result was that the lagged dependent variables came in significant; this is hardly surprising in light of the fact that both banking and debt crises are mostly multi-year phenomenon.

<sup>24</sup> Other subsamples are available from the authors upon request.

$ED_{Y_{EMt}}$ . In all cases, we consider the change in the relevant debt/GDP ratio,  $\Delta PD_{Y_t}$ ; from ( $t$  to  $t-2$ ).

Adding the public debt variable does not alter any of the aforementioned temporal patterns. Banking crises in financial centers are still significant in the domestic banking crisis equation, as Table 5 highlights. Debt crises remain statistically insignificant. The three-year change in public debt/GDP only enters the banking crisis equation significantly for the most recent 1947-2009 subsample. In effect, on the basis of a careful review of the country histories that connect banking crises to surges in private debt—these results are not surprising.

Turning to the debt crisis equation, domestic banking crises continue to be a significant predictor of debt crises, while crises in the financial center have no direct independent effect (obviously, there is an indirect link through systematic relationship with domestic banking crises). Surges in public debt, have the significant expected positive effect on the likelihood of default, although it appears that the relationship is somewhat weaker for the 1947-2009 subsample.

External (public and private) debt for the period over which this data is available (1970-2009) significantly increases the chances of a banking crisis but had no systematic direct impact on the probability of default, which continues to depend significantly on whether there is a banking crisis or not.

**TABLE 4.** Temporal Patterns of Banking Crises and Sovereign Default: Multinomial Logit (robusterrors) Alternative Specifications, Panel Data

<b>Do sovereign defaults and banking crises in financial centers anticipate domestic banking crises?</b>			
Dependent variable:	First year of a banking crisis		
Explanatory variables:	Sample period		
	1824-2009	1900-2009	1946-2009
Banking crisis (t-1 to t-3)	0.251	-0.092	-0.383
<i>p</i> -value	0.237	0.892	0.276
Default (t-1 to t-3)	-0.753	-0.327	-0.315
<i>p</i> -value	0.708	0.441	0.417
Financial center crisis (t to t-2)	<b>3.320</b>	<b>4.238</b>	<b>3.749</b>
<i>p</i> -value	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Advanced economy intercept	-3.834	-3.616	-4.030
<i>p</i> -value	0.000	0.000	0.000
Emerging market intercept	-4.245	-3.935	-3.720
<i>p</i> -value	0.000	0.000	0.000
Number of observations	13,206	7,810	4,473
Number of positive observations	281	212	128
R <sup>2</sup>	0.060	0.080	0.052

<b>Do domestic banking crises and banking crises in financial centers anticipate sovereign defaults?</b>			
Dependent variable:	First year of a default		
Explanatory variables:	Sample period		
	1824-2009	1900-2009	1947-2009
First year of a banking crisis (t-1 to t-3)	<b>2.663</b>	<b>2.510</b>	<b>2.754</b>
<i>p</i> -value	<b>0.000</b>	<b>0.000</b>	<b>0.001</b>
Default (t-1 to t-3)	0.542	0.560	1.097
<i>p</i> -value	0.064	0.000	0.000
Financial center banking crisis (t to t-2)	0.967	0.767	-1.470
<i>p</i> -value	0.102	0.176	0.176
Advanced economy intercept	-5.480	-6.441	--
<i>p</i> -value	0.000	0.000	--
Emerging market intercept	-4.241	-4.047	-4.022
<i>p</i> -value	0.000	0.000	0.000
Number of observations	13,206	7,810	4,473
Number of positive observations	203	140	92
R <sup>2</sup>	0.043	0.070	0.051

**TABLE 5. Public Debt, Banking Crises, and Sovereign Default: Multinomial Logit (robusterrors) Alternative Specifications, Panel Data**

Dependent variable:	First year of a banking crisis		
Explanatory variables:	Sample period		
	1824-2009	1900-2009	1946-2009
Banking crisis (t-1 to t-3)	-1.882	-1.837	-1.994
<i>p</i> -value	0.016	0.034	0.083
Default (t-1 to t-3)	-1.600	-1.866	-01.210
<i>p</i> -value	0.145	0.111	0.336
Financial center crisis (t to t-2)	<b>4.431</b>	<b>4.238</b>	<b>3.510</b>
<i>p</i> -value	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
$\Delta$ Public debt/GDP (t to t-2)	0.003	0.003	<b>0.003</b>
<i>p</i> -value	0.127	0.069	<b>0.050</b>
Advanced economy intercept	-3.554	-3.541	-4.030
<i>p</i> -value	0.000	0.000	0.000
Emerging market intercept	-3.586	-3.530	-3.720
<i>p</i> -value	0.000	0.000	0.000
Number of observations	5,986	4,931	3,343
Number of positive observations	221	181	116
R <sup>2</sup>	0.060	0.080	0.052
Dependent variable:	First year of a default		
Explanatory variables:	Sample period		
	1824-2009	1900-2009	1947-2009
Banking crisis (t-1 to t-3)	<b>1.909</b>	<b>1.978</b>	<b>2.680</b>
<i>p</i> -value	<b>0.012</b>	<b>0.001</b>	<b>0.003</b>
Default (t-1 to t-3)	1.406	0.560	1.097
<i>p</i> -value	0.113	0.000	0.000
Financial center crisis (t to t-2)	0.902	0.767	-1.218
<i>p</i> -value	0.102	0.176	0.075
$\Delta$ Public debt/GDP (t to t-2)	<b>0.004</b>	<b>0.003</b>	0.003
<i>p</i> -value	<b>0.025</b>	<b>0.028</b>	0.090
Advanced economy intercept	-6.576	-7.261	--
<i>p</i> -value	0.000	0.000	--
Emerging market intercept	-3.823	-3.781	-4.022
<i>p</i> -value	0.000	0.000	0.000
Number of observations	5,986	4,931	3,343
Number of positive observations	104	95	72
R <sup>2</sup>	0.042	0.070	0.051

**TABLE 6.** External Debt, Banking Crises, and Sovereign Default: Multinomial Logit (robust errors), Panel Data

Explanatory variables:	1974-2009	
	Dependent Variable: First year of a	
	Banking crisis	Default
Banking crisis (t-1 to t-3)	0.218	0.004
<i>p</i> -value	0.000	0.391
Default (t-1 to t-3)	-0.042	0.018
<i>p</i> -value	0.115	-0.051
Financial center crisis (t to t-2)	<b>0.781</b>	<b>-0.051</b>
<i>p</i> -value	<b>0.016</b>	<b>0.004</b>
External debt/GDP (t-1)	<b>0.001</b>	0.001
<i>p</i> -value	<b>0.000</b>	0.152
Intercept	0.060	0.043
<i>p</i> -value	0.000	0.000
Number of observations	1,496	1,496
Number of positive observations	85	55
R <sup>2</sup>	0.295	0.012

## V. Concluding observations

Our analysis has documented some of the links between public and private debt cycles and the recurrent pattern of banking and sovereign debt crises over the past two centuries. Banking crises are importantly preceded by rapidly rising private indebtedness. But banking crises (even those of a purely private origin) directly increase the likelihood of a sovereign default in their own right (according to our findings) and indirectly as public debts surge. There is little to suggest in this analysis that these debt cycles and their connections with economic crises have changed appreciably over time.

## References

Aguire, Mark and Gita Gopinath, "Emerging Market Business Cycles: The Cycle is the Trend," *Journal of Political Economy* 115, 2007.

Alesina, Alberto and Guido Tabellini, "A Positive Theory of Fiscal Deficits and Government Debt," *Review of Economic Studies* 57, 1990, 403-414.

Amador, Manuel, "A Political Theory of Sovereign Debt," mimeo, Stanford University, 2002.

Amador, Manuel, "Sovereign Debt and the Tragedy of the Commons," mimeo, Stanford University, 2008.

Bordo, Michael, Barry Eichengreen, 1999. "Is Our Current International Economic Environment Unusually Crisis Prone?" Prepared for the Reserve Bank of Australia Conference on Private Capital. Sydney. August.

Bordo, Michael, Barry Eichengreen, Daniela Klingebiel, Maria Soledad Martinez-Peria, "Is the Crisis Problem Growing More Severe?" *Economic Policy* 16, April 2001, 51–82.

Cagan, Philip, "The Monetary Dynamics of Hyperinflation," in Milton Friedman, ed. *Studies in the Quantity Theory of Money* (University of Chicago Press, 1956), 25–117.

Calvo, Guillermo, "Servicing the Public Debt: The Role of Expectations," *American Economic Review* 78 (September): 647-661.

Camerer, Colin and Dan Lovallo, "Overconfidence and Excess Entry: An Experimental Approach," *American Economic Review* vol. 1, no. 1, March 1999, 306-318.

Caprio, Gerard and Daniela Klingebiel, Luc Laeven and Guillermo Noguera, "Banking Crisis Database." In Patrick Honohan and Luc Laeven (eds.), *Systemic Financial Crises*, Cambridge: Cambridge University Press, 2005.

Diamond, Douglas and Philip H. Dybvig, "[Bank Runs, Deposit Insurance, and Liquidity](#)," *Journal of Political Economy* 91(3): 401-19, June 1983.

Eichengreen, Barry, *Golden Fetters The Gold Standard and the Great Depression 1919–1939*, (New York: Oxford University Press, 1992).

Eichengreen, Barry, and Peter H. Lindert, eds., *The International Debt Crisis in Historical Perspective* (Cambridge: MIT Press, 1989).

Flandreau, Marc and Frederic Zumer, *The Making of Global Finance, 1880-1913*, (Paris: OECD, 2004.)

Fostel, Ana and John Geanakoplos, "Leverage Cycles and the Anxious Economy," *American Economic Review* 98 (4): 1211-1244.

Frankel, Jeffrey A., and Andrew K. Rose, Currency Crashes in Emerging Markets: An Empirical Treatment, *Journal of International Economics* 41, November 1996, 351–368.

Friedman, Milton, and Anna Jacobson Schwartz, *A Monetary History of the United States 1867–1960*, (Princeton: Princeton University Press, 1963).

Gopinath, Gita, and Mark Aguiar, "Defaultable Risk, Interest Rates and the Current Account," *Journal of International Economics* 69 vol 1 (June 2006).

Jeanne, Olivier, "Debt Maturity and the International Financial Architecture," *American Economic Review* forthcoming, 2010.

Kahneman, Daniel, Paul Slovic and Amos Tversky, *Judgment under Uncertainty: Heuristics and Biases*, Cambridge University Press, 1982.

Kaminsky, Graciela L. and Carmen M. Reinhart, "The Twin Crises: The Causes of Banking and Balance of Payments Problems," *American Economic Review*, Vol. 89 No. 3, June 1999, 473–500.

Kindleberger, Charles P., *Manias, Panics and Crashes: A History of Financial Crises* (New York: Basic Books, 1989).

Kletzer, Kenneth M., "Asymmetries of Information and LDC Borrowing with Sovereign Risk," *The Economic Journal*, Vol. 94, No. 374 (Jun., 1984), pp. 287-307.

Laibson, David, "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics* 112 (May 1997), 443-477.

Lazaretou, Sophia (2005) "Greek Monetary Economics in Retrospect: The Adventures of the Drachma," *Economic Notes by Banca Monte dei Paschi di Siena* Vol. 34, No. 3, 331–370.

Lindert, Peter H. and Peter J. Morton, "How Sovereign Debt Has Worked," in Jeffrey Sachs, ed., *Developing Country Debt and Economic Performance, Vol. 1* (University of Chicago Press), 39–106.

Morris, Stephen, and Hyun Song Shin, "Rethinking Multiple Equilibria in Macroeconomic Modelling," in Kenneth Rogoff and Ben S Bernanke (eds.) *NBER Macroeconomics Annual 2000* (Cambridge, National Bureau of Economic Research).

Mendoza, Enrique G. and Marco E. Terrones (2008). "An Anatomy of Credit Booms: Evidence from macro Aggregates and Micro Data, NBER Working Paper 14049, May.

Obstfeld, Maurice, "The Logic of Currency Crises," *Cahiers Economiques et Monétaires* 43:189-213.

Obstfeld, Maurice and Kenneth Rogoff, *Foundations of International Economics*, MIT Press, 1995.

Persson, Torsten, and Lars Svensson, "Why a Stubborn Conservative would run a Deficit: Policy with Time-Inconsistent Preferences," *Quarterly Journal of Economics* vol 104, May 1989, 325-345.

Purcell, John F. H., and Jeffrey A. Kaufman, *The Risks of Sovereign Lending: Lessons from History*, (New York: Salomon Brothers, 1993).

Reinhart, Carmen M., “This Time is Different Chartbook: Country Histories on Debt, Default, and Financial Crises,” NBER Working Paper, (February 2010).

Reinhart, Carmen M., Kenneth S. Rogoff, and Miguel A. Savastano, “Debt Intolerance,” *Brookings Papers on Economic Activity*, Vol.1, Spring 2003, 1–74.

Reinhart, Carmen M., and Kenneth S. Rogoff, “The Modern History of Exchange Rate Arrangements: A Reinterpretation” *Quarterly Journal of Economics*, Vol. CXIX No. 1, February 2004, 1–48.

Reinhart, Carmen M., and Kenneth S. Rogoff, “This Time is Different: A Panoramic View of Eight Centuries of Financial Crises”, NBER Working Paper 13882, March 2008a.

Reinhart, Carmen M., and Kenneth S. Rogoff, “Domestic Debt: The Forgotten History,” NBER Working Paper 13882, March 2008b.

Rodrik, Dani and Andres Velasco, "Short-Term Capital Flows," in Annual World Bank Conference on Development Economics April 2000.

Sachs, Jeffrey, *Theoretical Issues in International Borrowing*, Princeton Studies in International Finance 54, Princeton University, Princeton New Jersey.

Suter, Christian, *Debt Cycles in the World-Economy: Foreign Loans, Financial Crises, and Debt Settlements, 1820–1990* (Boulder: Westview Press, 1992).

Tomz, Michael, *Reputation and International Cooperation, Sovereign Debt Across Three Centuries*, (Princeton: Princeton University Press, 2007).

Winkler, Max, *Foreign Bonds: An Autopsy*, (Philadelphia: Roland Sway Co., 1933).

Wynne, William H., *State Insolvency and Foreign Bondholders: Selected Case Histories of Governmental Foreign Bond Defaults and Debt Readjustments* Vol. II (London: Oxford University Press, 1951).

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APPENDIX TABLE 1. DEBT GLOSSARY

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**External Debt:** 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 to international law (for multilateral credits).

**Total government debt (total public debt):** total debt liabilities of a government with both domestic and foreign creditors. The “government” normally comprises the central administration, provincial governments, federal governments and all other 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 or the currency denomination of the debt (therefore it includes *government foreign currency domestic debt*, as defined below). Terms of the debt contracts can be market determined or set unilaterally by the government.

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

**Central bank debt:** Not usually included under government debt (despite the fact that it usually carries an implicit government guarantee). Central banks usually issue such debt to facilitate open market operations (including sterilized intervention). Such debts may be denominated in either local or foreign currency.

**Domestic debt:** liabilities of the public and private sector under domestic law. These are comprised of government domestic debt (see above) and private debts, which for most countries in our sample are dominated by debts of households and firms contracted through domestic banking institutions. In our analysis we do not include data on non bank domestic debts (i.e. domestic corporate bonds and commercial paper).

**Hidden debt:** This is **not** an accounting definition as in previous categories of debt. Hidden debt includes contingent liabilities of the government these could be (i) explicit guarantees (in which case they are not entirely hidden). While we have not come across any public debt time series that quantify such guarantees, more recent measures of government guarantees are now published under the International Monetary Funds Standard Data Dissemination System (SDDS) framework; (ii) implicit guarantees which could extend to all kinds of private sector debts. (iii) Debts of the central bank (see above). (iv) Off-balance sheet debts that arise from transactions in derivative markets. (v) Last, but not least, any liability of the government not included in official debt statistics (thus official statistics would understate true public sector indebtedness) not already included in (i)-(iv) above. After all, if we knew what these debts were, they would not be hidden. (see discussion in Section IV)

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Appendix Table 2. Countries, Regions, and Year of Independence

Country	Year of Independence If post 1800	Country	Year of Independence If post 1800
<b>Africa</b>		<b>Latin America</b>	
Algeria	1962	Argentina	1816
Angola	1975	Bolivia	1825
Central Africa Republic	1960	Brazil	1822
Cote D'Ivoire	1960	Chile	1818
Egypt	1831	Colombia	1819
Ghana	1957	Costa Rica	1821
Kenya	1963	Dominican Republic	1841
Mauritius *	1968	Ecuador	1830
Morocco	1956	El Salvador	1821
Nigeria	1960	Guatemala	1821
South Africa	1910	Honduras	1821
Tunisia	1591/1957	Mexico	1821
Zambia	1964	Nicaragua	1821
Zimbabwe	1965	Panama	1903
<b>Asia</b>		Paraguay	1811
China		Peru	1821
Hong Kong *		Uruguay	1811
India	1947	Venezuela	1830
Indonesia	1949	<b>North America</b>	
Japan		Canada	1867
Korea *	1945	United States	
Malaysia *	1957	<b>Oceania</b>	
Myanmar	1948	Australia	1901
Philippines	1947	New Zealand	1907
Singapore *	1965		
Taiwan *	1949		
Thailand *			
<b>Europe</b>			
Austria			
Belgium *	1830		
Denmark *			
Finland *	1917		
France			
Germany			
Greece	1829		
Hungary	1918		
Iceland	1918		
Ireland	1921		
Italy	1569		
Netherlands *			
Norway *	1905		
Poland	1918		
Portugal			
Romania	1878		
Russia			
Spain			
Sweden			
Switzerland			
Turkey			
United Kingdom			

Sources: *Correlates of War* (2007).