From Financial Crash to Debt Crisis[†]

By Carmen M. Reinhart and Kenneth S. Rogoff*

Newly developed historical time series on public debt, along with data on external debts, allow a deeper analysis of the debt cycles underlying serial debt and banking crises. We test three related hypotheses at both "world" aggregate levels and on an individual country basis. First, external debt surges are an antecedent to banking crises. Second, banking crises (domestic and those in financial centers) often precede or accompany sovereign debt crises; we find they help predict them. Third, public borrowing surges ahead of external sovereign default, as governments have "hidden domestic debts" that exceed the better documented levels of external debt. (JEL E44, F34, F44, G01, H63, N20)

The economics profession has an unfortunate tendency to view recent experience in the narrow window provided by standard datasets.[1] It is particularly distressing that so many cross-country analyses of financial crises rely on debt and default data going back only to 1980, when the underlying cycle can be a half century or more long, not just 30 years.[2]

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.[3] To construct our dataset, we build on the work of many scholars as well as a considerable amount of new material from diverse primary and secondary sources. The data covers 70 countries in Africa, Asia, Europe, Latin America, North America, and Oceania.[4] The range of variables encompasses external and domestic debt, trade, GNP, inflation, exchange rates, interest rates, and commodity prices.[5] Our analysis spans over two centuries, going back to the date of independence or well into the colonial period for some countries.

[1]That is why an exception such as Milton Friedman and Anna Jacobson Schwartz's (1963) monumental monetary history of the United States still resonates almost one-half century after publication.

[2]For a longer perspective on crises, see the work of Michael Bordo, Barry Eichengreen, Peter H. Lindert and Peter J. Morton, and Moritz Schularick and Alan M. Taylor (2009).

[3]This is the first formal application of the core dataset described in Reinhart and Rogoff (2009a), and the scope of the dataset has been expanded significantly as well.

[4]See Appendix Table A1 for the full list of countries.

[5]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.

Exploiting the multicentury span of the data, we study the 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. We test three related hypotheses at both "world" aggregate levels and on an individual country basis. *First*, external debt surges are a recurring antecedent to banking crises. *Second*, banking crises (both domestic and those emanating from international financial centers) often precede or accompany sovereign debt crises. Indeed, we find they help predict them. *Third*, public borrowing surges ahead of an external sovereign debt crisis, as governments often have "hidden debts" that far exceed the better documented levels of external debt. These hidden debts include domestic public debt (which was largely undocumented prior to our data) and private debt that becomes public (and publicly known) as the crisis unfolds.[6] 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.[7]

This paper is organized as follows. Section I describes our approach toward cataloging, dating, and connecting the various manifestations of economic crises. Here we define the key concepts in our analysis: serial default and the "this time is different" syndrome. Section II presents the big picture on global cycles of debt, financial crises and sovereign debt crises. We use representative country histories to elaborate on and complement some of the patterns seen in the global aggregates. The robustness of the descriptive analysis is grounded in a related Chartbook[8] that spans more than two centuries of data and documents the crisis experience and debt history of *each and every one* of the 70 countries that make up our sample. We emphasize 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 III 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 IV complements the descriptive big-picture analysis in Section II 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 run-up to sovereign debt and financial crises.

I. 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

---

[6] Quantifying public contingent liabilities is beyond the scope of this paper.

[7] This is closely related to the themes in Dani Rodrik and Andres Velasco (2000).

[8] See Reinhart (2010), "This Time Is Different Chartbook: Country Histories on Debt, Default, and Financial Crises," which henceforth will be referred to as the Chartbook.

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

A. *Inflation*, *Hyperinflation*, *and Currency Crises*

Expropriation takes various forms, beyond outright default, repudiation, or the 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 12-month inflation threshold of 40 percent or higher 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.[9] Hungary 1946 holds the sample's record despite the recent challenge from Zimbabwe, which comes in second.[10]

To date currency crashes, we follow a variant of Jeffrey A. Frankel and Andrew K. 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.[11] 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 plots the incidence of the two varieties of monetary, or fiat-money, crises—i.e., exchange rate and inflation crises. The "honor" for the record annual currency crash goes to Greece in 1944, also a year of hyperinflation (see Reinhart and Rogoff 2009a).

---

[9] Note that this definition of hyperinflation (unlike Philip Cagan's (1956) classic definition of a monthly inflation rate of 50 percent or greater) does not require monthly readings of inflation, which are scarce prior to the twentieth century.

[10] See Figure 70 (Zimbabwe) in the Chartbook for a comparison of hyperinflation episodes.

[11] See Graciela L. Kaminsky and Carmen M. Reinhart (1999) for a more detailed discussion of indices that measure exchange market turbulence.

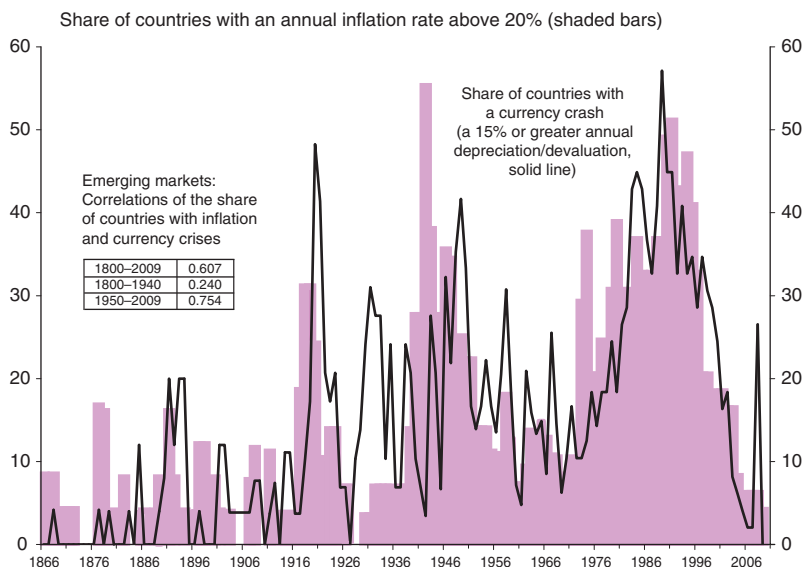Share of countries with an annual inflation rate above 20% (shaded bars)

FIGURE 1. THE TIGHT CONNECTION BETWEEN CURRENCY CRASHES AND INFLATION CRISES: EMERGING MARKETS, 1865–2009

Notes: An inflation crisis is defined as a year when 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.

Sources: Reinhart and Rogoff (2008, 2009a), sources cited therein, and authors' calculations.

B. *Debt Categories and Debt Crises*

External debt crises involve outright *default* on payment of debt obligations incurred under foreign legal jurisdiction, including nonpayment, *repudiation*, or the *restructuring* of debt into terms less favorable to the lender than in the original contract.[12]

These events have received considerable attention in the academic literature from leading modern-day economic historians, such as Bordo, Eichengreen, Marc Flandreau, Lindert and Morton, and Taylor.[13] 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 postwar restructurings and early defaults. This source has been supplemented with additional information from Lindert and Morton (1989), Christian Suter (1992) and Michael Tomz (2007). Of course, required reading in this field includes Max Winkler (1933) and William H. Wynne (1951).

While the time of default is accurately classified as a crisis year, in a large number of cases the final resolution with the creditors (if it ever does 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

---

[12] The Appendix provides a brief glossary of the major categories of debt studied in this paper.

[13] This is not meant to be an exhaustive list of the scholars that have worked on historical sovereign default. Closely related contributions include Bordo et al (2001), Eichengreen (1992), Eichengreen and Lindert (1989), Flandreau and Frederic Zumer (2004), and Maurice Obstfeld and Taylor (2003).

53 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.[14] Indeed, as Reinhart and Rogoff (2009a) 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 sovereign domestic debt are often relegated to the footnotes of data tables. 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. Our 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.

C. *Banking Crises*

Due to the paucity of quantitative information, our analysis stresses events when dating banking crises. 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 crisis. This indicator would certainly have 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 such cases, a large increase in bankruptcies or nonperforming loans would better mark the onset of the crisis. Unfortunately, indicators of business failures and nonperforming loans are also usually available only 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: (i) bank runs that lead to the closure, merging, or takeover by the public sector of one or more financial institutions; or (ii) 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.

---

[14] Domestic debt refers to public debts issued under domestic law. Most often, such debts have been denominated in the domestic currency and largely held by residents.

The main sources for cross-country dating of crises are as follows: for post-1970, the comprehensive and well-known study by Gerard Caprio and Daniela Klingebiel—updated by them through 2003—is authoritative, especially when it comes to classifying banking crises into systemic or more benign categories (see also: Caprio et al. 2005). For pre–World War II, Charles P. Kindleberger (1989), and Bordo et al. (2001), among others, provide multicountry coverage on banking crises. 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.

D. *The "This-Time-Is-Different" Syndrome and Serial Default*

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 50 years apart; they may be wholesale default (or repudiation) or a partial default through rescheduling.

The essence of the *this-time-is-different syndrome* is simple. It is rooted in the firmly held belief that financial crisis is something that happens 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 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 ...

II. 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 complemented 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 debt or on private-sector debts that were publicly guaranteed).

A. *Sovereign Debt Crises*

For the world as a whole (more than 90 percent of global GDP is represented by our dataset), the 2003–2009 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 lulls, *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
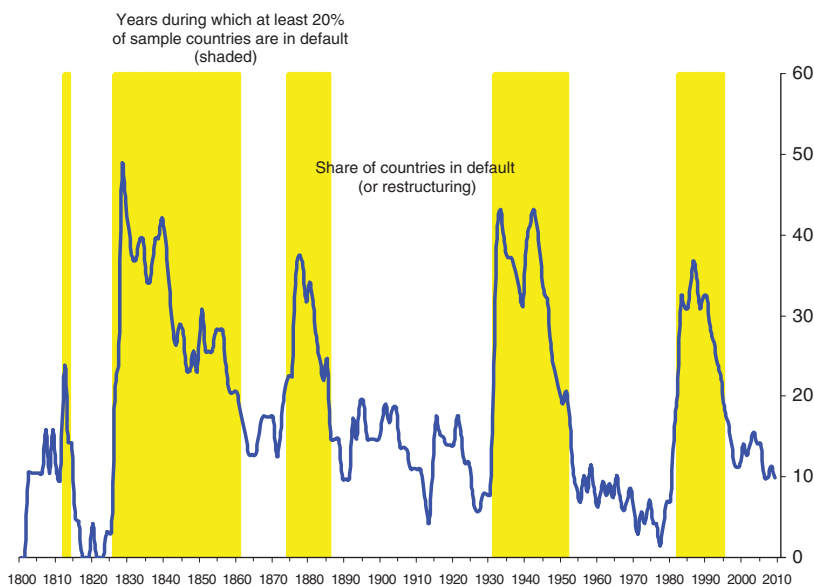
FIGURE 2. GLOBAL SOVEREIGN EXTERNAL DEFAULT CYCLES: 1800–2009
(*share of countries in default or restructuring*)

Notes: Sample includes all countries, out of a total of 70 listed in Appendix Table A1, 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 gain 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 sovereigns increases to a total of 70—the full sample.

Sources: Lindert and Morton (1989); James Macdonald (2006); John H.F. Purcell and Jeffrey A. Kaufman (1993); Reinhart, Rogoff, and Miguel A. Savastano (2003); Suter (1992); and *Standard and Poor's* (various years).

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 early 1950s, when nearly half of all countries stood in default.[15] The most recent default cycle encompasses the emerging market debt crises of the 1980s and 1990s.

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 accumulate and GDP contracts markedly.[16] Figure 3 plots the incidence of default shown in Figure 2 from 1824, (when the newly independent Latin American economies first entered the global capital market) through 2010, against an unweighted average debt/GDP ratio for all the countries for which such data are 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)

---

[15] Kindleberger (1989) is among the few scholars who emphasize that the 1950s can be viewed as a financial crisis era. By 1954, however, nearly all wartime defaults had been resolved.

[16] See Reinhart and Rogoff (2009a, 2011) for evidence on output behavior before, during, and after debt crises.
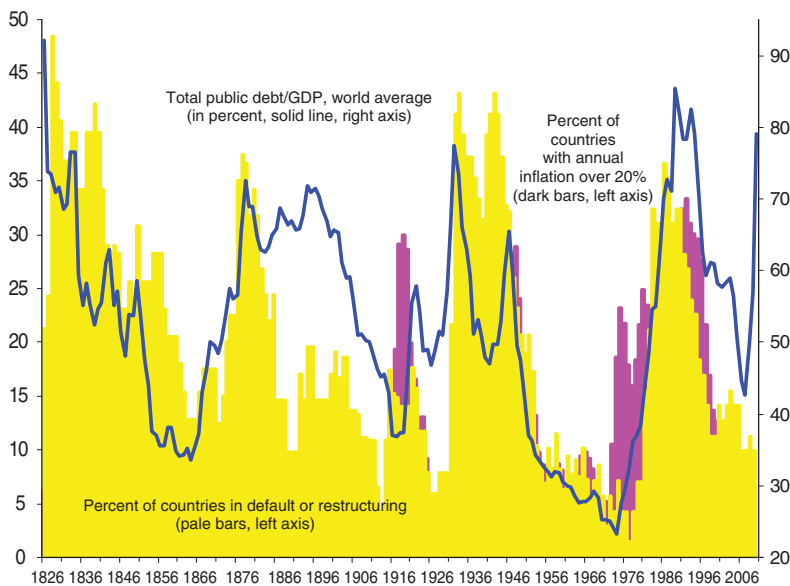
FIGURE 3. SOVEREIGN DEFAULT ON EXTERNAL DEBT, TOTAL (DOMESTIC PLUS EXTERNAL) PUBLIC DEBT, AND INFLATION CRISES: WORLD AGGREGATES, 1826–2010 (*debt as a percent of GDP*)

Dependent variable	World: Share of countries in default or restructuring	
Sample	1824–2009	
Independent variables	OLS (robust errors)	Fractional logit[a] (robust errors)
World: public debt/GDP ($t-1$)	*0.346*	*0.008*
p-value	*0.000*	*0.000*
Observations	184	184
R^2	0.224	0.246

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 nineteenth 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) to the available debt/GDP data. The split between advanced and emerging economies is made along the present-day IMF classification.

[a] The specification of the fractional logit allows for a dependent variable to be bounded (fractional) not binary as in the standard logit functional form (see Leslie E. Papke and Jeffrey M. Wooldridge 1996).

Sources: Reinhart and Rogoff (2008, 2009a), sources cited therein, and authors' calculations.

confirm. The evident positive correlation between rising debt burdens and higher incidence of default will be investigated more systematically in Section IV. Periods of higher indebtedness also appear to be associated with a higher incidence of inflation crises (an indirect form of default, highlighted as a darker shaded bar where the incidence of inflation exceeds that of default). Default through inflation has been 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.[17] Notably absent in Figure

---

[17] See Reinhart and Rogoff (2010) for evidence on the debt thresholds that are associated with higher inflation outcomes.
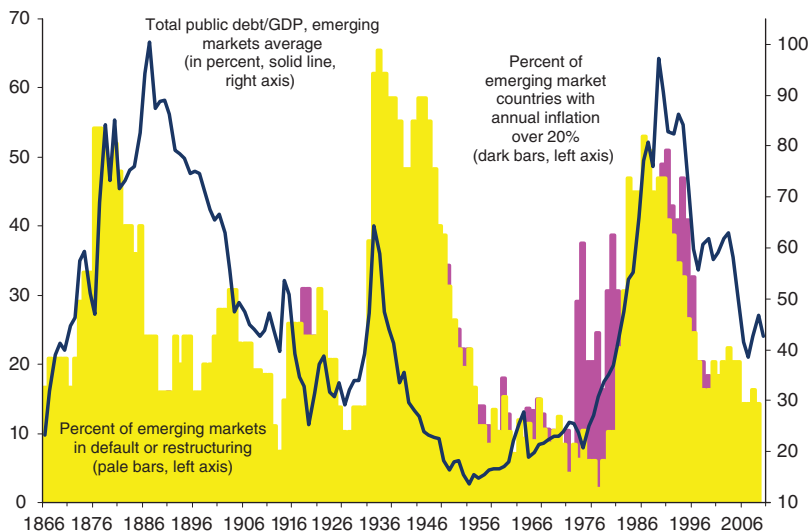
FIGURE 4. SOVEREIGN DEFAULT ON EXTERNAL DEBT, TOTAL (DOMESTIC PLUS EXTERNAL) PUBLIC DEBT, AND INFLATION CRISES: EMERGING MARKETS, 1866–2010 (*debt as a percent of GDP*)

Dependent variable	Emerging markets: Share of countries in default or restructuring	
Sample	1866–2009	
Independent variables	OLS (robust errors)	Fractional logit (robust errors)
Emerging markets: public debt/GDP $(t - 1)$	*0.232*	*0.007*
p-value	*0.000*	*0.000*
Observations	144	144
R^2	0.120	0.133

Notes: The debt aggregates for the emerging economies are the simple arithmetic average of the individual countries' debt/GDP ratios. For additional notes, see Figure 3.

Sources: Reinhart and Rogoff (2008, 2009a), sources cited therein, and authors' calculations.

4 are the debt spikes during the two world wars evident in Figure 3, highlighting that (with the exception of the European emerging markets) the fiscal finances of emerging markets were not adversely affected by these events.

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 cuts 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 for Greece's two defaults in 1894 and in 1932—the latter default spell lasting about 33 years from the beginning to its eventual resolution in 1964.

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* (three years versus six years, as shown in Figure 7).
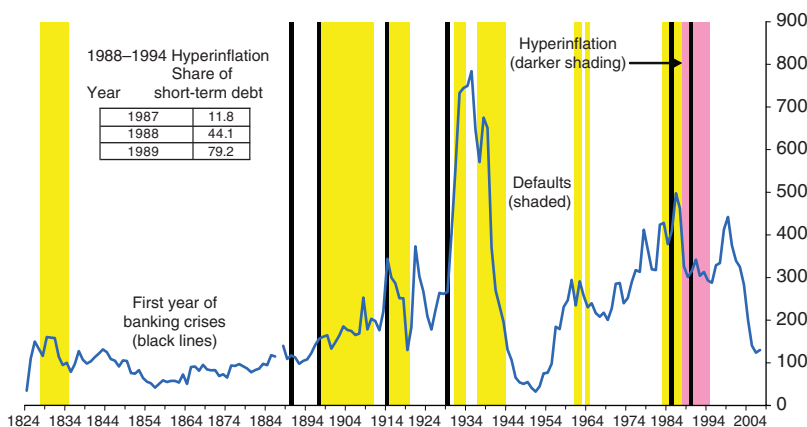
FIGURE 5. BRAZIL: EXTERNAL DEBT, DEFAULT, HYPERINFLATION, AND BANKING CRISES, 1824–2009
(*debt as a percent of exports*)

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	*or*		
1914–1919	6		1914	*single*		
1931–1933	3		1923	*episode*		
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)		

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 above). Only systemic banking crises are shown. Independence is September 7, 1822, but the debt time series starts in 1824.

Sources: Reinhart (2010), Reinhart and Rogoff (2008, 2009a) and sources cited therein.

A charitable interpretation is that crisis resolution mechanisms have improved since the bygone days of gunboat diplomacy. After all, Newfoundland lost nothing less than its 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 bailouts are facilitated by deep-pocketed multilateral lenders such as the International Monetary Fund, creditors are willing to cut more slack to their serial-defaulting clients.

The fact remains that, as Bordo and Eichengreen (1999) 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).
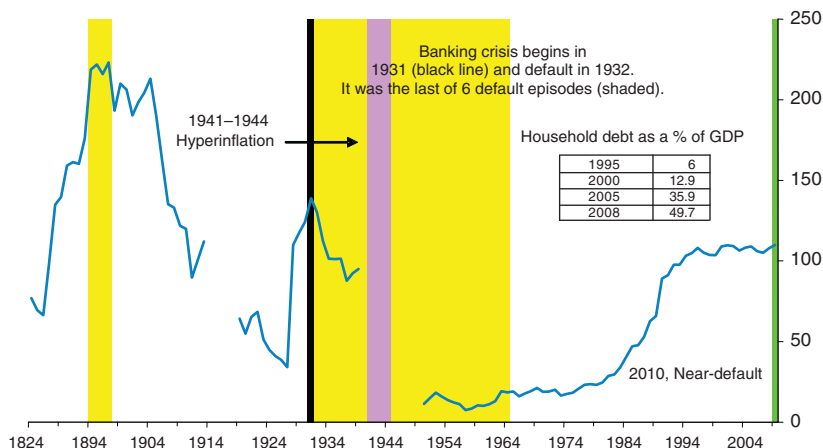
FIGURE 6. GREECE: CENTRAL GOVERNMENT (DOMESTIC PLUS EXTERNAL) DEBT, DEFAULT, HYPERINFLATION, AND BANKING CRISES, 1884–2009 (*debt as a percent of GDP*)

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						
6[a]		1	2	1		

Notes: 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).

[a] The first 17-year default period involves two default episodes.

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

B. *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 nineteenth and early twentieth centuries is illustrated in Figure 8 with Belgium's chronology since 1835 but is systematically documented in Reinhart (2010), 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–World War II. However, all except Portugal experienced at least one postwar crisis prior to the current episode. When the late-2000s crises are fully factored in, the apparent drop will likely be even less pronounced. Indeed, as discussed in Reinhart and Rogoff (2009a, 2011), despite dramatic differences in recent sovereign default performance, the incidence of bank-
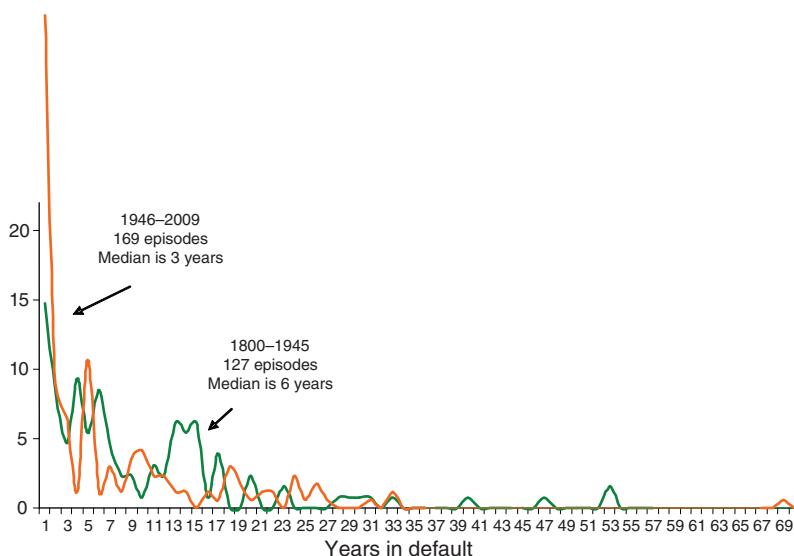
Figure 7. Duration of Default Episodes: 1800–2009
(*frequency of occurrence, percent*)

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–Smirnoff test for comparing the equality of two distributions rejects the null hypothesis of equal distributions at the 1 percent significance level.

Sources: Lindert and Morton (1989); Macdonald (2006); Purcell and Kaufman (1993); Reinhart, Rogoff, and Savastano (2003); Suter (1992), *Standard and Poor*'s (various years), and authors' calculations.

ing 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.[18]

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 of debt in advance of a banking crisis or a sovereign default. Specifically, when we discuss rising debts ahead of the crisis we are referring to *surges* in capital inflow ("bonanzas" as defined in Reinhart and Reinhart 2009) or, more generally, in any kind of debt (domestic or external). This nonlinear pattern in borrowing ahead of banking and debt crises (as these often overlap) is documented in its multiple manifestations in Figures 9 through 13.

The 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 below the figure) confirm what the visual inspection of the time series plotted in the figure suggests. Increases in external debt systematically help predict

[18] As already acknowledged, our accounting of financial crises in poorer countries may be incomplete, especially for earlier periods, despite our best efforts.
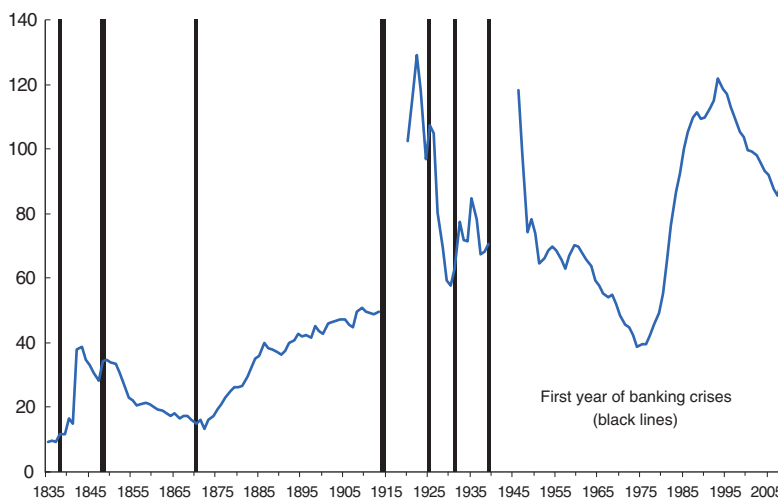
FIGURE 8. BELGIUM: CENTRAL GOVERNMENT (DOMESTIC PLUS EXTERNAL) DEBT AND BANKING CRISES, 1835–2009
(*debt as a percent of GDP*)

Note: Only systemic banking crises are shown.
Sources: Reinhart and Rogoff (2008, 2009a) and sources cited therein.

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. 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.

In light of the preceding discussion of the time profile of external debt before, during, and following debt and banking crises, 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[19] just before or during the year of the crisis (even in crisis episodes of an earlier century and in advanced economies). Figures 11 and 12, which show public and private capital flows from the United Kingdom to Latin America and the United States, respectively, for 1865–1914, both exemplify this behavior.

Like every other measure of indebtedness that we could find, domestic credit climbs sharply prior to a banking crisis and unwinds afterward. Figure 13 provides more than one example from Norway's banking crises. Other comparable examples populate the country histories in Reinhart (2010), including the buildup of household debt almost across the board in OECD countries in the years immediately prior to the eruption of the global crisis in 2007–2008. Graciela L. Kaminsky and

---

[19] That is, capital inflows to an emerging market economy suddenly dry up as global investors shun the country, as explained in Guillermo Calvo, Alejandro Izquierdo, and Rudy Loo-Kung (2006), for example.
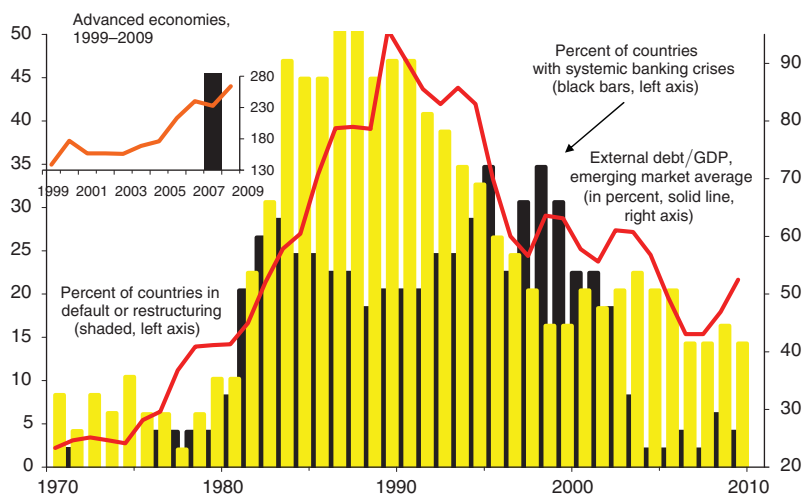
FIGURE 9. GROSS EXTERNAL DEBTS (PUBLIC AND PRIVATE), SOVEREIGN DEFAULT, AND SYSTEMIC BANKING CRISES:
ADVANCED ECONOMIES (INSET ONLY) AND EMERGING MARKETS, 1970–2009
(*debt as a percent of GDP*)

Dependent variable Sample	Emerging markets: share of countries in default or restructuring 1971–2009	
Independent variables	OLS (robust errors)	Fractional logit (robust errors)
Emerging markets: external debt/GDP $(t-1)$	*0.574*	*0.013*
p-value	*0.000*	*0.000*
Observations	39	39
R^2	0.615	0.595
Dependent variable Sample	Emerging markets: share of countries in systemic banking crises 1971–2009	
Independent variables	OLS (robust errors)	Fractional logit (robust errors)
Emerging markets: external debt/GDP $(t-1)$	*0.383*	*0.007*
p-value	*0.000*	*0.000*
Observations	39	39
R^2	0.479	0.514

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

Reinhart (1999) investigated the pre–banking crisis (and currency crash) run-up and subsequent contraction in domestic credit aggregates (as a percent of GDP). Their results are along the lines of the observations made here.

C. *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 Carlos Diaz-Alejandro (1985) and formalized in Velasco (1987), in which the government takes on massive debts from the private banks, thus undermining its own solvency.[20] The currency crashes that are an integral part of the "twin crisis"

---

[20] See Cristina Arellano and Narayana R. Kocherlakota (2008) for a framework that is consistent with these dynamics.
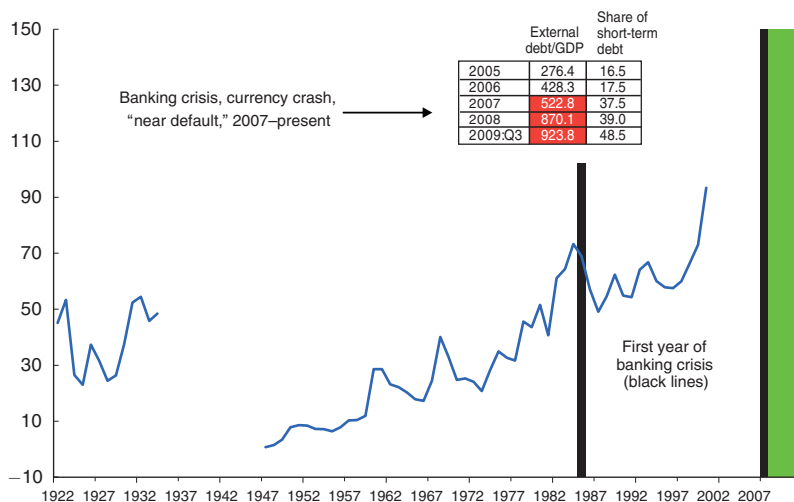
FIGURE 10. ICELAND: EXTERNAL (PUBLIC PLUS PRIVATE) DEBT AND BANKING CRISES, 1922–2009
(*debt as a percent of GDP*)

Sources: Reinhart and Rogoff (2008, 2009a) and sources cited therein.

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

Even absent large-scale bailouts (and without counting the postcrisis new government guarantees), Reinhart and Rogoff (2009a, 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-case 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. (China's prolonged banking crisis in the 1990s, associated with nearly bankrupt state-owned enterprises, is an example of this problem.) A government default, in those circumstances, would directly impact the banks' balance sheets. 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 a 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 IV.
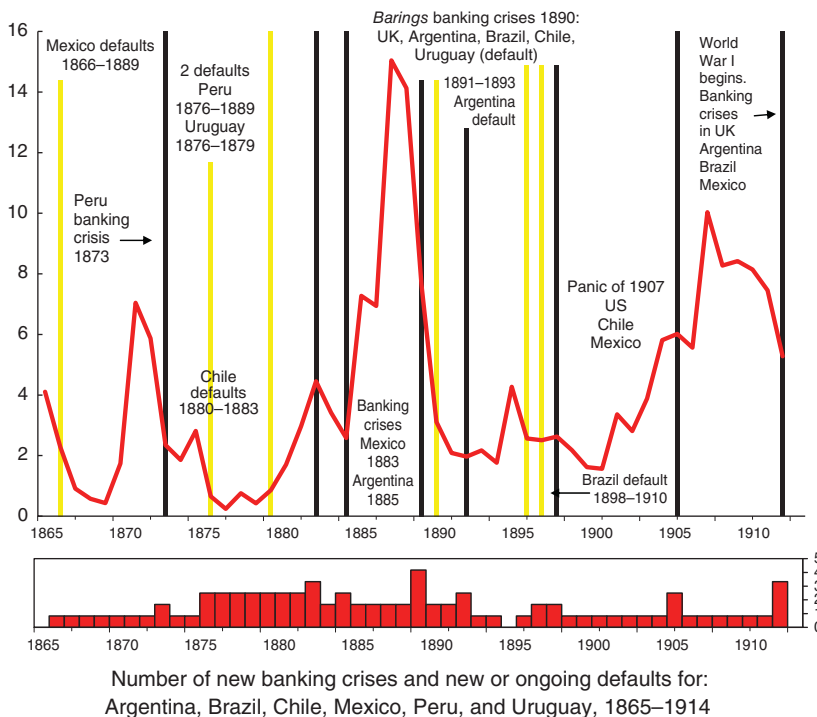
FIGURE 11. LATIN AMERICA: PRIVATE AND PUBLIC CAPITAL INFLOWS FROM THE UNITED KINGDOM, DEFAULT AND BANKING CRISES, 1865–1914 (*capital flows as a percent of UK exports*)

Notes: Only the first year of banking crises (black lines) and defaults (light lines) 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 had both a banking crisis and a 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.

Sources: Irving Stone (1999), Reinhart and Rogoff (2008, 2009a), and sources cited therein.

D. *Observations on the Composition of Debts*

To shed light on the maturity composition of external debt (public and private) around financial crises 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). As the figure illustrates, *short-term debts escalate on the eve of banking crises*; the ratio of short-term to total debt about doubles from 12 to 24 percent. Regardless of whether the rise in short-term debt reflects growing reluctance by lenders to extend longer term debt, or opportunism during a boom, a higher short-term debt ratio exposes a country to greater risk of a self-fulfilling panic, as we discuss more fully in Section III. A similar pattern emerges in the run-up to sovereign defaults (which in this particular exercise immediately follow banking crises). Many individual crisis episodes are equally, or possibly even more, compelling; see Figure 16 on Indonesia. The small table inset in Figure 10, which
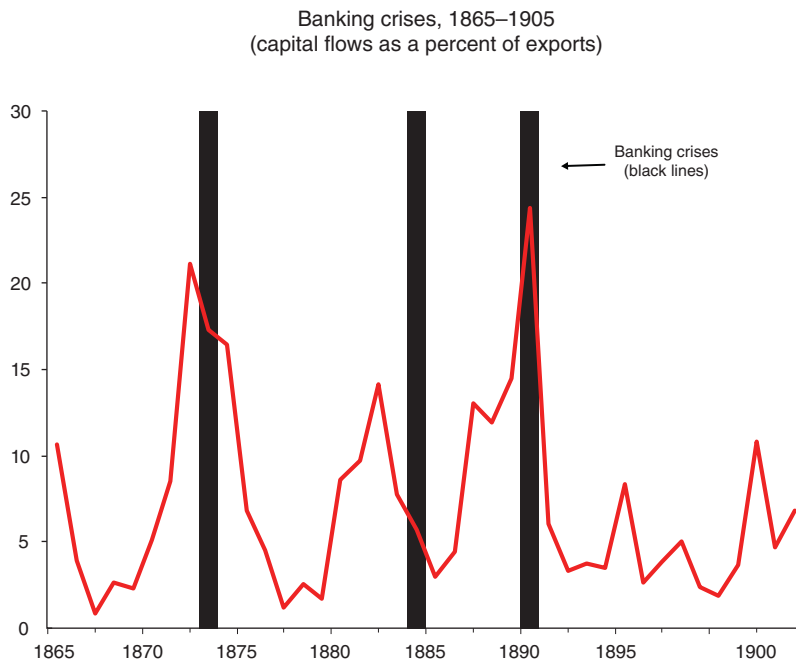
Banking crises, 1865–1905
(capital flows as a percent of exports)

Figure 12. United States: Private Capital Inflows from the United Kingdom and Banking Crises, 1865–1905 (*capital flows as a percent of exports*)

Sources: Stone (1999), Reinhart and Rogoff (2008, 2009a), and sources cited therein.

shows external debt for Iceland over 1922–2009, also reveals a striking increase in the share of short-term debt as the crisis approaches, rising from about 17 to 49 percent. In the march toward hyperinflation, it is not unusual to see long-term debt 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 of hyperinflation in 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.[21] Along the lines shown in Figure 16 (inset), the precrisis surge in indebtedness is in the private sectors.

III. Theoretical Underpinnings of the This-Time-Is-Different Syndrome

Our results raise 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.

---

[21] See, for instance, the experiences of El Salvador and Ecuador, in which nearly all postcrisis debts were public.
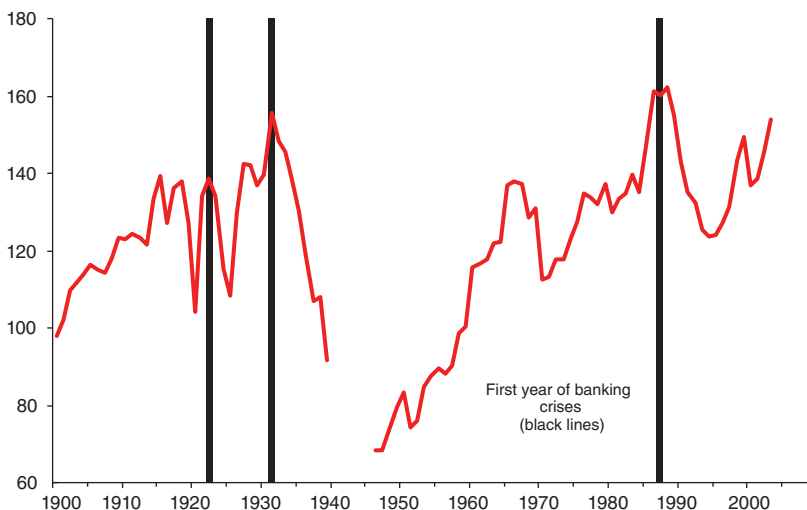
FIGURE 13. NORWAY: DOMESTIC PRIVATE CREDIT, 1900–2004
(*amount outstanding at year end as a percent of GDP*)

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

A. *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 equilibria model is a variant of Douglas Diamond and Philip Dybvig's (1983) analysis of bank runs. Their analysis suggests that any entity that uses short-term borrowing to fund holdings of illiquid assets can be vulnerable to crises of confidence (runs), that occur essentially when massive unexpected withdrawals of short-term lending force premature liquidation of long-term projects at deep discount. Models that explain government debt crises as arising from multiple equilibria include Jeffrey Sachs (1984); Calvo (1988); and Maurice Obstfeld and Rogoff (1996, ch. 6), among others. Even those models that yield a unique equilibrium (e.g., the bargaining theoretic sovereign debt model of Jeremy Bulow and Rogoff 1989), often do so only under fairly restrictive assumptions and are subject to multiple equilibria for more general versions. 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, are fairly generic, and therefore consistent with the near-universality of crises. The buildup in short-term debt we observed on the eve of financial crises (perhaps to economize on interest rate costs as debt rises) certainly increases a country's vulnerability to panics and runs. During the boom, politicians and investors could misinterpret a "high-trade" outcome among a set of potential
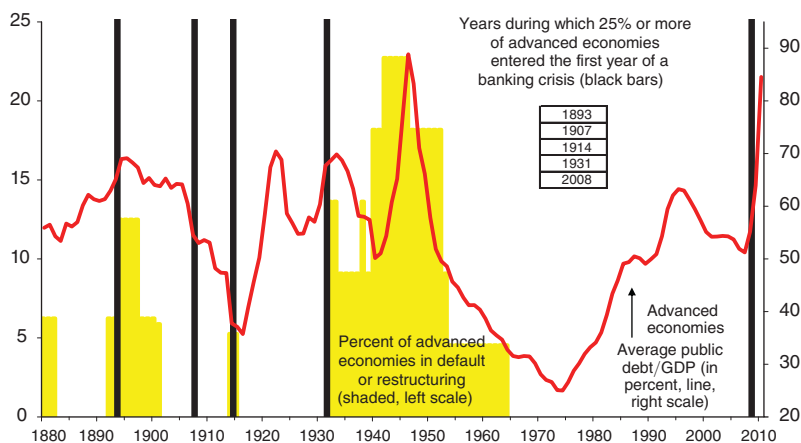
FIGURE 14. SOVEREIGN DEFAULT ON EXTERNAL DEBT, TOTAL (DOMESTIC PLUS EXTERNAL) PUBLIC DEBT,
AND SYSTEMIC BANKING CRISES: ADVANCED ECONOMIES, 1880–2010 (*debt as a percent of GDP*)

Dependent variable Sample Independent variables	Advanced economies: share of countries in default or restructuring 1880–2009	
	OLS (robust errors)	Fractional logit (robust errors)
Advanced economies: public debt/GDP ($t-1$)	*0.209*	*0.002*
p-value	*0.000*	*0.000*
Observations	130	130
R^2	0.176	0.167
Dependent variable Sample Independent variables	Advanced economies: share of countries in systemic banking crises 1880–2009	
	OLS (robust errors)	Logit (robust errors)
Advanced economies: public debt/GDP ($t-1$)	*0.057*	*0.002*
p-value	*0.002*	*0.006*
Observations	130	130
R^2	0.047	0.050

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 nineteenth 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) 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.

Sources: Reinhart and Rogoff (2008, 2009a), sources cited therein, and authors' calculations.

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 risk across different economies. True, there have been important efforts to refine multiple equilibria models to strengthen their explanatory power, starting with Stephen
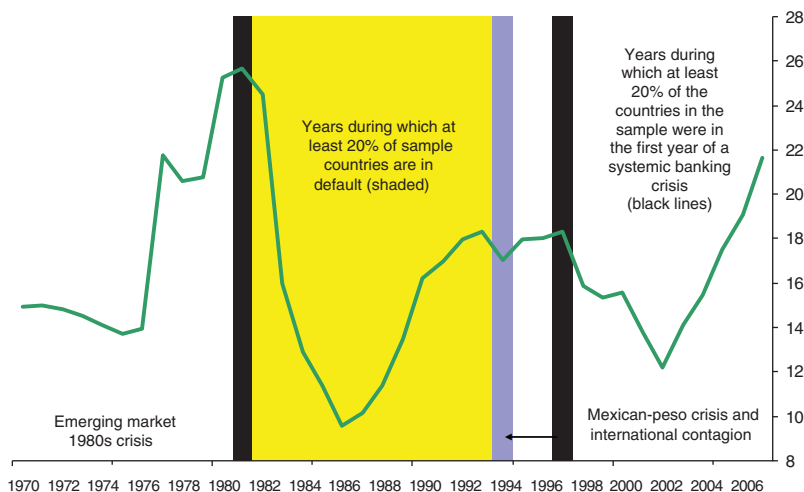
Figure 15. Share of Short-term Gross External Debt (Public plus Private): Emerging Markets, 1970–2009 (*in percent*)

Sources: Reinhart and Rogoff (2008, 2009a) and sources cited therein.

Morris and Hyun Song Shin (2001), but the results can be sensitive to difficult-to-confirm underlying assumptions, such as the importance of public relative to private information.

B. *Short-Term Biases that Allow Crisis Risks to Build Up*

But even setting aside the difficulty of testing or applying multiple equilibria models of financial crises, multiple equilibria analyses 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 the risk of catastrophe?[22] Why is regulation so often procyclical 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 adopt tax and financial policies that seem to promote it?

Although it does not address the exact question we ask here, there is certainly an important political economy literature on debt bias. For example, Alberto Alesina and Guido Tabellini (1990) as well as Torsten Persson and Lars E. O. Svensson (1989) 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, Manuel Amador (2008) argues that contemporaneous competition

---

[22] Zhiguo He and Wei Xiong (2011) also explain the debt maturity structure ahead of crisis in a model where creditors have incentives to shorten debt maturity to protect themselves against runs by other creditors. (See, also, Jeanne 2009).
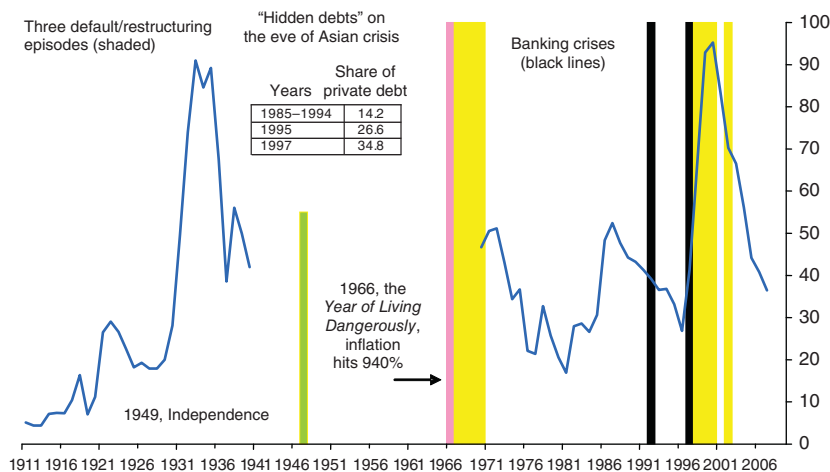
FIGURE 16. INDONESIA: CENTRAL GOVERNMENT (DOMESTIC PLUS EXTERNAL) DEBT, DEFAULT, AND BANKING CRISES, 1911–2009 (*debt as a percent of GDP*)

Sources: Reinhart (2010), Reinhart and Rogoff (2009a) and sources cited therein.

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 (2003), building on David Laibson (1997), shows how politicians' limited horizons can fundamentally change the market for sovereign debt. Recent quantitative analyses of sovereign default, including, for example, Mark Aguiar and Gita 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 (2009a). 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.

C. *Hidden Debt*

Our results here, as well as a plethora of vivid examples from the accompanying Chartbook, suggest that more attention needs to be paid to hidden debts and liabilities. In a crisis, government debt burdens often come pouring out of 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 prior to the 2007 crisis. Indeed, in many economies, the range of implicit government guarantees is breathtaking. As we emphasize in Reinhart and Rogoff (2009a), many governments find in a crisis that they are forced to deal not only with their external debts (owed to foreigners) but with 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 2009a, 2011). 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 Max 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 the models.[23] 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 needed to better understand its role in the this-time-is-different syndrome.

D. *Further Models of Leverage and Behavior*

Our list of potential crisis models is far from complete. For example, Ana Fostel and John 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.[24] Here, modern behavioral economics can hopefully contribute new perspectives. For example, Daniel Kahneman, Paul Slovic, and Amos Tversky (1982) provide 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, leaders and voters may simply be overconfident (for example, as suggested by Colin Camerer and Dan Lovallo 1999).[25] 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 Kindleberger famously remarked about financial crises) that needs further clarification and study.

IV. Debt, Banking Crises, and Default: Cross-Country Evidence

In Section II, we presented evidence based on both cross-country aggregates and individual country histories that suggests a strong connection between debt

---

[23] An early attempt to model borrowing when lenders do not know aggregate debt is Kenneth M. Kletzer (1984).

[24] See Reinhart and Rogoff (2009a, ch. 1) for examples of the this-time-is-different mentality over the ages.

[25] The authors are grateful to David Laibson for suggesting these references.

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 buildup ahead of banking crises; and (iii) public debts may or may not contribute to the precrisis surge in indebtedness on the eve of banking crises. Furthermore, banking and debt crises often occur simultaneously (or in proximity to one another) and, more often than not, banking crises anticipate (temporally precede) 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 bound to be riddled with structural change, we are careful to reexamine the relationships of interest over several subperiods.

A. 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 debt crises. The causality tests employed here mimic the spirit of the standard vector autoregression (VAR) setup. The specification employed here looks for temporal precedence using a logit specification, which of course is highly nonlinear. Both variables (banking and debt crisis 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) regressor the financial crisis dummy for the global financial center and allow the intercept to vary depending on whether the country is an advanced or 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,

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

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

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. $BC_{t-1 \ to \ t-3}$ and $DC_{t-1 \ to \ t-3}$ are three-year moving averages of the two crisis variables, β_k, $k = AE$, EM, which are the intercept terms 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.

TABLE 1—TEMPORAL PATTERNS OF BANKING CRISES AND SOVEREIGN DEFAULT:
MULTINOMIAL LOGIT (ROBUST ERRORS) ALTERNATIVE SPECIFICATIONS, PANEL DATA

Dependent variable:	First year of a banking crisis sample period		
Explanatory variables:	1824–2009	1900–2009	1946–2009
Banking crisis ($t-1$ to $t-3$)	0.251	−0.092	−0.383
p-value	0.237	0.892	0.276
Default ($t-1$ to $t-3$)	−0.753	−0.327	−0.315
p-value	0.708	0.441	0.417
Financial center crisis (t to $t-2$)	***3.320***	***4.238***	***3.749***
p-value	***0.000***	***0.000***	***0.000***
Advanced economy intercept	−3.834	−3.616	−4.030
p-value	0.000	0.000	0.000
Emerging market intercept	−4.245	−3.935	−3.720
p-value	0.000	0.000	0.000
Observations	13,206	7,810	4,473
Number of positive observations	281	212	128
R^2	0.060	0.080	0.052
Dependent variable:	First year of a default sample period		
Explanatory variables:	1824–2009	1900–2009	1946–2009
First year of a banking crisis ($t-1$ to $t-3$)	***2.663***	***2.510***	***2.754***
p-value	***0.000***	***0.000***	***0.001***
Default ($t-1$ to $t-3$)	0.542	0.560	1.097
p-value	0.064	0.000	0.000
Financial center banking crisis (t to $t-2$)	0.967	0.767	−1.470
p-value	0.102	0.176	0.176
Advanced economy intercept	−5.480	−6.441	—
p-value	0.000	0.000	—
Emerging market intercept	−4.241	−4.047	−4.022
p-value	0.000	0.000	0.000
Observations	13,206	7,810	4,473
Number of positive observations	203	140	92
R^2	0.043	0.070	0.051

Variations of the model presented in (1) and (2) that restrict the intercept to being the same for all countries, that allow the intercept to vary by region, and that incorporate a fixed effect for all 70 countries, were also estimated but were not reported in order to conserve space.[26] 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 1 reports the results for the specification given by (1)–(2) for the full sample for 1824–2009, 1900–2009, and 1946–2009.[27] 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, are that systemic banking

---

[26] 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 multiyear phenomena.

[27] Other subsamples are available from the authors upon request.

TABLE 2—PUBLIC DEBT, BANKING CRISES, AND SOVEREIGN DEFAULT:
MULTINOMIAL LOGIT (ROBUST ERRORS) ALTERNATIVE SPECIFICATIONS, PANEL DATA

Dependent variable:	First year of a banking crisis sample period		
Explanatory variables:	1824–2009	1900–2009	1946–2009
Banking crisis ($t-1$ to $t-3$)	−1.882	−1.837	−1.994
p-value	0.016	0.034	0.083
Default ($t-1$ to $t-3$)	−1.600	−1.866	−1.210
p-value	0.145	0.111	0.336
Financial center crisis (t to $t-2$)	*4.431*	*4.238*	*3.510*
p-value	*0.000*	*0.000*	*0.000*
Δ Public debt/GDP (t to $t-2$)	0.003	0.003	0.003
p-value	0.127	0.069	0.050
Advanced economy intercept	−3.554	−3.541	−4.030
p-value	0.000	0.000	0.000
Emerging market intercept	−3.586	−3.530	−3.720
p-value	0.000	0.000	0.000
Observations	5,986	4,931	3,343
Number of positive observations	221	181	116
R^2	0.060	0.080	0.052
Dependent variable:	First year of a default sample period		
Explanatory variables	1824– 2009	1900–2009	1946–2009
Banking crisis ($t-1$ to $t-3$)	*1.909*	*1.978*	*2.680*
p-value	*0.012*	*0.001*	*0.003*
Default ($t-1$ to $t-3$)	1.406	0.560	1.097
p-value	0.113	0.000	0.000
Financial center crisis (t to $t-2$)	0.902	0.767	−1.218
p-value	0.102	0.176	0.075
Δ Public debt/GDP (t to $t-2$)	*0.004*	*0.003*	0.003
p-value	*0.025*	*0.028*	0.090
Advanced economy intercept	−6.576	−7.261	—
p-value	0.000	0.000	—
Emerging market intercept	−3.823	−3.781	−4.022
p-value	0.000	0.000	0.000
Observations	5,986	4,931	3,343
Number of positive observations	104	95	72
R^2	0.042	0.070	0.051

crises, in financial centers help explain domestic banking crises, and domestic banking crises help explain sovereign default.

B. *Public and External Debt, Default and Banking Crises*

Beyond the causal pattern between the three dichotomous events considered, we now include a debt/GDP measure as a regressor in equations (1) and (2). 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 subgroup, ED_Y_{EMt}. It is worth noting that public debt is measured with error, as implicit guarantees and other hidden debts are not captured in the official data used here, and that such hidden debts also tend to rise markedly in the vicinity

TABLE 3—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
p-value	0.000	0.391
Default ($t - 1$ to $t - 3$)	−0.042	0.018
p-value	0.115	−0.051
Financial center crisis (t to $t - 2$)	*0.781*	*−0.051*
p-value	*0.016*	*0.004*
External debt/GDP ($t - 1$)	*0.001*	0.001
p-value	*0.000*	0.152
Intercept	*0.060*	0.043
p-value	*0.000*	0.000
Observations	1,496	1,496
Number of positive observations	85	55
R^2	0.295	0.012

of crises.[28] In all cases, we consider the change in the relevant debt/GDP ratio, ΔPD_Y_t; from t to $t - 2$.[29]

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 2 highlights. Debt crises remain statistically insignificant. The three-year change in public debt/GDP enters the banking crisis equation significantly only for the most recent (1946–2009) subsample. 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 a systematic relationship with domestic banking crises). Surges in public debt have the expected significant positive effect on the likelihood of default, although it appears that the relationship is somewhat weaker for the 1946–2009 subsample.

External (public and private) debt for the period over which this data is available (1970–2009) significantly increased the chances of a banking crisis but had no systematic direct impact on the probability of default (Table 3), which continues to depend significantly on whether there is a banking crisis or not.

V. Concluding Observations

Our analysis here has only scratched the surface of what the expansive new database underlying this paper might ultimately yield. Among many diverse avenues for future research, it would be interesting to explore the link between inflation crises and public debt (the most novel feature of our dataset) suggested in Figures 3 and 4.

[28] This is possibly a fruitful issue to explore in future research.
[29] The same exercise was performed using t–1 to t–3, t–1 to t–2, and t–1 only with very similar results.

Here we have chosen to focus particularly on some of the links between 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, perhaps more surprisingly, our analysis suggests that banking crises (even those of a purely private origin) increase the likelihood of a sovereign default. We find a direct effect (perhaps in part due to the recession that typically arises) as well as an indirect effect (perhaps due to the typical post–banking crisis explosion in public debt). There is little to suggest in this analysis that debt cycles and their connections with economic crises have changed appreciably over time.

Appendix: Debt Glossary

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 comprise 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 the previous categories of debt. Hidden debt includes contingent liabilities of the government. Historically, domestic debt (see above) has in many countries been a major part of hidden debt.

TABLE A1—COUNTRIES, REGIONS, AND YEAR OF INDEPENDENCE

Country	Year of independence if post 1800	Country	Year of independence if post 1800
Africa		*Latin America*	
Algeria	1962	Argentina	1816
Angola	1975	Bolivia	1825
Central African 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
Asia		Paraguay	1811
China		Peru	1821
Hong Kong		Uruguay	1811
India	1947	Venezuela	1830
Indonesia	1949	*North America*	
Japan		Canada	1867
Korea	1945	United States	
Malaysia	1957	*Oceania*	
Myanmar	1948	Australia	1901
Philippines	1947	New Zealand	1907
Singapore	1965		
Taiwan	1949		
Thailand			
Europe			
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			

Source: Correlates of War (2007).

In addition, 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 Fund's 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) and 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 III.)

REFERENCES

Aguiar, Mark, and Gita Gopinath. 2006. "Defaultable Debt, Interest Rates and the Current Account." *Journal of International Economics*, 69(1): 64–83.

Alesina, Alberto, and Guido Tabellini. 1990. "A Positive Theory of Fiscal Deficits and Government Debt." *Review of Economic Studies*, 57(3): 403–14.

Amador, Manuel. 2003. "A Political Economy Model of Sovereign Debt Repayment." http://www.stanford.com/~amador/debt.pdf.

Amador, Manuel. 2008. "Sovereign Debt and the Tragedy of the Commons." http://www.stanford.com/~amador/tragedy.pdf.

Arellano, Cristina, and Narayana R. Kocherlakota. 2008. "Internal Debt Crises and Sovereign Defaults." National Bureau of Economic Research Working Paper 13794.

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

Bordo, Michael D., Barry Eichengreen, Daniela Klingebiel, Maria Soledad Martinez-Peria. 2001. "Is the Crisis Problem Growing More Severe?" *Economic Policy: A European Forum*, 32: 51–75.

Bulow, Jeremy, and Kenneth Rogoff. 1989. "A Constant Recontracting Model of Sovereign Debt." *Journal of Political Economy*, 97(1): 155–78.

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

Calvo, Guillermo A. 1988. "Servicing the Public Debt: The Role of Expectations." *American Economic Review*, 78(4): 647–61.

Calvo, Guillermo A., Alejandro Izquierdo, and Rudy Loo-Kung. 2006. "Relative Price Volatility under Sudden Stops: The Relevance of Balance Sheet Effects." *Journal of International Economics*, 69(1): 231–54.

Camerer, Colin, and Dan Lovallo. 1999. "Overconfidence and Excess Entry: An Experimental Approach." *American Economic Review*, 89(1): 306–18.

Caprio, Gerard, and Daniela Klingebiel. 2003. "Episodes of Systemic and Borderline Financial Crises." http://siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/648083-1108140788422/23456_Table_on_systemic_and_non-systemic_banking_crises_January_21_2003.pdf.

Caprio, Gerard, Daniela Klingebiel, Luc Laeven, and Guillermo Noguera. 2005. "Banking Crisis Database." In *Systemic Financial Crises: Containment and Resolution*, ed. Patrick Honohan and Luc Laeven, 307–40. Cambridge, UK: Cambridge University Press.

Diamond, Douglas W., and Philip H. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity." *Journal of Political Economy*, 91(3): 401–19.

Diaz-Alejandro, Carlos. 1985. "Good-Bye Financial Repression, Hello Financial Crash." *Journal of Development Economics*, 19(1–2): 1–24.

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

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

Eitrheim, Ø., K. Gerdrup, and J. T. Klovland. 2004. "Credit, Banking and Monetary Developments in Norway 1819–2003." In *Historical Monetary Statistics for Norway, 1819–2003*, 377–407. Oslo, Norway: Norges Bank.

Flandreau, Marc, and Frederic Zumer. 2004. *The Making of Global Finance 1880–1913*. Paris: Organisation for Economic Co-operation and Development.

Fostel, Ana, and John Geanakoplos. 2008. "Leverage Cycles and the Anxious Economy." *American Economic Review*, 98(4): 1211–44.

Frankel, Jeffrey A., and Andrew K. Rose. 1996. "Currency Crashes in Emerging Markets: An Empirical Treatment." *Journal of International Economics*, 41(3–4): 351–66.

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

He, Zhiguo, and Wei Xiong. 2011. "Dynamic Debt Runs." University of Chicago and Princeton University. http://www.princeton.edu/~wxiong/papers/dynamic.pdf.

Jeanne, Olivier. 2009. "Debt Maturity and the International Financial Architecture." *American Economic Review*, 99(5): 2135–48.

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

Kaminsky, Graciela L., and Carmen M. Reinhart. 1999. "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems." *American Economic Review*, 89(3): 473–500.

Kindleberger, Charles P. 1989. *Manias, Panics and Crashes*: *A History of Financial Crises*. 2nd ed. New York: Basic Books.

Kletzer, Kenneth M. 1984. "Asymmetries of Information and LDC Borrowing with Sovereign Risk." *Economic Journal*, 94(374): 287–307.

Laibson, David. 1997. "Golden Eggs and Hyperbolic Discounting." *Quarterly Journal of Economics*, 112(2): 443–77.

Lindert, Peter H., and Peter J. Morton. 1989. "How Sovereign Debt Has Worked." In *Developing Country Debt and Economic Performance Volume 1 the International Financial System*, ed. J. D. Sachs, 39–106. Chicago: University of Chicago Press.

Macdonald, James. 2006. *A Free Nation Deep in Debt: The Financial Roots of Democracy*. Princeton, NJ: Princeton University Press.

Morris, Stephen, and Hyun Song Shin. 2001. "Rethinking Multiple Equilibria in Macroeconomic Modeling." In *NBER Macroeconomics Annual 2000*, ed. Ben S. Bernanke and Kenneth Rogoff, 139–61. Cambridge, MA: MIT Press.

Obstfeld, Maurice. 1994. "The Logic of Currency Crises." *Cahiers Economiques et Monetaires*, 43: 189–213.

Obstfeld, Maurice, and Kenneth Rogoff. 1996. *Foundations of International Macroeconomics*. Cambridge, MA: MIT Press.

Obstfeld, Maurice, and Alan Taylor. 2003. *Global Capital Markets: Integration, Crisis, and Growth*. Cambridge: Cambridge University Press.

Papke, Leslie E., and Jeffrey M. Wooldridge. 1996. "Econometric Methods for Fractional Response Variables with an Application to 401(K) Plan Participation Rates." *Journal of Applied Econometrics*, 11(6): 619–32.

Persson, Torsten, and Lars E. O. Svensson. 1989. "Why a Stubborn Conservative Would Run a Deficit: Policy with Time-Inconsistent Preferences." *Quarterly Journal of Economics*, 104(2): 325–45.

Purcell, John F. H., and Jeffrey A. Kaufman. 1993. "The Risks of Sovereign Lending: Lessons from History." Unpublished.

Reinhart, Carmen M. 2010. "This Time Is Different Chartbook: Country Histories on Debt, Default, and Financial Crises." National Bureau of Economic Research Working Paper 15815.

Reinhart, Carmen M., and Vincent R. Reinhart. 2009. "Capital Flow Bonanzas: An Encompassing View of the Past and Present." In *NBER International Seminar in Macroeconomics 2008,* ed. Jeffrey Frankel and Christopher Pissarides, 1–54. Chicago: Chicago University Press.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2004. "The Modern History of Exchange Rate Arrangements: A Reinterpretation." *Quarterly Journal of Economics*, 119(1): 1–48.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2008. "This Time Is Different: A Panoramic View of Eight Centuries of Financial Crises." National Bureau of Economic Research Working Paper 13882.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2009a. *This Time Is Different: Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2009b. "The Aftermath of Financial Crises." *American Economic Review*, 99(2): 466–72.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2010. "Growth in a Time of Debt." *American Economic Review*, 100(2): 573–78.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2011. "From Financial Crash to Debt Crisis: Dataset." *American Economic Review.* http://www.aeaweb.org/articles.php?doi=10.1257/aer.101.5.1676.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2011. "The Forgotten History of Domestic Debt." *Economic Journal*, 121(552): 319–50.

Reinhart, Carmen M., Kenneth S. Rogoff, and Miguel A. Savastano. 2003. "Debt Intolerance." *Brookings Papers on Economic Activity*, 1: 1–62.

Rodrik, Dani, and Andres Velasco. 2000. "Short-Term Capital Flows." In *Annual World Bank Conference on Development Economics, 1999*, ed. B. Pleskovic and J. E. Stiglitz, 59–90. Washington, DC: World Bank.

Sachs, Jeffrey. 1984. *Theoretical Issues in International Borrowing*. Princeton, NJ: Princeton University.

Schularick, Moritz, and Alan M. Taylor. 2009. "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870–2008." National Bureau of Economic Research Working Paper 15512.

Stone, Irving. 1999. *The Global Export of Capital from Great Britain, 1865–1914: A Statistical Survey*. New York: St. Martin's Press.

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

Tomz, Michael. 2007. *Reputation and International Cooperation: Sovereign Debt across Three Centuries*. Princeton, NJ: Princeton University Press.

Velasco, Andres. 1987. "Financial Crises and Balance of Payments Crises: A Simple Model of the Southern Cone Experience." *Journal of Development Economics*, 27(1–2): 263–83.

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

Wynne, William H. 1951. *State Insolvency and Foreign Bondholders: Selected Case Histories of Governmental Foreign Bond Defaults and Debt Readjustments*. Vol. II. New Haven, CT: Yale University Press.