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ABSTRACT

Banking Crises: An Equal Opportunity Menace*

The historical frequency of banking crises is quite similar in high- and middle-to-low-income countries, with quantitative and qualitative parallels in both the run-ups and the aftermath. We establish these regularities using a unique dataset spanning from Denmark's financial panic during the Napoleonic War to the ongoing global financial crisis sparked by subprime mortgage defaults in the United States.

Banking crises dramatically weaken fiscal positions in both groups, with government revenues invariably contracting, and fiscal expenditures often expanding sharply. Three years after a financial crisis central government debt increases, on average, by about 86 percent. Thus the fiscal burden of banking crisis extends far beyond the commonly cited cost of the bailouts. Our new dataset includes housing price data for emerging markets; these allow us to show that the real estate price cycles around banking crises are similar in duration and amplitude to those in advanced economies, with the busts averaging four to six years. Corroborating earlier work, we find that systemic banking crises are typically preceded by asset price bubbles, large capital inflows and credit booms, in rich and poor countries alike.

JEL Classification: E6, F3 and N10
Keywords: bail out, banking, crisis, debt, equity prices and house prices

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I. Introduction

Until very recently, the study of banking crises has typically focused either on earlier historical experiences in advanced countries, mainly the banking panics before World War II, or else has focused on modern-day emerging market experiences.[1] This dichotomy is perhaps shaped by the belief that for advanced economies, destabilizing, systemic, multi-country financial crises were a relic of the past.[2] Of course, the recent global financial crisis emanating out of the United States and Europe has dashed this misconception, albeit at great social cost.

As this paper will demonstrate, banking crises have long been an equal opportunity menace. We develop this finding using a core sample of sixty-six countries (plus a broader extended sample for some exercises).[3] We examine banking crises ranging from Denmark's financial panic during the Napoleonic War to the current "first global financial crisis of the 21st century." The incidence of banking crises proves to be remarkably similar in the high- and middle-to-low-income countries. Indeed, the tally of crises is particularly high for the world's financial centers: the United Kingdom, the United States, and France. Perhaps more surprising still are the qualitative and quantitative parallels across disparate income groups. These parallels arise despite the relatively pristine modern sovereign default records of the rich countries.

Three features of our expansive dataset are of particular note. First, our data on global banking crises go back to 1800, extending the careful study of Bordo, et al. (2001) that covers

[1] See Calomiris and Gorton (1991) and Gorton (1988) on pre–WWII banking panics; Sundararajan and Baliño (1991) for several emerging market case studies; Jácome (2008) on banking crises in Latin America.
[2] Studies that encompass episodes in both advanced and emerging economies include Bordo et al. (2001), Demirgüç-Kunt and Detragiache (1998) and Kaminsky and Reinhart (1999).

[3] The core sample spans 66 advanced and emerging market economies in Africa, Asia, Europe, Latin and North America and Oceania; see Appendix Table A1. The extended sample includes all countries, see Table A3.

back to 1880. Second, to our knowledge, we are the first to examine the patterns of housing prices around major banking crises in emerging markets, including Asia, Europe and Latin America. Our emerging market data set facilitates comparisons, across both duration and magnitude, with the better-documented housing price cycles in the advanced economies, which have long been known to play a central role in financial crises.[4] We find that real estate price cycles around banking crises are similar in duration and amplitude across the two groups of countries. This result is surprising given that almost all other macroeconomic and financial time series (income, consumption, government spending, interest rates, etc.) exhibit higher volatility in emerging markets.[5]

Third, our analysis employs the comprehensive historical data on central government tax revenues and debt compiled in Reinhart and Rogoff (2008a,c). These new data afford a new perspective on the tax and debt consequences of the banking crises (Previously, the kind of historical data on debt necessary to analyze the aftermath of banking crises across countries was virtually non-existent for years prior to 1990.[6])

We find that banking crises almost invariably lead to sharp declines in tax revenues as well significant increases in government spending (a share of which is presumably dissipative). On average, government debt rises by 86 percent during the three years following a banking crisis. These indirect fiscal consequences are thus an order of magnitude larger than the usual bank bailout costs that are the centerpiece of most previous studies. That fact that the magnitudes are comparable in advanced and emerging market economies is also quite remarkable. Obviously, both the bailout costs and the fiscal costs depend on a host of political

[4] See Reinhart and Rogoff (2008b) for an analysis of all post–WWII banking crises in advanced economies.
[5] See, for instance, Agénor, McDermott, and Prasad (2000).
[6] Bordo and Meissner (2006) offer domestic debt data for selected years across 30 countries for 1880–1913, while Jeanne and Guscina (2006) provide domestic debt for 19 countries for 1980–2005. The Reinhart and Rogoff (2008c) time series for sixty-six countries spans 1913–2007, and much earlier for a large subset of these countries.

and economic factors, including especially the policy response as well as the severity of the real shock which, typically, triggers the crisis.[7]

The paper proceeds as follows. Section II provides an overview of the history of banking crises, with particular emphasis on the post-1900 experience. We also document the incidence and frequency of banking crises by country and by region. We discuss the links between banking crises, financial liberalization, the degree of capital mobility, and sovereign debt crises and discuss international financial contagion.

Section III examines some of the common features in the run-up to banking crises across countries and regions over time. The focus is on the systematic links between cycles in international capital flows, credit, and asset prices—specifically, home and equity prices. The next section examines some of the common features of the aftermath of banking crises. We document the toll that the crisis takes on output and government revenues, as well as the typically profound effect on the evolution of government debt during the years following the crisis. The concluding section takes up the question of "graduation." Specifically, to what extent do countries ever "graduate" from (stop experiencing) serial major financial crises as they seem to graduate from serial sovereign debt crises?[8]

[7] Reinhart and Rogoff 2008a,c show that output growth typically decelerates in advance of a crisis.
[8] An example of graduate from serial default is France, which defaulted 8 times on its external debt between 1500 and 1800, but has not defaulted since.

II. Banking Crises in Historical Perspective

We begin this section by providing an overview of the evolution of banking crises through history. To do so, it is necessary to first identify and date banking crisis episodes. Our approach, which follows the standard methodology in the literature (e.g., Kaminsky and Reinhart, 1999, Bordo, et al., 2001, and Caprio and Klingebiel, 2005, among others), is documented in detail in the appendix, along with our principal bibliographical sources. [9]

One dimension that distinguishes this study from previous efforts is that our dating of crises extends far before the much-studied modern post–World War II era. Specifically, we start in 1800. Our work was greatly simplified back to 1880 by the careful study of Bordo, et al. (2001), but for the earlier period we had to resort to old and often obscure works. The earliest advanced-economy banking crisis in our sample is France 1802; early crises in emerging markets befell India, 1863, China (several episodes during the 1860s–1870s), and Peru in 1873. [10]

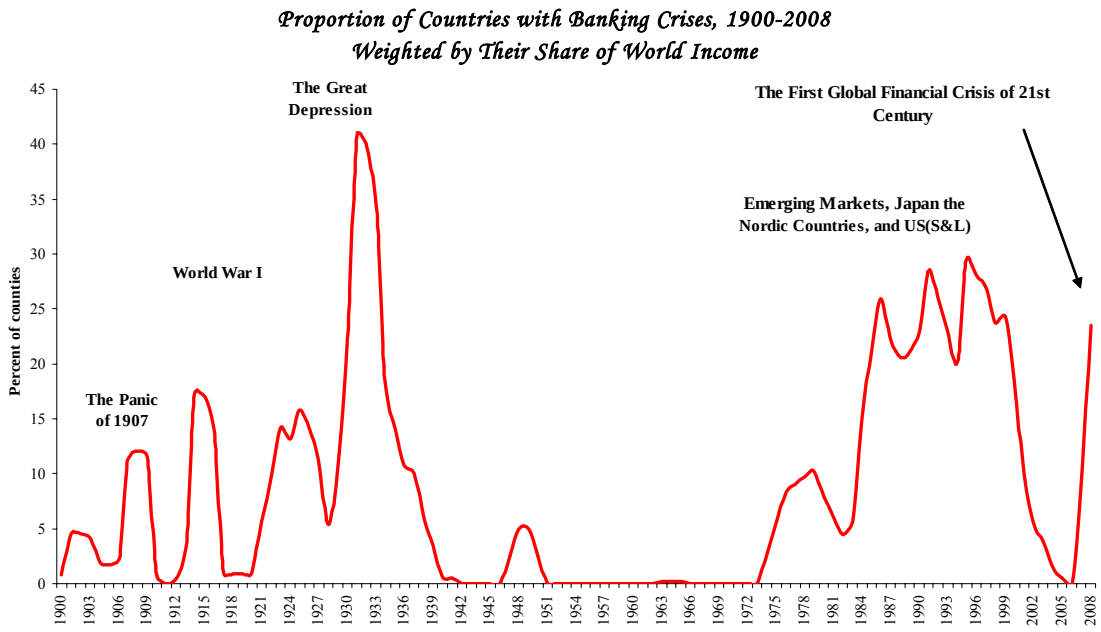
It may come as a surprise to the reader that previous attempts to document banking crises for the pre–World War II period are so limited. The problem is that because domestic banking crises do not typically impinge on large powerful creditors in the international financial centers, they do not leave the same imprint on the global press as, say, sovereign external defaults. For this reason, we acknowledge that despite our best efforts, our chronology may be missing a number of banking crises in emerging markets prior to World War II. [11] Fortunately, banking crisis episodes in the developed world tend to be better documented even throughout the 19th century.

[9] See also Reinhart and Rogoff (2008a).
[10] The work of Andrea McElderry (1976) and Cheng (2003) was invaluable in developing the timeline for China. The Peruvian case comes from a little-known 1957 book published in Lima by Carlos Camprubí Alcázar.
[11] The challenges encountered in dating banking crises are along similar lines as those faced when trying to construct a chronology of sovereign default on domestic debt, see Reinhart and Rogoff (2008c).

The Big Picture: Banking and Sovereign Debt Crises

Figure 1 plots the incidence of banking crises among the countries in our sample (which account for about 90 percent of world GDP). Specifically, the figure shows the percentage of all independent countries during 1900–2008 having a banking crisis in any given year. The tally weighs countries by their share of global GDP. This weighted aggregate is meant to provide a measure of the "global" impact of individual banking crises. As such, a crisis in the United States or Germany is accorded a much higher weight than a crisis in Angola or Honduras, all of which are part of our 66-country sample.

Figure 1



Sources: Bordo et al. (2001), Caprio et al. (2005), Kaminsky and Reinhart (1999), Jácome (2008), Maddison (2003), and additional sources listed in Appendix II, which provides banking crises dates.
Notes: Sample size includes all 66 countries listed in TableA1 that were independent states in the given year. Three sets of GDP weights are used, 1913 weights for the period 1800–1913, 1990 for the period 1914–1990, and finally 2003 weights for the period 1991–2006. The entries for 2007–2008 list crises in Austria, Belgium, Germany, Hungary, Japan, the Netherlands, Spain, the United Kingdom, and the United States. The figure shows a three-year moving average.

It is no surprise that the worldwide Great Depression of the 1930s posts the highest readings of banking crises during this 109-year stretch. Earlier, less widespread, "waves" of global financial stress are evident during and around the Panic of 1907 that originated in New York, as well as the crises accompanying the outbreak of the First World War. Another striking feature of Figure 1 is the relative calm during the late 1940s to the early 1970s. This calm may be partly explained by booming world growth, but perhaps more so by the repression of the domestic financial markets (in varying degrees) and the heavy-handed use of capital controls that followed for many years after World War II. (We are not necessarily implying that such repression and controls are the right approach to dealing with the risk of financial crises.)

Since the early 1970s, financial and international capital account liberalization took root worldwide. So, too, have banking crises. After a long hiatus, the share of countries having banking difficulties first began to expand in the 1970s. The break-up of the Bretton Woods system of fixed exchange rates together with the sharp spike in oil prices catalyzed a prolonged global recession, resulting in financial sector difficulties in a number of advanced economies. In the early 1980s, a collapse in global commodity prices combined with high and volatile interest rates in the United States contributed to a spate of banking and sovereign debt crises in emerging economies, most famously in Latin America and then Africa.

The United States had its savings and loan crisis beginning in 1984. During the late 1980s and early 1990s, the Nordic countries experienced some of the worst banking crises the wealthy economies had known in post–WWII following a surge in capital inflows and real estate prices. In 1992, Japan's asset price bubble burst and ushered in a decade-long banking crisis. Around the same time, with the collapse of the Soviet bloc, several formerly communist countries in Eastern Europe soon joined the ranks of nations facing banking sector problems. As the second half of the 1990s approached, emerging markets quickly faced a fresh round of banking crisis. Problems in Mexico and Argentina (1994–1995) were followed by the famous Asian crisis of 1997–1998, and then the troubles of Russia and Colombia, among others.[12] Argentina in 2001 and Uruguay in 2002 closed that upswing in the banking crisis cycle.

A brief tranquil period came to an abrupt halt in the summer of 2007 when the subprime crisis in the United States began in earnest, soon morphing into a global financial crisis.[13]

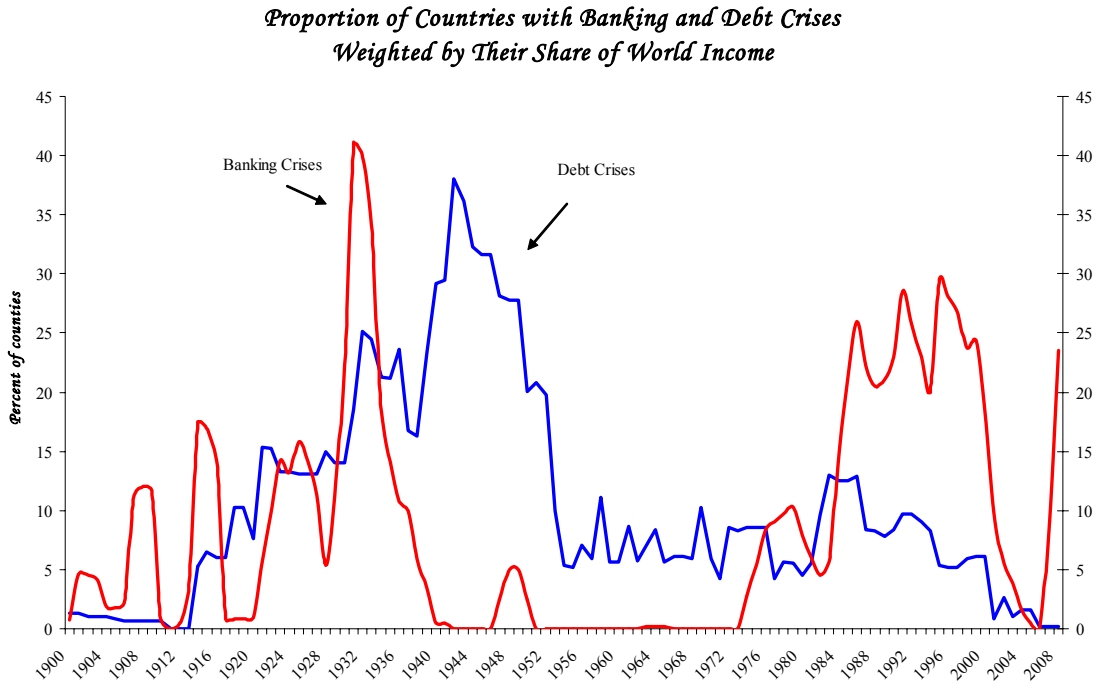
[12] While China's heavy-handed capital controls shielded it from contagious currency crashes during Asia's turmoil, it did not protect it from a systemic and costly banking crisis emanating primarily from large-scale lending to inefficient and bankrupt state-owned enterprises.

[13] Figure 1 does not fully capture the extent of the present upsurge in financial crises, as Ireland and Iceland (both having banking crises at the time of this writing) are not part of our core 66-country sample.

A high incidence of global banking crises has historically been associated with a high incidence of sovereign defaults of external debt. Figure 2 plots the (GDP-weighted) share of countries experiencing a banking crisis, as shown in Figure 1 and described above, against the comparably calculated share of countries experiencing a default or restructuring in their external debt. Sovereign defaults begin to climb with the onset of WWI (as do banking crises) and continue to escalate during the Great Depression and World War II. The decades that follow are relatively quiet, until debt crises sweep emerging markets beginning in the 1980s.[14] It remains to be seen whether the recent global surge in financial sector turbulence will lead to a similar outcome in the sovereign default cycle. Figure 2 suggests that a sharp rise in sovereign defaults would hardly be surprising.

[14] Note that in Figure 2 the debt crises of the 1980s do not loom as large as the previous cycle of defaults, as only middle- and low-income countries faced default, while in addition to emerging market economies several advanced economies defaulted during the Great Depression and several more defaulted during WWII.

Figure 2



Sources: Bordo et al. (2001), Caprio et al. (2005), Jácome (2008), Kaminsky and Reinhart (1999), Lindert and Morton (1989), Macdonald (2003), Maddison (2003), Purcell and Kaufman (1993), Reinhart, Rogoff, and Savastano (2003), Suter (1992), and Standard and Poor's (various years).
Notes: Sample size includes all countries, out of a total of sixty-six listed in Table 1 that were independent states in the given year. Three sets of GDP weights are used, 1913 weights for the period 1800–1913, 1990 for the period 1914–1990, and finally 2003 weights for the period 1991–2006. The entries for 2007–2008 list crises in Austria, Belgium, Germany, Hungary, Japan, the Netherlands, Spain, the United Kingdom, and the United States. The figure shows a three-year moving average.

Banking Crises: An Equal Opportunity Menace

In earlier papers, we have shown that the frequency of a default (or restructuring) on external debt is significantly lower for advanced economies than for emerging markets. For many high-income countries, that frequency has effectively been zero since 1800.[15] Even countries with a long history of multiple defaults prior to 1800, countries such as France and Spain, present evidence of having "graduated" from serial default on external debt.

The second column in Tables 1 and 2 highlights the vast differences between emerging markets (notably in Africa and in Latin America—but even in several countries in Asia) and high-income Western Europe, North America and Oceania. The third column of Tables 1 and 2 present the analogous calculation for each country for banking crises (i.e., number of years in banking crises, according to the extended dataset developed here, divided by the number of years since independence or since 1800—if independence was earlier). One striking observation from Tables 1 and 2 is that the average length of time spent in a state of sovereign default is far above the average amount of time spent in a financial crisis. A country can circumvent its external creditors for an extended period. It is far more costly to leave a domestic banking crisis hanging, due to the crippling effects on trade and investment.

[15] We do recognize, however, that the wide-spread abrogation of gold clauses—on domestic debt—during the 1930s' Great Depression by the United States and other developed economies were de facto sovereign defaults

Table 1. Debt and Banking Crises: Africa and Asia,
Year of Independence–2008

Country	*Share of years in default or rescheduling since independence or 1800*	*Share of years in a banking crisis since independence or 1800*
Africa		
Algeria	13.3	6.4
Angola	59.4	17.6
Central African Republic	53.2	38.8
Cote D'Ivoire	48.9	8.2
Egypt	3.4	5.6
Kenya	13.6	19.6
Mauritius	0.0	2.4
Morocco	15.7	3.8
Nigeria	21.3	10.2
South Africa	5.2	6.3
Tunisia	9.6	9.6
Zambia	27.9	2.2
Zimbabwe	40.5	27.3
Asia		
China	13.0	9.1
India	11.7	8.6
Indonesia	15.5	13.3
Japan	5.3	8.1
Korea	0.0	17.2
Malaysia	0.0	17.3
Myanmar	8.5	13.1
Philippines	16.4	19.0
Singapore	0.0	2.3
Sri Lanka	6.8	8.2
Taiwan	0.0	11.7
Thailand	0.0	6.7

[1] For countries that became independent prior to 1800 the calculations are for 1800–2006.
Sources: Authors' calculations, Bordo et al. (2001), Caprio et al. (2005), Kaminsky and Reinhart (1999), Jácome (2008), Standard and Poor's, Purcell and Kaufman (1993), Reinhart, Rogoff and Savastano (2003) and sources cited therein. See also Appendix II.

Table 2. Debt and Banking Crises: Europe, Latin America, North America, and Oceania, Year of Independence–2008

Country	*Share of years in default or rescheduling since independence or 1800*	*Share of years in a banking crisis since independence or 1800*
Europe		
Austria	17.4	1.9
Belgium	0.0	7.3
Denmark	0.0	7.2
Finland	0.0	8.7
France	0.0	11.5
Germany	13.0	6.2
Greece	50.6	4.4
Hungary	37.1	6.6
Italy	3.4	8.7
Netherlands	6.3	1.9
Norway	0.0	15.7
Poland	32.6	5.6
Portugal	10.6	2.4
Romania	23.3	7.8
Russia	39.1	1.0
Spain	23.7	8.1
Sweden	0.0	4.8
Turkey	15.5	2.4
United Kingdom	0.0	9.2
Latin America		
Argentina	32.5	8.8
Bolivia	22.0	4.3
Brazil	25.4	9.1
Chile	27.5	5.3
Colombia	36.2	3.7
Costa Rica	38.2	2.7
Dominican Republic	29.0	1.2
Ecuador	58.2	5.6
El Salvador	26.3	1.1
Guatemala	34.4	1.6
Honduras	64.0	1.1
Mexico	44.6	9.7
Nicaragua	45.2	5.4
Panama	27.9	1.9
Paraguay	23.0	3.1
Peru	40.3	4.3
Uruguay	12.8	3.1
Venezuela	38.4	6.2
North America		
Canada	0.0	8.5
United States	0.0	13.0
Oceania		
Australia	0.0	5.7
New Zealand	0.0	4.0

Sources: Authors' calculations, Bordo et al. (2001), Caprio et al. (2005), Kaminsky and Reinhart (1999), Jácome (2008), Standard and Poor's, Purcell and Kaufman (1993), Reinhart, Rogoff and Savastano (2003) and sources cited therein. See also Appendix II.

Tables 3 and 4 present a different perspective on the prevalence of banking crises. The second column tallies the number of banking crises (rather than the number of years in crisis) since independence or 1800; while the third narrows the window to the post–WWII period. Several features are worth noting***. For the advanced economies during the full sample, the picture that emerges is one of serial banking crises.*** 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 the advanced economies and the larger emerging markets alike during 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. Thus, ***while many now-advanced economies have graduated from a history of serial default on sovereign debt, or very high inflation (above 20 percent), graduation from banking crises has proven, so far, virtually impossible.*** Indeed, Tables 1–4 illustrate that 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.[16]

[16] As we have already acknowledged, our accounting of financial crises in poorer countries may be incomplete, especially for earlier periods, despite our best efforts.

Table 3. Frequency of Banking Crises: Africa and Asia through 2008

Country	*Number of banking crises since independence or 1800*	*Number of banking crises since independence or 1945*
Africa		
Algeria	1	1
Angola	1	1
Central African Republic	2	2
Cote D'Ivoire	1	1
Egypt	3	2
Kenya	2	2
Mauritius	1	1
Morocco	1	1
Nigeria	1	1
South Africa [1]	6	2
Tunisia	1	1
Zambia	1	1
Zimbabwe	1	1
Asia		
China	10	1
India [1]	6	1
Indonesia	3	3
Japan	8	2
Korea	3	3
Malaysia	2	2
Myanmar	1	1
Philippines	2	2
Singapore	1	1
Sri Lanka	1	1
Taiwan [1]	5	3
Thailand	2	2

[1] For South Africa the calculations are for 1850–2008; for India these are for 1800–2008.
Sources: Authors' calculations, Bordo et al. (2001), Caprio et al. (2005), Kaminsky and Reinhart (1999), and Jácome (2008). See also Appendix II.

Table 4. Frequency of Banking Crises: Europe, Latin America, North America, and Oceania, Through 2008

Country	*Number of banking crises since independence or 1800*	*Number of banking crises since independence or 1945*
Europe		
Austria	3	1
Belgium	10	1
Denmark	10	1
Finland	5	1
France	15	1
Germany	8	2
Greece	2	1
Hungary	2	2
Italy	11	1
Netherlands	4	1
Norway	6	1
Poland	1	1
Portugal	5	0
Romania	1	1
Russia	2	2
Spain	8	2
Sweden	5	1
Turkey	2	2
United Kingdom	12	4
Latin America		
Argentina	9	4
Bolivia	3	3
Brazil	11	3
Chile	7	2
Colombia	2	2
Costa Rica	2	2
Dominican Republic	2	2
Ecuador	2	2
El Salvador	2	2
Guatemala	3	2
Honduras	1	1
Mexico	7	2
Nicaragua	1	1
Panama	1	1
Paraguay	2	1
Peru	3	1
Uruguay	5	2
Venezuela	2	2
North America		
Canada	8	1
United States	13	2
Oceania		
Australia	3	2
New Zealand	1	1

[1] For countries that became independent prior to 1800 the calculations are for 1800–2006.
Sources: Authors' calculations, Bordo et al. (2001), Caprio et al. (2005), Kaminsky and Reinhart (1999), and Jácome (2008). See also Appendix II.

Summary Tables by Region of Frequency of Banking Crises, 1800-2007, and 1945-2007

Tables 5a and 5b summarize, by region, the evidence on the number of banking crises and share of years in banking crisis. Table 5a starts in 1800. (The table only includes post independence crises, which explains why emerging markets have lower cumulative totals since 1800.) Table 5b gives the evidence for post-1945.

Table 5a: Summary on the Incidence and Frequency of Banking Crises: 1800 (or independence)–2008

Region/Group	*Share of years in a banking crisis since independence or 1800*	*Number of banking crises*
Africa	12.5	1.7
Asia	11.2	3.6
Europe	6.3	5.9
Latin America	4.4	3.6
Of which: Argentina, Brazil, and Mexico	9.2	9.0
North America	11.2	10.5
Oceania	4.8	2.0
Advanced	7.2	7.2
Emerging	8.3	2.8

Table 5b: Summary on the Incidence and Frequency of Banking Crises: 1945 (or independence)–2008

Region/Group	*Share of years in a banking crisis since independence or 1800*	*Number of banking crises*
Africa	12.3	1.3
Asia	12.4	1.8
Europe	7.1	1.4
Latin America	9.7	2.0
Of which: Argentina, Brazil, and Mexico	13.5	3.0
North America	8.6	1.5
Oceania	7.0	1.5
Advanced	7.0	1.4
Emerging	10.8	1.7

Notes: Advanced economies are comprised of North America, Oceania, Japan and all European countries not listed below as part of emerging Europe. Emerging economies consist of Africa, all Asian countries except Japan, Latin America, and emerging Europe (Hungary, Poland, Romania, Russia, and Turkey).
Sources: based on Tables 1–4.

Whether the calculations are done from 1800 (Table 5a) or from 1945 (Table 5b), on average there are no significant differences in either the incidence or number of banking crises between advanced and emerging economies—banking crises are an equal opportunity menace. In fact, prior to WWII the advanced economies with their more developed financial systems were more prone to banking crises than many of the smaller low income counterparts. [17]

The Bunching of Banking Crises: Contagion or Common Fundamentals?

In this section, we discuss the bunching of banking crises across countries that is so evident in the late-2000s case, where both common shocks (the bursting of the global housing bubble) and cross-country linkages (for example, because many countries bought U.S. subprime mortgage debt) are evident.

Bordo and Murshid (2001) and Neal and Weidenmier (2003) have pointed out that cross-country correlations in banking crises were also common during 1880–1913, a period of relatively high international capital mobility under the gold standard. [18] Table 6 looks at a broader time span including the twentieth century; the table lists the years during which banking crises are bunched; greater detail on individual country dates is provided in Appendix A3.[19] The famous Baring crisis of 1890 (which involved Argentina and the U.K. before spreading elsewhere) appears to be the first episode of international bunching of banking crises; this was followed by the panic of 1907, which began in the United States and quickly spread to other

[17] On average, 7.2 crises for the advanced versus 2.8 for the emerging market countries (Table 5a).

[18] Bordo and Murshid (2001) look at the period 1880–1913. Neal and Weidenmier (2003) emphasize that periods of apparent contagion can be more readily interpreted as responses to common shocks, an issue we return to in the context of the present crisis. But, perhaps, the bottom line as regards a historical perspective on financial contagion is best summarized by Bordo and Murshid (2001), who conclude that "there is little evidence to suggest that cross-country linkages are tighter in the aftermath of a financial crisis for the recent period" (as opposed to 1880–1913, the earlier heyday of globalization in financial markets that they study).

[19] Table 6 does not include the bunching of other "types" of crises, such as the wave of sovereign defaults during 1825 or the currency crashes/debasements of the Napoleonic Wars.

advanced economies (particularly, Denmark, France, Italy, Japan, and Sweden). These episodes are reasonable benchmarks for modern-day financial contagion. [20]

Of course, other pre–World War II episodes of banking crisis contagion pale when confronted with the Great Depression (which also saw a large bunching in sovereign debt defaults, as seen earlier in Figure 2).

[20] See, Neal and Weidenmeir (2003) and Reinhart and Rogoff (2008a).

Table 6. Global Banking Crises, 1890–2008: Contagion or Common Fundamentals?

Years of bunching in banking crises	Affected countries	Comments
1890–1891	Argentina, Brazil, Chile, Portugal, UK, and US	Argentina defaults and there are runs on all Argentine banks (see della Paolera and Taylor (2001); Baring Brothers faces failure.
1907–1908	Chile, Denmark, France, Italy, Japan, Mexico, Sweden, US	A fall in copper prices undermines the solvency of a trust company (quasi bank) in NewYork.
1914	Argentina, Belgium, Brazil, France, India, Italy, Japan, Netherlands, Norway, UK, and US	The outbreak of WWI
1929–1931	Advanced: Belgium, Finland, France, Germany, Greece, Italy, Portugal, Spain, Sweden, US Emerging markets: Argentina, Brazil, China, India, Mexico	Real commodity prices collapse by about 51 percent during 1928–1931. Real interest rates reach almost 13 percent in the US.
1981–1982	Emerging markets: Argentina, Chile, Colombia, Congo, Ecuador, Egypt, Ghana, Mexico, the Philippines, Turkey, and Uruguay	Between 1979 and 1982, real commodity prices fall about 40 percent. US real interest rates hit about 6 percent—their highest readings since 1933. The beginning of the decade-long debt crisis in emerging markets.
1987–1988	Many small, mostly low-income countries, Sub-Saharan Africa-particularly hard hit.	The tail-end of a nearly decade-long debt crisis.
1991–1992	Advanced: Czech Republic, Finland, Greece, Japan, Sweden Others: Algeria, Brazil, Egypt, Georgia, Hungary, Poland, Romania, Slovak Republic	Real estate and equity price bubbles in the Nordic countries and Japan burst; many transition economies cope with liberalization and stabilization.
1994–1995	Argentina, Bolivia, Brazil, Ecuador, Mexico, and Paraguay Others: Azerbaijan, Croatia, Cameroon, Lithuania, Swaziland	The Mexican "tequila" crisis deals the first blow to the surge in capital inflows to emerging markets since the early 1990s.
1997–1998	Asia: Hong Kong, Indonesia, Malaysia, Philippines, Taiwan, Thailand, and Vietnam Others: Colombia, Ecuador, El Salvador, Mauritius, Russia, Ukraine	The second and last blow to capital flows to merging markets
2007--present	Germany, Hungary, Iceland, Ireland, Japan, Spain, UK, US and others	The US subprime real estate bubble—and other real estate bubbles in advance economies

The Late 2000s Global Financial Crisis

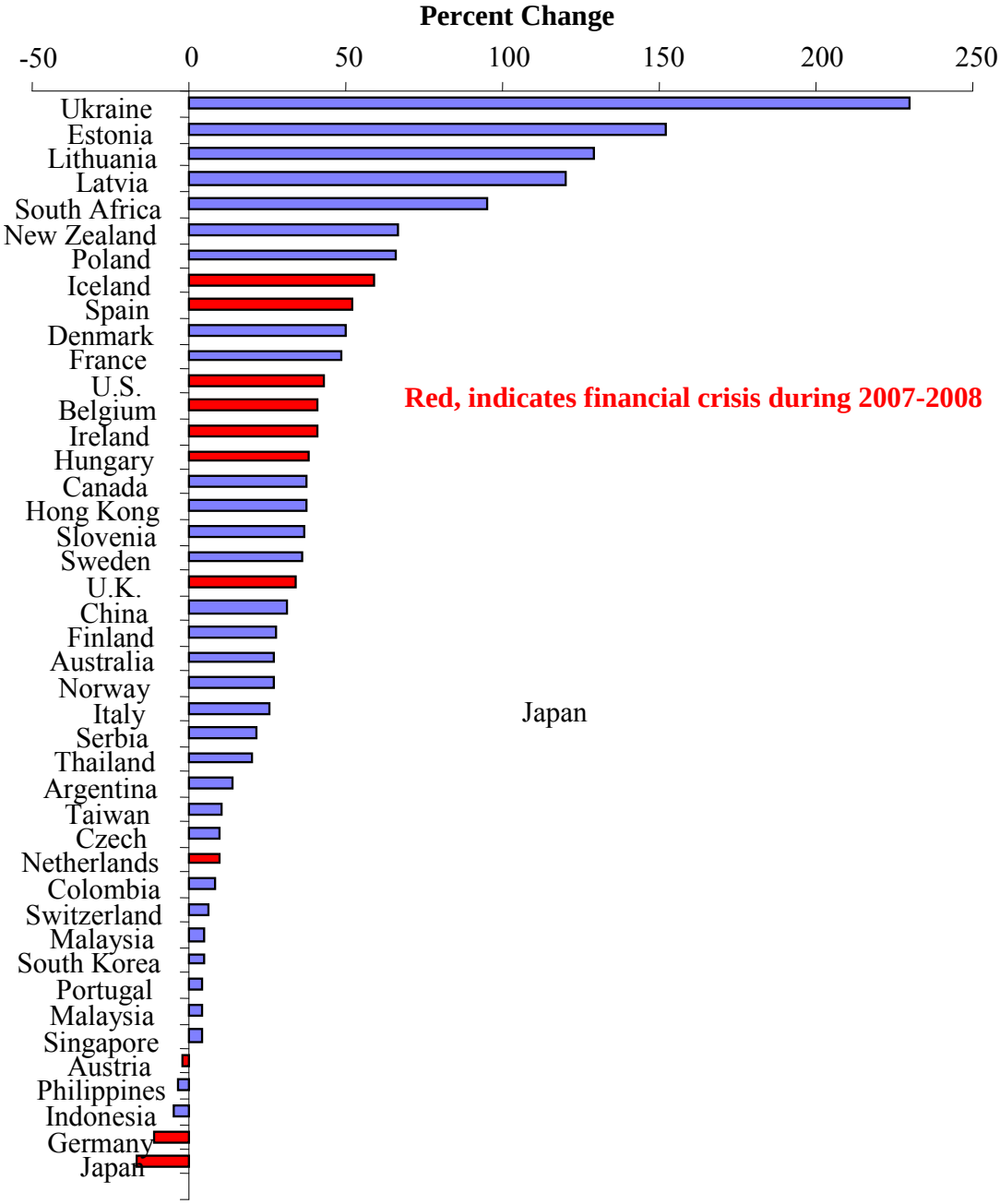
The current conjuncture is illustrative of the two channels of contagion, linkages and common shocks. There is little doubt that the U.S. crisis has spilled over into other markets through direct linkages. For example, German and Japanese financial institutions (and others ranging as far as Kazakhstan) sought more attractive returns in the U.S. subprime market, perhaps owing to the fact that profit opportunities in domestic real estate were limited at best and dismal at worst (Figure 3). Indeed, after the fact, it has become evident that many financial institutions outside the United States had nontrivial exposure to the U.S. subprime market.[21] This is a classic channel of transmission or contagion, through which a crisis in one country spreads across international borders. In the present context, however, contagion or spillovers are only part of the story.

That many other countries are experiencing economic difficulties at the same time as the United States also owes importantly to the fact that many of the features that characterized the run-up to the subprime crisis in the United States were present in many other advanced economies. Specifically, many countries in Europe and elsewhere (New Zealand, for example) were having their own home-grown real estate bubbles (Figure 3). This, in and of itself, makes these countries vulnerable to the usual nasty consequences of asset market crashes—irrespective of what may be happening in the United States.

[21] Owing to the opaqueness of balance sheets in many financial institutions in these countries, the full extent of exposure is, as yet, unknown.

Figure 3

Percent Change in Real Housing Prices: 2002-2006



Sources: Bank of International Settlements and sources listed in Table A4. China data covers 2003–2006.

Banking Crises, Capital Mobility, And Financial Liberalization

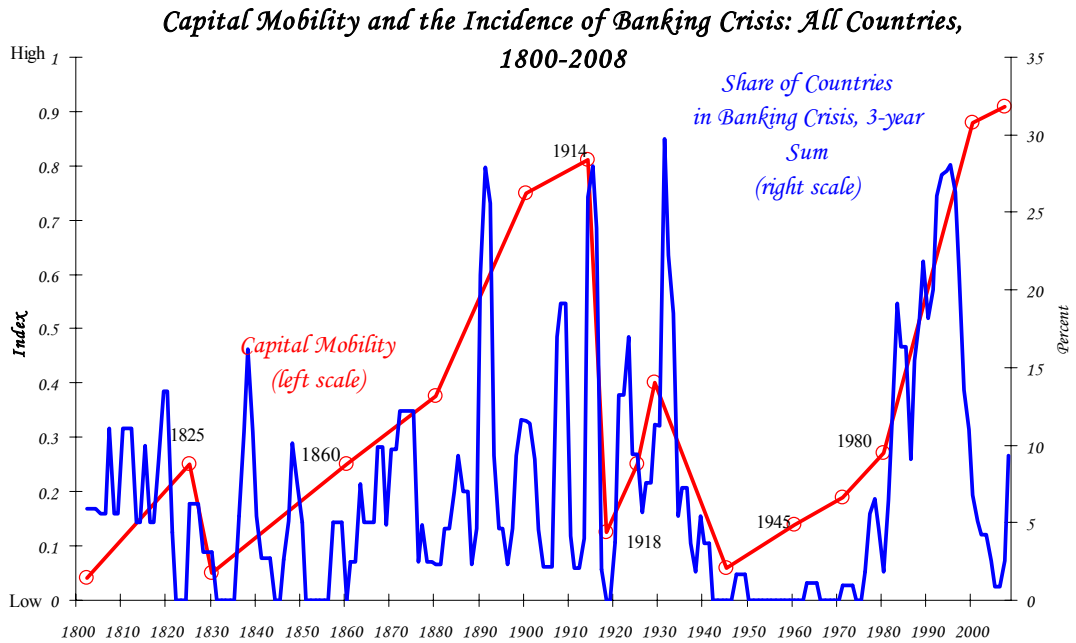
Also consonant with the modern theory of crises is the striking correlation between freer capital mobility and the incidence of banking crises, as shown in Figure 4. ***Periods of high international capital mobility have repeatedly produced international banking crises, not only famously as they did in the 1990s, but historically.*** The figure plots a three-year moving average of the share of all countries experiencing banking crises on the right scale. On the left scale, we graph the index of capital mobility, due to Obstfeld and Taylor (2004), updated and back cast using their same design principle, to cover our full sample period. While the Obstfeld–Taylor index may have its limitations, we feel it nevertheless provides a concise summary of complicated forces by emphasizing de facto capital mobility based on actual flows.

For the post-1970 period, Kaminsky and Reinhart (1999) present formal evidence on the links of crises with financial liberalization. In 18 of the 26 banking crises they study, the financial sector had been liberalized within the preceding five years, usually less. In the 1980s and 1990s most liberalization episodes were associated with financial crises of varying severity. Only in a handful of countries (for instance, Canada) did financial sector liberalization proceed smoothly. Specifically, the paper presents evidence that the probability of a banking crisis conditional on financial liberalization having taken place is higher than the unconditional probability of a banking crisis; probit analysis confirmed these results. Using a 53-country sample for the period 1980–1995 Demirgüç-Kunt and Detragiache (1998) also show, in the context of a multivariate logit model, that financial liberalization has an independent negative effect on banking sector stability and that this result is robust across numerous specifications. [22]

[22] See also, Drees and Pazarbasioglu (1998) for an insightful discussion of the Nordic experience with financial liberalization.

The stylized evidence presented in Caprio and Klingebiel (1996) suggests that inadequate regulation and lack of supervision at the time of the liberalization may play a key role in explaining why deregulation and banking crises are so closely entwined. Again, this is a theme across developed countries and emerging markets alike.

Figure 4



Sources: Bordo et al. (2001), Caprio et al. (2005), Kaminsky and Reinhart (1999), Obstfeld and Taylor (2004), and these authors.
Notes: This sample includes **all** countries (even those not in our core sample of 66). The full listing of banking crises dates are shown in Appendix II**.** On the left scale, we updated our favorite index of capital mobility, admittedly arbitrary, but a concise summary of complicated forces. The smooth red line shows the judgmental index of the extent of capital mobility given by Obstfeld and Taylor (2004), back cast from 1800 to 1859 using their same design principle.

III. Capital Flow Bonanzas, Credit Cycles and Asset Prices

This section examines some of the common features of banking crises across countries, regions and time. The focus is on the regularities among cycles in international capital flows, credit, and asset prices (specifically, housing and equity prices).

Capital flow bonanzas and crisis vulnerability

One common characteristic of the run-up to banking crises is a sustained surge in capital inflows. Reinhart and Reinhart (2008) delineate a criterion to define a capital flow bonanza, catalogue (country-by-country) "bonanza" [23] episodes for 1960–2006, and examined the links between bonanza spells and banking crises, employing the crisis dates defined and dated in the Appendix to the present paper. [24]

From the Appendix crises dates and the bonanza dates, two country-specific probabilities were calculated. The unconditional probability of a banking crisis, along the lines of those shown in Tables 1 and 2 (except for 1960–2007), and the probability of a banking crisis within a window of three years before and after the bonanza year or years—that is, as the conditional probability of a crisis. If capital flow bonanzas make countries more crises prone, the conditional probability, P(Crisis | Bonanza) should be greater than the unconditional probability of a crisis, P(Crisis).

[23]Reinhart an Reinhart define a capital flow bonanza as follows They settled on an algorithm that provided uniform treatment across countries but was flexible enough to allow for significant cross-country variation in the current account. As in Kaminsky and Reinhart (1999), we select a threshold to define bonanzas that is common across countries (in this case the 20th percentile).[23] This threshold included most of the better known episodes in the literature but was not so inclusive as to label a bonanza more "routine" deteriorations in the current account. Because the underlying frequency distributions vary widely across countries, the common threshold produces quite disperse country-specific cutoffs. For instance, in the case of relatively closed India, the cutoff to define a bonanza is a current account deficit/GDP in excess of 1.8 percent, while for trade-oriented Malaysia the comparable cutoff is a deficit/GDP ratio of 6.6 percent. [23]. [23]

[24] They performed a comparable exercise for currency, debt, and inflation crises.

Table 7 reproduces a subset of the results a Reinhart and Reinhart for banking crises. It presents aggregates of the country-specific conditional and unconditional probabilities for three groups (all countries, high income, and middle and low income).

The probability of a banking crisis conditional on a capital flow bonanza is higher than the unconditional probability. The bottom row of Table 6 provides the share of countries for which P(Crisis | Bonanza) ≥ P(Crisis) as an additional indication of how common place is it across countries to see bonanzas associated with a more crisis-prone environment. For banking crises, the majority of countries (61 percent) register a higher propensity to banking crises around bonanza periods.

We conjecture that the 61 percent figure would be higher if one were to include post-2007 data in Table 7. Many countries experiencing the most severe banking crises have also run large sustained current account deficits. These include many developed countries, such as the United States, the United Kingdom, Spain, Iceland and Ireland.

Table 7. Are Capital Flow Bonanza Episodes More Prone to Banking Crisis?
1960–2007

Probability of a banking crisis (in percent), 66-country sample	
Conditional on a bonanza (three-year window)	18.4
Unconditional	13.2
Difference	*5.2*
Memorandum item:	
Percent of countries for which conditional probability is greater than unconditional	60.9

Notes: The three-year window encompasses three years before the bonanza years (see Reinhart and Reinhart, 2008, Table 2), the year (or years if these are consecutive) of the bonanza, and the three years following the episode. *Italics* denote significance at the one-percent confidence level.
Source: Reinhart and Reinhart (2008), based on Tables 2 and 4 and authors' calculations.

The findings on capital flow bonanzas in Reinhart and Reinhart (2008) are also consistent with empirical regularities surrounding credit cycles. Mendoza and Terrones (2008), who examine cycles in credit in both advanced and emerging market economies using a very different

approach from that just discussed, find that credit booms in emerging market economies are often preceded by surges in capital inflows. They also conclude that while not all credit booms end in financial crises, most emerging market crises were preceded by credit booms. They link credit booms to rising asset prices, an issue we turn to next. [25]

Equity and housing price cycles and banking crises

In this section, we summarize the literature on asset price bubbles and banking crises, extending it to incorporate new data on housing prices in emerging markets, as well as data on the unfolding crises in the advanced economies.

The now-infamous real estate bubble in the United States that began to deflate at the end of 2005 occupies center stage as a culprit of the present financial crisis. But the subprime episode is far from unique in that regard. In Reinhart and Rogoff (2008b), we document the trajectory in real housing prices around all the post–WWII banking crises in advanced economies, with particular emphasis on the "Big 5" crises (Spain, 1977, Norway, 1987, Finland and Sweden, 1991 and Japan, 1992).[26] The pattern that emerges is clear: a boom in real housing prices in the run-up to the crisis is followed by a marked decline the year of the crisis and in subsequent years. Bordo and Jeanne (2002), also studying the advanced economies during 1970–2001, find that banking crises tend to occur either at the peak of the boom in real housing prices, or right after the bust. Gerdrup (2003) presents a compelling narrative of the links between Norway's three banking crises during 1890s–1993 and the booms and busts in housing prices.

Table 8 illustrates the magnitude and duration of the downturn in housing prices that has historically accompanied major banking crises in both advanced and emerging economies.

[25] See also Kaminsky and Reinhart (1999), who also examine the growth in real credit to the private sector around both banking and currency crises.
[26] The years refer to the beginning of the crisis.

While the links between banking crises and the housing price cycle have been examined in both our earlier work and numerous other papers (most frequently case studies), this is the first paper to provide systematic evidence on the behavior of housing prices for emerging market economies around some of their major banking crises. The crisis episodes include the "Big 6" Asian crises of 1997–1998, Indonesia, Korea, Malaysia, the Philippines, Thailand, and the much buffeted Hong Kong.

Table 8. Real Housing Price Cycles and Banking Crises

Country	Crisis date	Peak	Trough	Duration of downturn	Magnitude of decline (in percent)
		Advanced economies: The Big 5			
Finland	1991	1989:Q2	1995:Q4	6 years	–50.4
Japan	1992	1991:Q1	Ongoing	Ongoing	–40.2
Norway	1987	1987:Q2	1993:Q1	5 years	–41.5
Spain	1977	1978	1982	4 years	–33.3
Sweden	1991	1990:Q2	1994:Q4	4 years	–31.7
		Asian Crisis: The Big 6			
Hong Kong	1997	1997:Q2	2003:Q2	6 years	–58.9
Indonesia	1997	1994:Q1	1999:Q1	5 years	–49.9
Malaysia	1997	1996	1999	3 years	–19.0
Philippines	1997	1997:Q1	2004:Q3	7 years	–53.0
South Korea	1997		2001:Q2	4 years	–20.4
Thailand	1997	1995:Q3	1999:Q4	4 years	–19.9
		Other emerging			
Argentina	2001	1999	2003	4 years	–25.5
Colombia	1998	1997:Q1	2003:Q2	6 years	–51.2
Historical episodes					
Norway	1898	1899	1905	6 years	–25.5
US	1929	1925	1932	7 years	–12.6
		Current cases			
Hungary	2008	2006	Ongoing	Ongoing	–11.3
Iceland	2007	November 2007	Ongoing	Ongoing	–9.2
Ireland	2007	October 2006	Ongoing	Ongoing	–18.9
Spain	2007	2007:Q1	Ongoing	Ongoing	–3.1
UK	2007	October 2007	Ongoing	Ongoing	–12.1
US	2007	December 2005			–16.6

Sources: Bank of International Settlements and the individual country sources described in the Data Appendix.

Other emerging market episodes include Argentina's mega-crisis in 2001–2002, and Colombia's 1998 crisis, which produced the worst recession since the national income accounts were tabulated in the early 1920s. In the current conjuncture of unfolding crises, we include

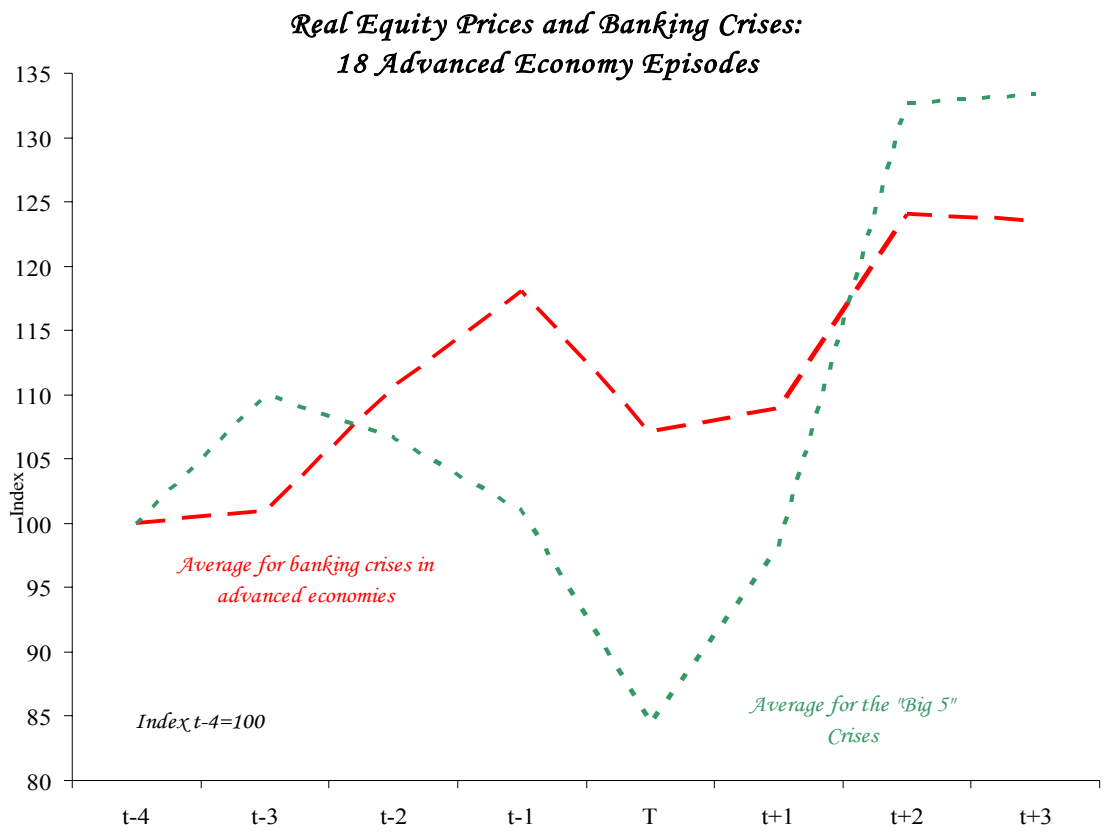
Hungary, in addition to the advanced economies that have had recent housing market bubbles (Iceland, Ireland, Spain, the United Kingdom, and the United States).[27]

Two features stand out from the summary statistics presented in Table 8. First is the persistence of the cycle in real housing prices in both advanced economies and emerging markets, typically four to six years.[28] The second feature that stands out from Table 8 is that the ***magnitudes of the declines in real housing prices around banking crises from peak to trough are not appreciably different in emerging and advanced economies.*** This comparability is quite surprising given that most macroeconomic time series exhibit drastically greater volatility in emerging markets, and thus it merits further attention.[29] Certainly, the first results presented here on comparing housing price booms and busts around banking crisis dates appears to strongly support the contention that banking crises are an equal opportunity menace.

The prolonged housing price downturns following financial crises are in stark contrast to the behavior of real equity prices, as illustrated in Figures 5a and 5b in which the pattern of decline and recovery is more v-shaped.

[27] Historical comparisons are hard to come by, as most real housing price series are of recent vintage. We do include in this category two episodes: the United States during the Great Depression and Norway's crisis at the turn of the century (1898).
[28] See Ceron and Suarez (2006), who estimate its average duration at six years
[29] For example, Agenor, McDermott, and Prasad (2000) provide evidence that output and real consumption are far more volatile in emerging markets; Kaminsky, Reinhart and Vegh (2003) present evidence that the amplitude of the cycle in real government spending is orders of magnitude greater in emerging markets.

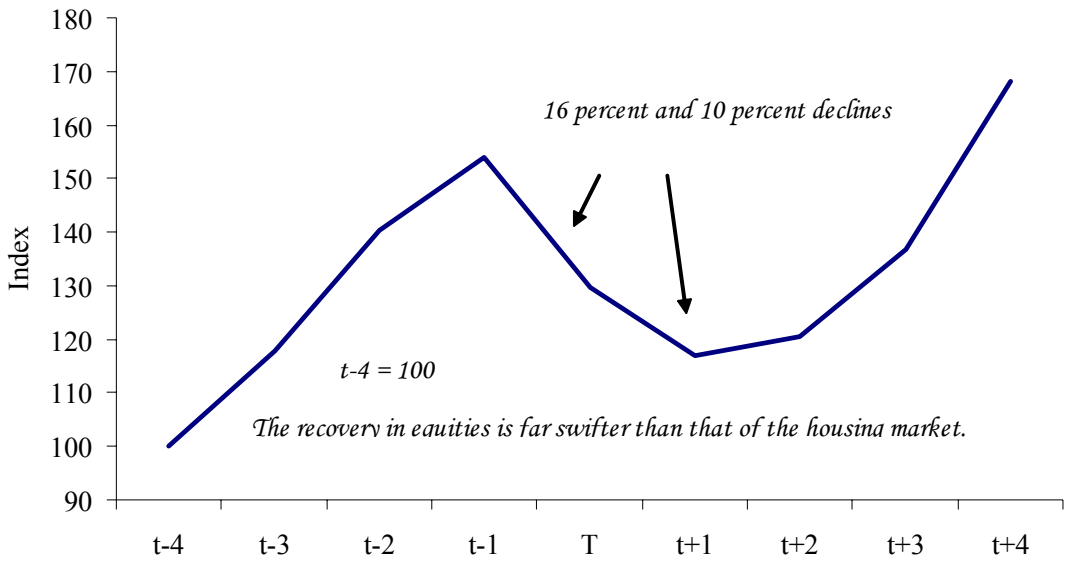
Figure 5a



Notes: The Big 5 crises are: Spain, 1977; Norway, 1987; Finland, 1991, Sweden, 1991; and Japan 1992.
Source: Global Financial Data and author's calculations.

Figure 5b

Equity Prices and Banking Crises:
40 Emerging Market Episodes



Source: Global Financial Data and author's calculations.
Notes: Four of the 40 episodes are pre–World War II (1921–1929).

These figures show the evolution of real equity prices from four years prior to the crisis to three years afterwards for emerging and advanced economies separately. As the figures make plain, equity prices typically peak before the year of the banking crisis and decline for 2–3 years as the crisis approaches and, in the case of emerging markets in the year following the crisis. However, the pattern tends to be v-shaped and the recovery complete, in the sense that three years after the crisis real equity prices are on average higher than the pre-crisis peak.

One can conjecture that one reason why major banking crises are such protracted affairs is that these episodes involve the real estate market's persistent cycle in a way that "pure stock market crashes" (for instance, Black Monday in October 1987 or the burst of the IT bubble in 2001) do not. [30]

Financial Sector Expansion and Financial Crisis

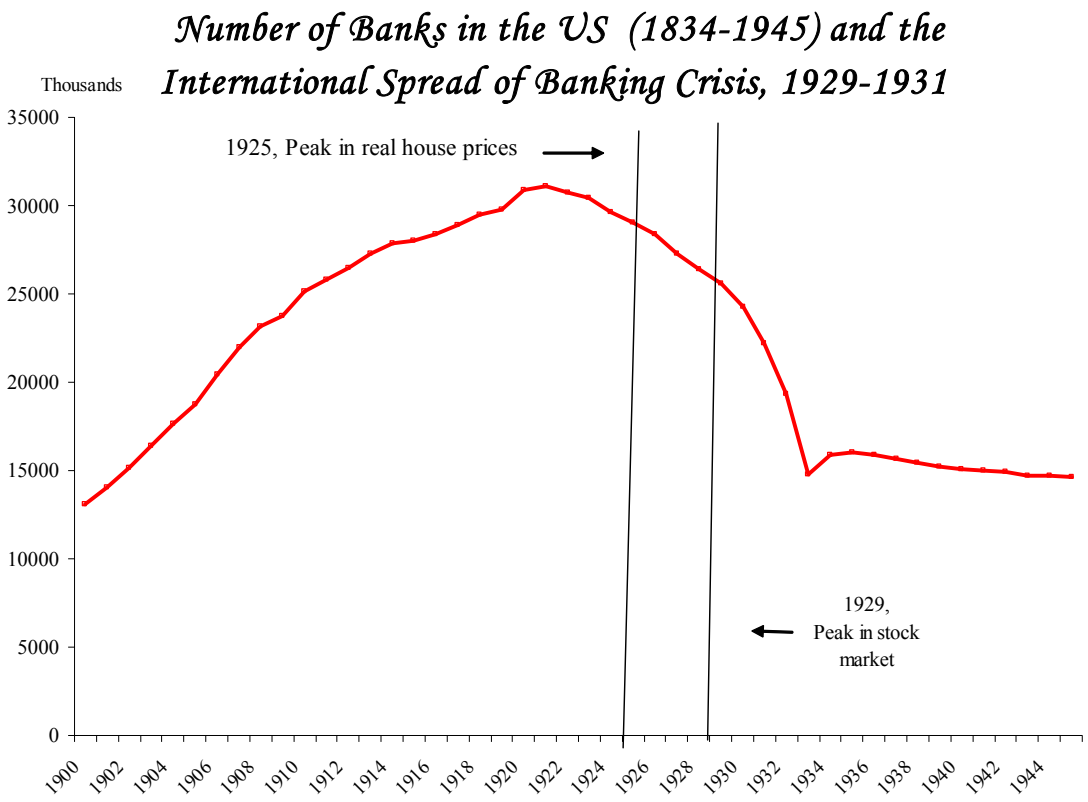
Philippon (2007) analyzes the expansion of the financial services sector (including insurance) in the United States, which averaged 4.9 percent of GDP during 1976–85, rising to 7.5 percent 1996–2005. His paper argues that this gain was not sustainable and a decline of at least 1 percent of GDP was probable. In the wake of the subprime crisis, the shrinkage of the financial sector during 2008 and 2009 is likely to be significantly larger. The pre-crisis explosion and post-collapse implosion of the financial sector surrounding a banking crisis is also not new or unique to the United States.

Figure 6 plots the number of banks in the United States in the run-up and aftermath of the Great Depression. Perhaps, the bubble in equity and real estate prices also extended to the number of financial institutions. This expansion in the run-up and contraction in the aftermath in

[30] This is consistent with the regularity that house prices are far more predictable (i.e., inertial) than equity prices.

the number of financial institutions is evident during other banking crises—especially in those cases where financial liberalization preceded the banking crisis.

Figure 6



Sources: Historical Statistics of the Unites States.

IV. The Fiscal and Growth Consequences of Banking Crises

Looking at the fiscal and growth consequences of banking crises, we again find some surprising parallels between developed countries and emerging markets. Our analysis of the fiscal consequences, in particular, is a sharp departure from the previous literature, which has focused almost entirely on imputed "bailout costs" to the government which, as we shall argue, are extremely difficult to measure. Instead, we will focus on the fiscal costs to the government, particularly the huge build-ups in debt that follow banking crises. We are able to do so by tapping the extensive new cross-country annual dataset on domestic debt compiled in Reinhart and Rogoff (2008c). This data allow us to show the remarkable surge in debt that occurs in the wake of crises.

That elusive concept of bailout costs

As we have noted, much of the literature that studies banking crisis episodes is fixated on providing estimates of the fiscal or bailout costs of these crises (see, for example, an excellent discussion in Frydl, 1999, and various papers in Norges Bank, 2006).[31] At the time of this writing, the International Monetary Fund estimates that the fiscal costs of the U.S. subprime crisis will tally about $1.4 trillion, or around 11 percent of GDP.[32] However, estimates of bailout costs vary markedly across studies, depending on the methodology and vary even more across time, depending on the length of horizon used to calculate the fiscal impact of the crisis, a point stressed in Frydl (1999). [33] Table 9 presents the upper and lower bounds of estimates of the bailout costs for some of the better-known banking crises in both advanced and emerging economies in nearly all regions. The discrepancies across estimates are large and, in some cases,

[31] See also Caprio et al. (2005), and Hoggarth et al. (2002), and Sanhueza (2001).
[32] See International Monetary Fund, October 2008 *World Economic Outlook* and *Global Financial Stability Report*.
[33] A similar problem plagues work on determining the effectiveness of foreign exchange intervention by measuring the profitability of such market purchases or sales. The results depend importantly on the width of the time window and implicit assumptions of the cost of financing. See Neely (1995).

staggering. Among the ”Big 5” post–WWII crises in advanced economies, the differences in estimated bailout costs for Japan and Spain are 16 and 11 percent of GDP, respectively. Even for Norway, where the difference between the upper and lower bounds of the estimates is 2 percent of GDP, a different way of looking at the discrepancy is to note that the upper end of the estimates (4 percent of GDP) is twice as large as the lower bound estimates of the costs of the bailout. Furthermore, as noted in Vale (2006), if the costs are calculated over a longer time horizon after the crisis, the picture that emerges is even more at odds with the higher-end estimates; it shows that the Norwegian government actually made a small profit on the banking resolution, due to the later sale of shares in the nationalized banks.

Table 9. Creative Accounting? Discrepancies in Estimated??? Bailout Costs of Banking Crises

Country/beginning year	Estimated bailout cost as a percent of GDP		
	Upper bound	Lower bound	Difference
Argentina, 1981	55.3	4.0	51.3
Chile, 1981	41.2	29.0	12.2
Ghana, 1982	6.0	3.0	3.0
Japan, 1992	24.0	8.0	16.0
Norway, 1987	4.0	2.0	2.0 [1]
Philippines 1984	13.2	3.0	10.2
Spain, 1977	16.8	5.6	11.2
Sweden, 1991	6.4	3.6	2.8
US (S&L), 1984	3.2	2.4	0.8

Sources: Frydl (1999) and sources cited therein and Vale (2006).
[1] In Norges Bank (2006) it is argued that the Norwegian government actually made a small profit on the banking resolution.

In what follows, we argue that this nearly universal focus on providing opaque calculations of bailout costs is both misguided and incomplete. It is misguided because there are no widely agreed upon guidelines to calculate these estimates. It is incomplete because the fiscal consequences of banking crises reach far beyond the more immediate bailout costs. These consequences mainly result from the significant adverse impact that the crisis has on government

revenues (in nearly all cases) and the fact that in several episodes the fiscal policy reaction to the crisis has also involved substantial fiscal stimulus packages.

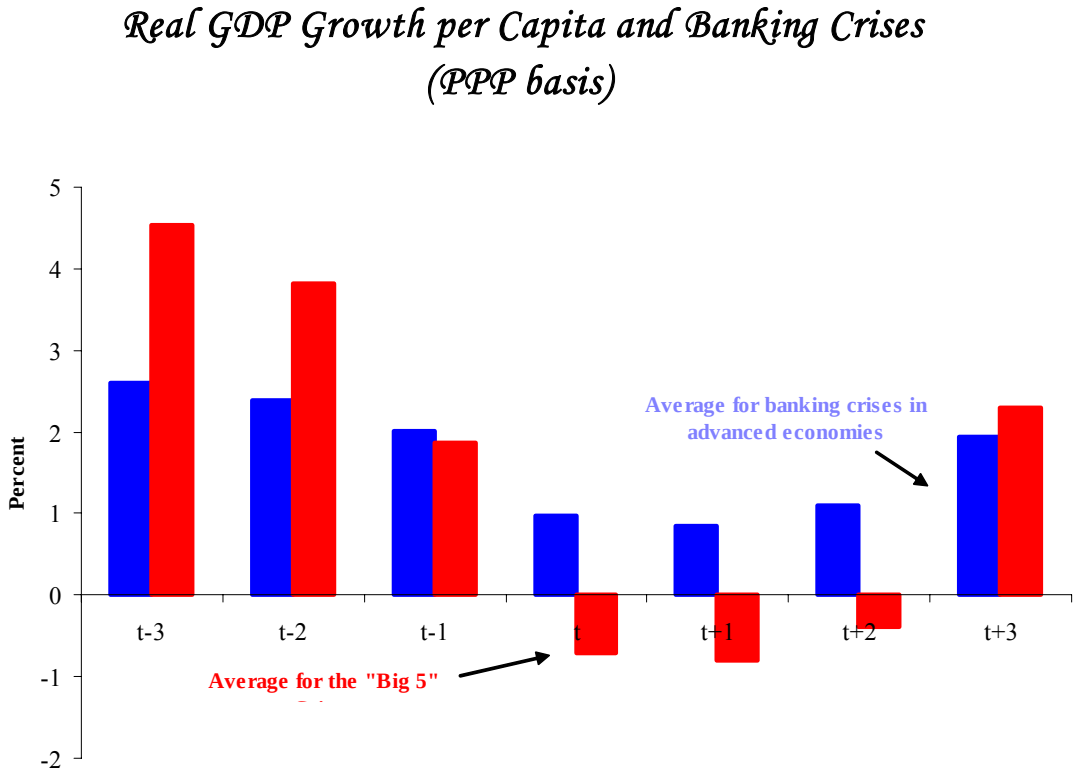
Growth in the Aftermath of Crises

The fact that most banking crises, especially systemic ones, are associated with economic downturns is well established in the empirical literature and we offer no new compelling evidence on that score. [34] Reinhart and Rogoff (2008b) recently summarized the evolution of output before, during, and after all the banking crises (systemic or not) in post–WWII. Figure 7 shows the advanced economies as a group, as well as the "big five" (Japan, Nordics and Spain), while Figure 7b augments this analysis with a comparable summary for the post-war banking crises in emerging markets. As before, time *t* denotes the year of the crisis. It is interesting to note that the figures show a steeper decline but a somewhat faster comeback in growth for emerging markets than in the advanced economies. [35] It is beyond the scope of this paper to ascertain the longer run growth consequences of banking crises, but we wish to note this post-crises pattern because growth (important in its own right) has nontrivial implications for fiscal balances, government debts, and the broader cost and consequences of any financial crisis.

[34] See, for instance, Frydl (1999), and Kaminsky and Reinhart (1999), and especially Rajan, Detragiache and Dell'Ariccia (2008), who examine the output consequences of the credit channel following banking crises using micro data. We note that the cases of output collapses studied in Barro and Ursua (2008) virtually all are associated with banking crises.

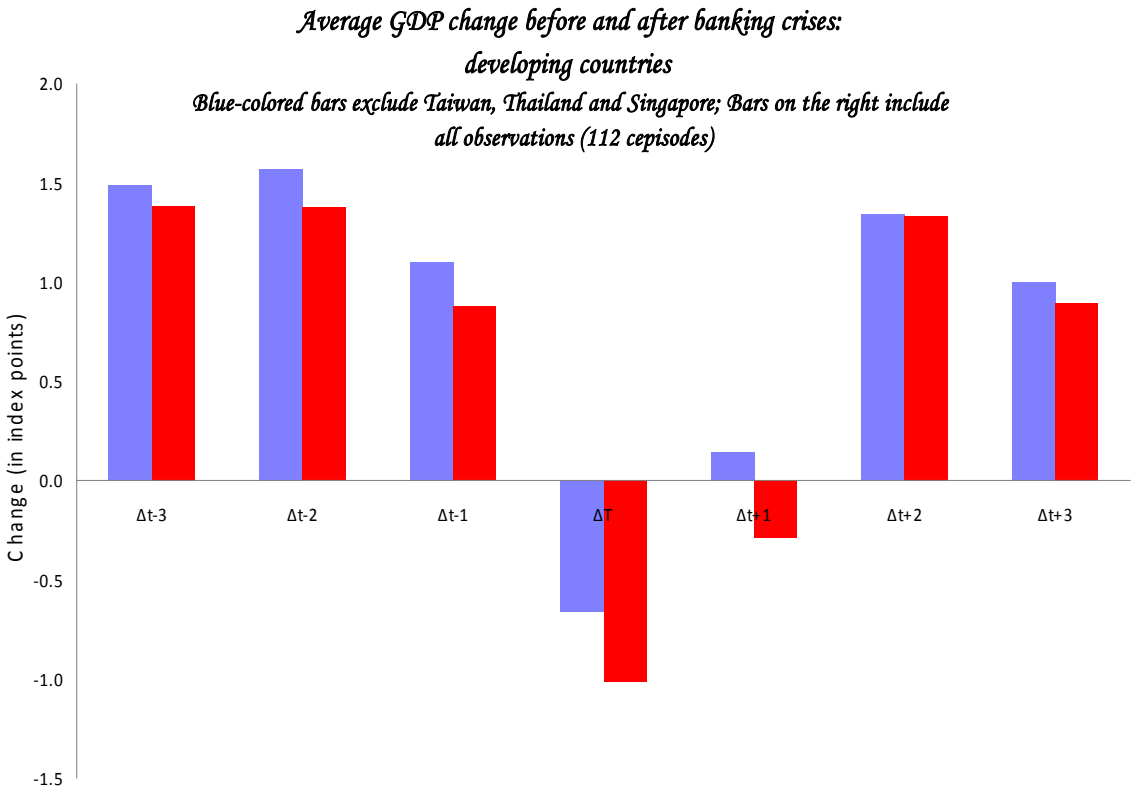
[35] It is important to note that the v-shaped pattern of recovery is importantly influenced by the sharp comebacks of the Asian economies from the severe 1997–1998 crisis. Excluding these countries considerably worsens the average performance two and three years after the banking crisis, making the pattern look more u-shaped.

Figure7a



Sources: Maddison (2003), Total Economy Database (2008), IMF *World Economic Outlook* (2008), and author's calculations.
Notes: Banking crisis episodes are listed in Appendix II.

Figure 7b



Sources: Maddison (2004), Total Economy Database (2008), IMF *World Economic Outlook* (2008), and author's calculations.
Notes: Banking Crisis episodes are listed in Appendix II.

Beyond Bailout Costs: The Impact Of The Crisis On Revenues And Debt

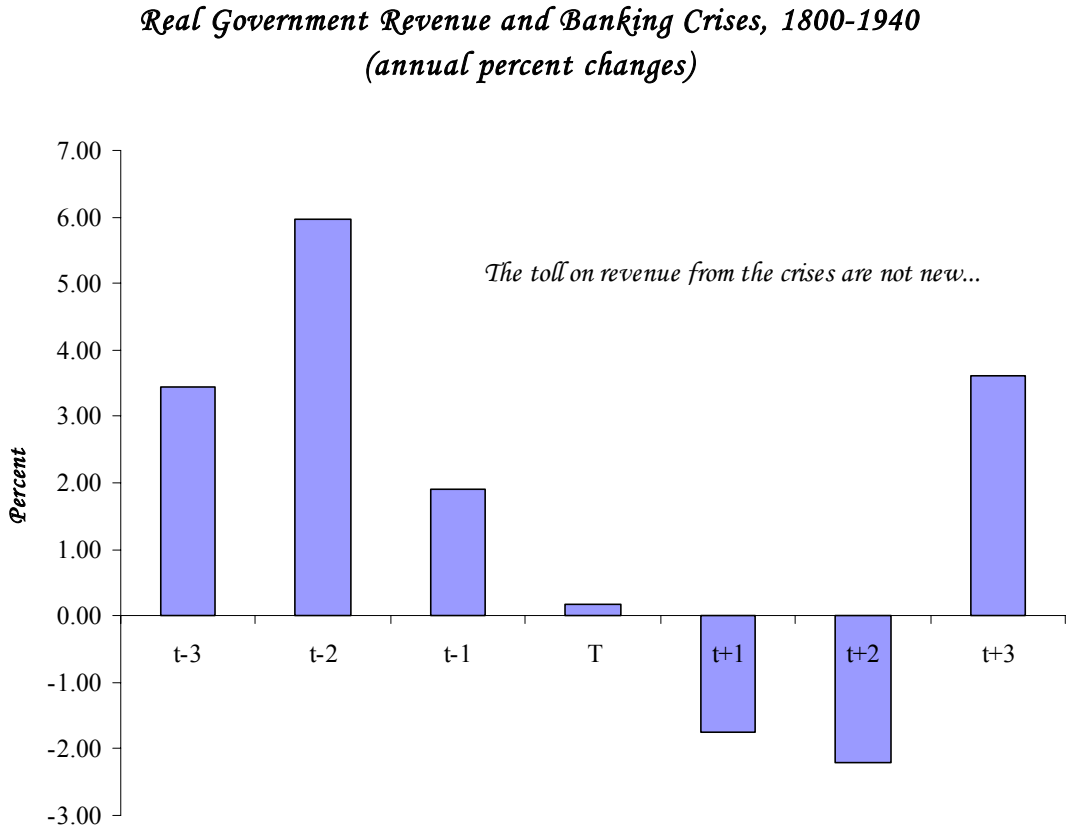
Since WWII the most common policy response to a systemic banking crisis (in both emerging and advanced economies) has been to engineer (with varying degrees of success) a bailout of the banking sector, whether through purchases of bad assets, directed mergers of bad banks with relatively sound institutions, direct government takeovers, or some combination of these. Such actions have had in many cases major fiscal consequences, typically early on in the crisis. However, as noted earlier, banking crises are protracted affairs with lingering consequences in asset markets—notably real estate prices and the real economy. As such it is not surprising that government revenues are adversely and significantly impacted by the crisis.

As noted, several studies have traced out the adverse impacts of banking crises on economic activity; what these studies have left unexplored is the direct consequences of the recession on government finances—specifically, tax revenues. Figure 8a plots the average pattern in annual real revenue growth three years before, during, and three years after banking crises for a total of 86 banking crises during 1800–1944 for which we have complete revenue data. [36]

The comparable exercise is shown for all 138 post–WWII banking crises in Figure 8b. The patterns for the pre- and post-war samples are not identical but strikingly similar. Annual revenue growth is robust in the years leading up to the banking crisis; growth weakens significantly the year of the crisis and subsequently posts declines in the years immediately following the onset of the crisis. For the pre-war episodes revenues decline, on average for two years, while for the post-war the revenue slump extends to the third year.

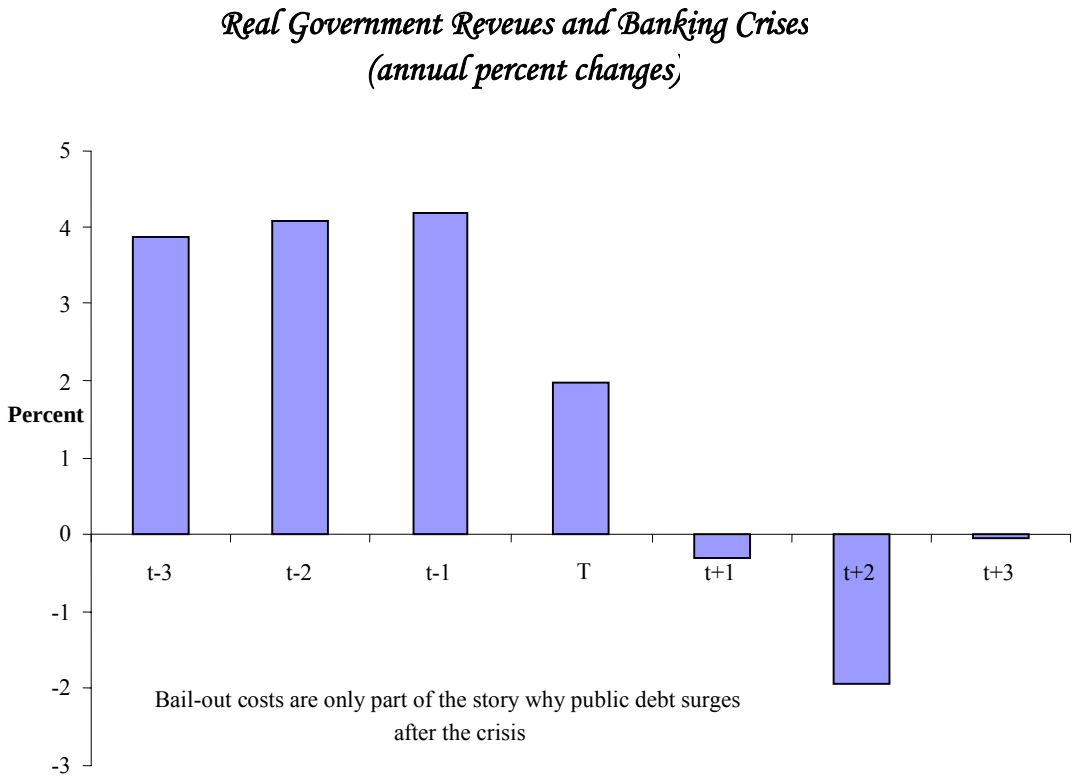
[36] Revenues (from Mitchell, 2003a, b, and c) are deflated by consumer price indices; the numerous sources for these data are given on a country-by-country and period-by-period basis in the data appendix to Reinhart and Rogoff (2008a).

Figure 8a (all countries)



Sources: Revenues are from Mitchell (2003a, b,). For the numerous country-specific sources of prices see Reinhart and Rogoff (2008a).
Notes: Central government revenues deflated by consumer prices. There are a total of 86 banking crisis episodes during 1800–1940 for which we have revenue data.

Figure 8b (all countries)



Sources: Revenues are taken from Mitchell (2003a, b). For the numerous country-specific sources of prices see Reinhart and Rogoff (2008a).
Notes: Central government revenues deflated by consumer prices. There are a total of 138 banking crises during 1945–2008 for which we have revenue data.

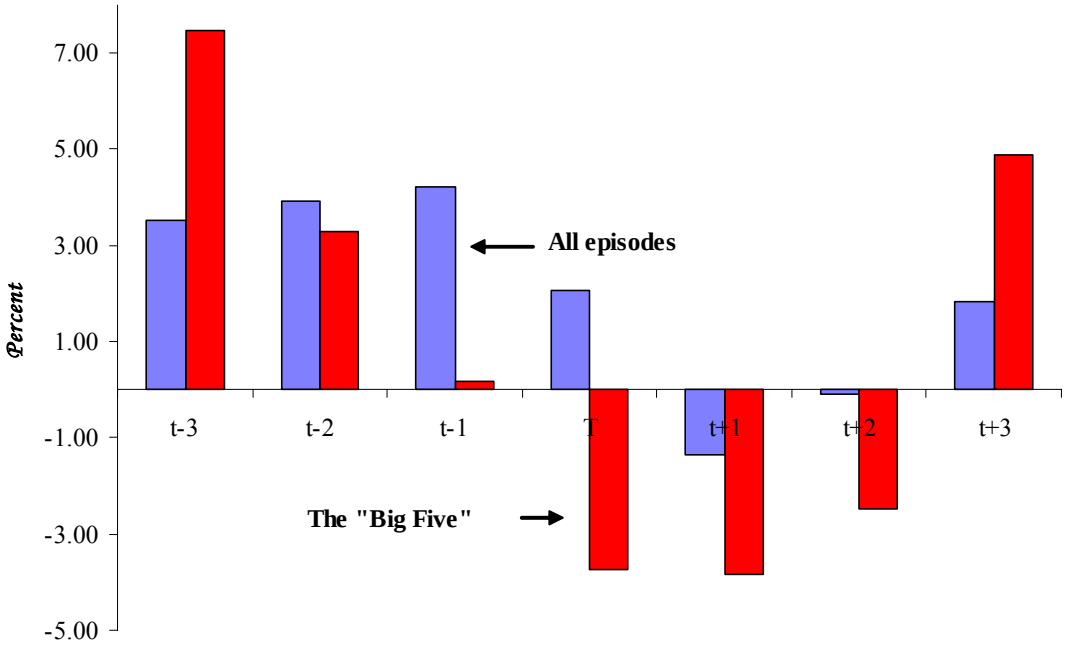
Parallels in Revenue Losses between Emerging Markets and Developed Economies

Again, the parallels between developed countries and emerging markets is striking. Figure 8c shows the revenue declines surrounding banking crises for the advanced countries across the entire sample, with the "big five" post-war crises also listed separately. Revenue growth resumes (from a lower base) starting in the third year after the crisis. Advanced economies exhibit a strong inclination to resort to stimulus measures to cushion economic activity, seen most spectacularly in the aggressive use of infrastructure spending in Japan during the 1990s. Emerging markets are far less well poised to engage in countercyclical fiscal policy.

Nevertheless, the effect of the crisis on the trajectory of taxes is broadly similar. Figure 8d gives revenue declines around banking crises for emerging markets for the entire sample. The average revenue drop is actually quite similar to the "big five," although the recovery is faster—in line with a more swift recovery in growth, as discussed in the preceding section.

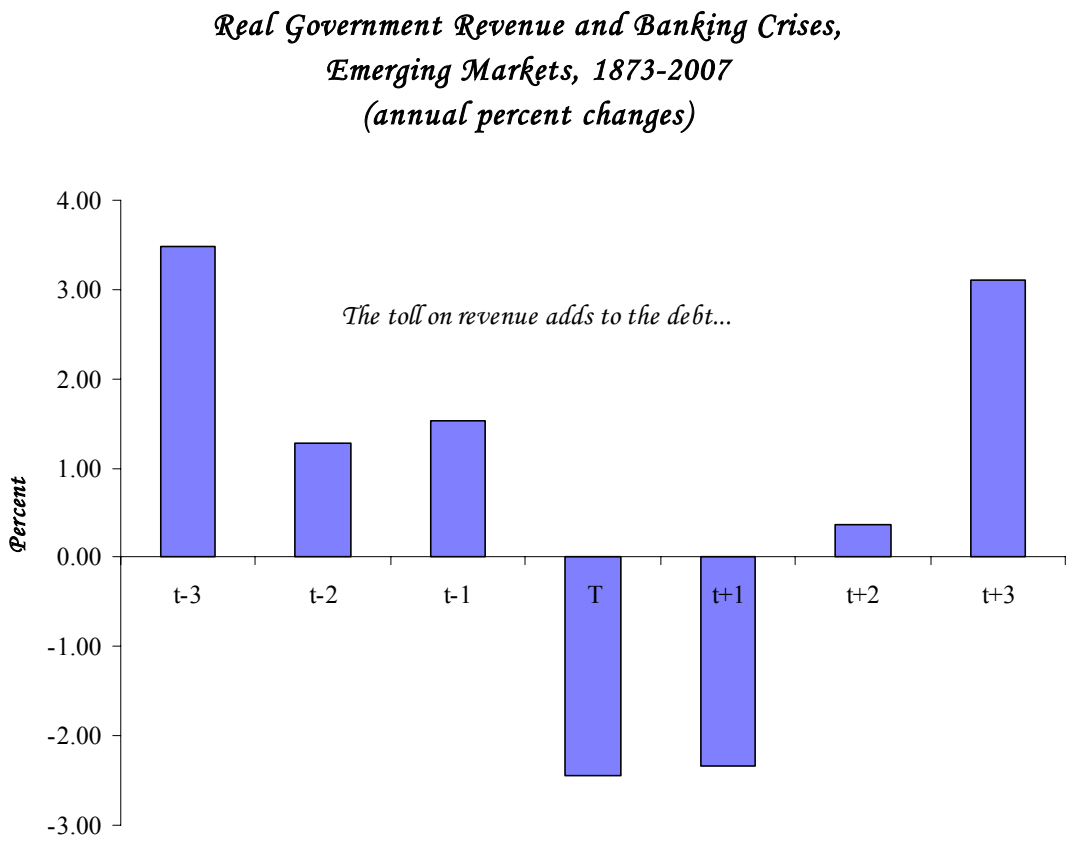
Figure 8c

Real Government Revenue and Banking Crises, Advanced Economies, 1815-2007 (annual percent changes)



Sources: Revenues are taken from Mitchell (2003a, b,). For the numerous country-specific sources of prices see Reinhart and Rogoff (2008a).
Notes: Central government revenues deflated by consumer prices.

Figure 8d



Sources: Revenues are from Mitchell (2003a, b). For the numerous country-specific sources of prices see Reinhart and Rogoff (2008a).
Notes: Central government revenues deflated by consumer prices.

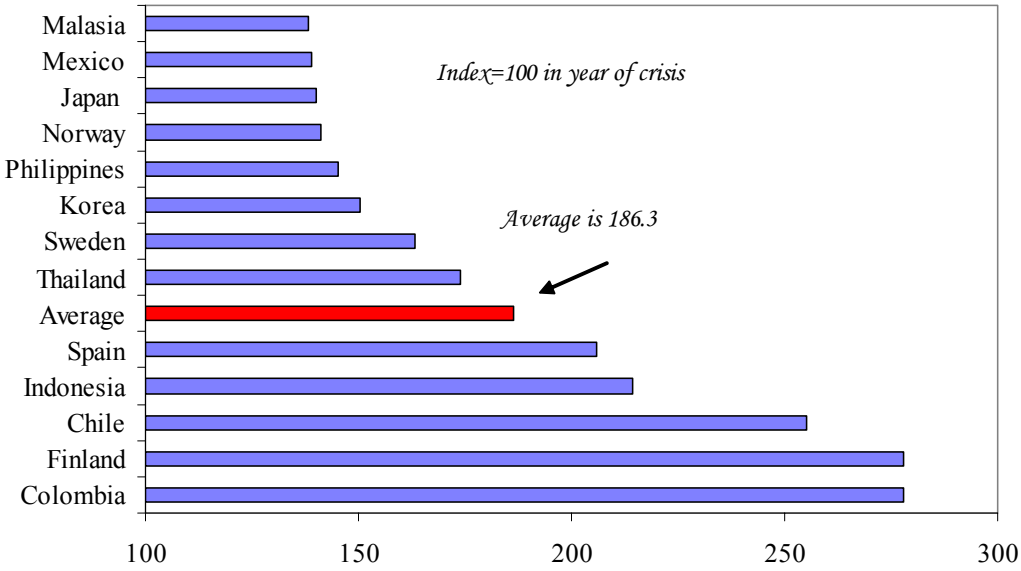
Government debt buildup in the aftermath of banking crises

To get a rough approximation of the impact of a crisis on government finances, we use the historical central government debt data compiled in Reinhart and Rogoff (2008c). It is important to note that this is a partial picture, since the general (not just central government) is affected by the crisis. Also, there is typically during these episodes a marked expansion in government-guaranteed debt, which does not show up in the central government figures.

With these caveats in mind, Figure 9 presents a summary of the evolution of debt in the aftermath of some of the major post-war crises in both advanced and emerging markets.

Figure 9

Cumulative increase in public debt in the three years following the banking crisis



Source: Reinhart and Rogoff (2008c).

Not surprisingly, taken together, the bailout of the banking sector, the shortfall in revenue, and the fiscal stimulus packages that have accompanied some of these crises imply widening fiscal deficits adding to the existing stock of government debt. What is perhaps surprising is how dramatic the rise in debt is. ***If the stock of debt is indexed to equal 100 at the time of the crisis (T), the average experience is one in which the real stock of debt rises to 186 three years after the crisis. That is to say, the real stock of debt nearly doubles.***[37] Such increases in government indebtedness are evident in emerging and advanced economies alike,

[37] Indeed, there are some important cases such as Japan where the accelerated debt build-up goes on for over a decade, so the three-year cutoff grossly understates the longer term consequences.

and extremely high in both. Arguably, the true legacy of banking crises is higher public indebtedness—far over and beyond the direct headline costs of big bailout packages.[38] (Obviously, as we noted earlier, the rise in public debt depends on a whole range of political and economic factors, including the effectiveness of the policy response and the severity of the initial real economic shock that produced the crisis. Nevertheless, the universality of the large debt rise is stunning.)

V. Concluding Remarks

Countries may "graduate" from serial default on sovereign debt and recurrent episodes of very high inflation, as the cases of France, Austria, Spain and others illustrate. History tells us, however, that graduation from recurrent banking and financial crises is much more elusive. And it should not have taken the 2007–2009 financial crisis to remind us. Out of the 66 countries in our sample, only Portugal, Austria, the Netherlands and Belgium had managed to escape from banking crises from 1945–2007. During 2008, however, even three of these four countries were among those engaged in massive bailouts as the current global financial crisis evolves.

Indeed, the wave of financial crises that began with the onset of the subprime crisis in the United States in 2007 has dispelled any prior notion among academics, market participants, or policymakers that acute financial crises are either a thing of the past or relegated to the "volatile" emerging markets. The "this time is different syndrome" has been alive and well in the United States, where it first took the form of a widespread belief that sharp productivity gains stemming from the information technology industry justified price–earning ratios in the equity market that

[38] We note that Figure 9 gives percentage change in debt, rather than debt to GDP, in order not to distort numbers by the large falls in GDP that sometimes accompany crises. However, the same basic message comes across looking at debt to GDP instead. Note that the calculations are based on total central government debt.

far exceeded any historical norm. [39] That delusion ended with the burst of the IT bubble in 2001. But the excesses quickly reemerged, morphing into a different shape in a different market. The securitization of subprime mortgages combined with a heavy appetite for these instruments from countries like Germany, Japan, and major emerging markets like China fueled perceptions that housing prices would continue to climb forever. "This time it was different" because there were new markets, new instruments, and new lenders. In particular, financial engineering was thought to have tamed risk by better tailoring exposures to investors' appetites. Derivatives contracts, meanwhile, offered all manner of hedging opportunities. We now know how that popular delusion ended.

Historical experience already shows that rich countries are not as "special" as some cheerleaders had been arguing, both when it comes to managing capital inflows and especially when it comes to banking crises. This paper has used an extensive new dataset that includes data on housing prices in some key emerging markets as well as revenue and domestic debt data that dates back almost a century for most countries and more for many. Surprisingly, not only is the frequency and duration of banking crises similar across developed countries and middle-income countries, so too are quantitative measures of both the run-up and the fall-out. Notably, the duration of real housing price declines following financial crises in both groups are often four years or more, while the magnitudes of the crash are comparable. One striking finding is the huge surge in debt most countries experience in the wake of a financial crisis, with real central government debt typically increasing by about 86 percent on average (in real terms) during the three years following the crisis.

[39] An important question is how rare banking crises, through sudden changes in market liquidity, might amplify the effects on asset prices analyzed by Barro (2009).

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Appendix I. Country sample, crisis definition and dates

In this section, we list the countries in the core sample (Table A1), and describe the criteria used in this study to date banking crises.

With regard to banking crises, our analysis stresses events. The main reason for following this approach has to do with the lack of long time-series data that would allow us to date banking or financial crises quantitatively along the lines of inflation or currency crashes. For example, the relative price of bank stocks (or financial institutions relative to the market) would be a logical indicator to examine. However, this is problematic, particularly for the earlier part of our sample as well as for developing countries (where many domestic banks do not have publicly traded equity).

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 only sporadically, if at all; the latter are also made less informative by the banks' desire to hide their problems for as long as possible.

Table A1. Countries, Regions, and World GDP

Country (An asterisk denotes no sovereign default or rescheduling history)	Year of Independence if after 1800	Share of World Real GDP 1990 International Geary–Khamis US dollars	
		1913	1990
Africa			
Algeria	1962	0.23	0.27
Angola	1975	0.00	0.03
Central Africa Republic	1960	0.00	0.01
Côte D'Ivoire	1960	0.00	0.06
Egypt	1831	0.40	0.53
Kenya	1963	0.00	0.10
Mauritius *	1968	0.00	0.03
Morocco	1956	0.13	0.24
Nigeria	1960	0.00	0.40
South Africa	1910	0.36	0.54
Tunisia	1957	0.06	0.10
Zambia	1964	0.00	0.02
Zimbabwe	1965	0.00	0.05
Asia			
China		8.80	7.70
Hong Kong *			
India	1947	7.47	4.05
Indonesia	1949	1.65	1.66
Japan		2.62	8.57
Korea *	1945	0.34	1.38
Malaysia *	1957	0.10	0.33
Myanmar	1948	0.31	0.11
Philippines	1947	0.34	0.53
Singapore *	1965	0.02	0.16
Taiwan *	1949	0.09	0.74
Thailand *		0.27	0.94
Europe			
Austria		0.86	0.48
Belgium *	1830	1.18	0.63
Denmark *		0.43	0.35
Finland *	1917	0.23	0.31
France		5.29	3.79
Germany		8.68	4.67
Greece	1829	0.32	0.37
Hungary	1918	0.60	0.25
Italy		3.49	3.42
Netherlands *		0.91	0.95
Norway *	1905	0.22	0.29
Poland	1918	1.70	0.72
Portugal		0.27	0.40
Romania	1878	0.80	0.30
Russia		8.50	4.25
Spain		1.52	1.75
Sweden		0.64	0.56
Turkey		0.67	1.13
United Kingdom *		8.22	3.49

Sources: *Correlates of War* (2007), Maddison (2004).
Notes: An asterisk denotes no sovereign external default or rescheduling history.

Table A1 (concluded) Countries, Regions, and World GDP

	Year of Independence	Share of World Real GDP	1990 International if after 1800
	1	Geary dollars	
		1913	1990
Latin America			
Argentina	1816	1.06	0.78
Bolivia	1825	0.00	0.05
Brazil	1822	0.70	2.74
Chile	1818	0.38	0.31
Colombia	1819	0.23	0.59
Costa Rica	1821	0.00	0.05
Dominican Republic	1845	0.00	0.06
Ecuador	1830	0.00	0.15
El Salvador	1821	0.00	0.04
Guatemala	1821	0.00	0.11
Honduras	1821	0.00	0.03
Mexico	1821	0.95	1.91
Nicaragua	1821	0.00	0.02
Panama	1903	0.00	0.04
Paraguay	1811	0.00	0.05
Peru	1821	0.16	0.24
Uruguay	1811	0.14	0.07
Venezuela	1830	0.12	0.59
North America			
Canada *	1867	1.28	1.94
United States *		18.93	21.41
Oceania			
Australia *	1901	0.91	1.07
New Zealand *	1907	0.21	0.17
		Total Sample-66 countries	
		93.04	89.24

Sources: *Correlates of War* (2007), Maddison (2004).

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 (as in Venezuela in 1993 or Argentina in 2001); and (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 (as in Thailand 1996–97). We rely on existing studies of banking crises and on the financial press; according to these studies the fragility of the banking sector was widespread during these periods.

Many country-specific studies (such as Camprubi, 1957, for Peru; Cheng, 2003, McElderry, 1976, for China; and Noel, 2002, for Mexico) pick up banking crisis episodes not covered by the multicountry literature and contribute importantly to this chronology, but 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; Kaminsky and Reinhart (1999), and Jácome (2008) for Latin America round out the sources. For pre–World War II, Kindleberger (1989), Bordo et al. (2001), and Willis and Beckhart (1929) provide multicountry coverage on banking crises.

We relegate a summary discussion of the limitations of this event-based dating approach to Table A2, while the years in which the banking crises began are listed in Table A3—unfortunately, for many of the early episodes it is difficult to ascertain how long the crisis lasted.

Table A2. Defining Banking Crises by Events: A Summary

Type of Crisis	Definition and/or Criteria	Comments
Banking crisis Type I: systemic/severe Type II: financial distress/ milder	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; and (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.	This approach to dating the beginning of a banking crisis is not without drawbacks. It could date a crisis too late, because the financial problems usually begin well before a bank is finally closed or merged; it could also date a crisis too early, because the worst part of a crisis may come later. Unlike the external debt crises (see below), which have well-defined closure dates, it is often difficult or impossible to accurately pinpoint the year in which a crisis ended.

Table A3. Banking Crises Dates and Capital Mobility: 1800–2007

High-Income		Middle Income		Low Income	
Country (ies)	BeginningYear	Country (ies)	BeginningYear	Country (ies)	BeginningYear
		Capital Mobility: Low-Moderate, 1800-1879			
France	1802				
France	1805				
UK	1810				
UK	1815				
Denmark	1813				
US	1818				
UK, US	1825				
US	1836				
Canada, UK	1837				
UK	1847				
Belgium	1848				
UK, US	1857			India	1863
Italy, UK	1866				
Austria, US	1873	Peru	1873		
		South Africa	1877		
		Capital Mobility: High, 1880-1914			
Germany	1880				
France	1882	Mexico	1883		
US	1884				
Denmark	1885				
Italy	1887				
France	1889				
Portugal, UK, US	1890	Argentina* Brazil, Chile, South Africa	1890		
Germany, Italy, Portugal	1891				
Australia	1893				
Netherlands, Sweden	1897				
Norway	1898	Chile	1899		
Finland	1900	Brazil	1900		
Germany, Japan	1901				
Denmark, France, Italy, Japan, Sweden, US	1907	Mexico	1907		
		Chile	1908		
		Mexico	1913	India	1913
Belgium, France*, Italy, Japan, Netherlands, Norway,* UK, US	1914	Argentina*, Brazil*	1914		
		Capital Mobility: Low, 1915-1919			
		Chile*	1915		

Table A3. Banking Crises Dates and Capital Mobility: 1800–2007 (continued)

High Income		Middle Income		Low Income	
Country (ies)	BeginningYear	Country (ies)	BeginningYear	Country (ies)	BeginningYear
		Capital Mobility: Moderate, 1920–1929			
Portugal*	1920	Mexico	1920		
Finland, Italy, Netherlands,* Norway*	1921			India	1921
Canada, Japan, Taiwan	1923	China	1923		
Austria	1924				
Belgium,* Germany*	1925	Brazil, Chile*	1926		
Japan, Taiwan	1927				
US*	1929	Brazil, Mexico*	1929	India	1929
		Capital Mobility: Low, 1930–1969			
France, Italy	1930				
Belgium, Finland, Germany*, Greece, Portugal* Spain,* Sweden*	1931	Argentina*, Brazil, China	1931		
Belgium*	1934	Argentina, China	1934		
Italy	1935	Brazil	1937		
Belgium,* Finland	1939				
				India	1947*
		Brazil	1963		
		Capital Mobility: Moderate, 1970–1979			
		Uruguay	1971		
UK	1974	Chile *	1976	Central African Republic	1976
Germany, **Israel, Spain**	1977	South Africa	1977		
		Venezuela	1978		

Table A3. Banking Crises Dates and Capital Mobility: 1800–2007 (continued)

High Income		Middle Income		Low Income	
Country (ies)	BeginningYear	Country (ies)	BeginningYear	Country (ies)	BeginningYear
		Capital Mobility: High, 1980-2007			
		Argentina,*	1980		
		Chile *			
		Ecuador,			
		Egypt,			
		Mexico,	1981		
		Philippines			
		Uruguay			
Hong Kong, Singapore	1982	**Colombia**, Turkey	1982	**Congo (Dem. Rep.), Ghana**	1982
Canada, Korea, **Kuwait** Taiwan	1983	**Morocco, Peru, Thailand**	1983	**Equatorial Guinea, Niger**	1983
UK, US	1984			Mauritania	1984
		Argentina*	1985	**Guinea, Kenya**	1985
		Brazil,*			
		Malaysia*			
					1986
Denmark, New Zealand, Norway	1987	**Bolivia, Cameroon, Costa Rica, Nicaragua**	1987	**Bangladesh, Mali, Mozambique, Tanzania**	1987
		Lebanon, Panama	1988	**Benin, Burkina Faso, Central African Republic**, **Côte D'Ivoire, Madagascar, Nepal, Senegal**	1988
Australia	1989	**Argentina, ***	1989		
		El Salvador, South Africa, **Sri Lanka**			
Italy	1990	**Algeria, Brazil*,** Egypt, **Romania**	1990	**Sierra Leone**	1990
Czech Republic, Finland, Greece, **Sweden,** UK	1991	**Georgia, Hungary, Poland, Slovak Republic**	1991	**Djbouti, Liberia, Sao Tome**	1991
Japan	1992	**Albania, Bosnia-Herzegovina**, **Estonia,** Indonesia	1992	Angola, Chad, **China, Congo, Kenya**, Nigeria	1992
Slovenia, **Macedonia**		**Cape Verde**, **Venezuela**	1993	**Guinea, Eritrea**, India, **Kyrgyz Republic**, **Togo**	1993

Table A3. Banking Crises Dates and Capital Mobility: 1800–2007 (continued)

High Income		Middle Income		Low Income	
Country (ies)	BeginningYear	Country (ies)	BeginningYear	Country (ies)	BeginningYear
		Capital Mobility: High, 1980–2007			
France	1994	Armenia, Bolivia, Bulgaria, Costa Rica, Jamaica, Latvia, Mexico*, Turkey	1994	Burundi, Congo (Rep.), Uganda	1994
UK	1995	Argentina, Azerbaijan, Brazil, Cameroon, Lithuania, Paraguay, Russia, Swaziland,	1995	Guinea-Bissau, Zambia, Zimbabwe	1995
		Croatia, Ecuador, Thailand	1996	Myanmar Yemen	1996
Taiwan	1997	Indonesia, Korea*, Malaysia, Mauritius, Philippines, Ukraine	1997	Vietnam	1997
		Colombia*, Ecuador, El Salvador Russia	1998		
		Bolivia, Honduras, Peru	1999		
		Nicaragua	2000		
		Argentina* Guatemala	2001		
		Paraguay Uruguay	2002		
		Dominican Republic	2003		
		Guatemala	2006		
US, UK	2007				

Note: An asterisk (*) denotes that the episode in question was associated with an output collapse as defined in Barro and Ursua (2008). However, many of the countries in our extended sample are not covered in Barro and Ursua (2008).

Table A4. Real House Prices

Country	Period covered	Source	Commentary
Argentina	1981–2007	Reporte Immobiliario	Average value of old apartments, Buenos Aires
Colombia	1997:Q1–2007:Q4	Departamento Administrativo Nacional de Estadistica	New housing price index, total 23 municipalities
Finland	1983:Q1–2008:Q1	Stat-Fin Online Service	Dwellings in old blocks of flats, Finland
	1970–2007	Bank of International Settlements	House price index, Finland
Hong Kong	1991:7–2008:2	Hong Kong University	Real estate index series, Hong Kong
Hungary	2000–2007	Otthon Centrum	Average price of old condominiums, Budapest
Iceland	2000:3–2008:4	Statistics Iceland	House price index, Iceland
Indonesia	1994:Q1–2008:Q1	Bank of Indonesia	Residential property price index, new houses, new developments, big cities
Ireland	1996:Q1–2008:Q1	ESRI/Permanent TSB	House prices, standardized, Ireland
Japan	1955:H1–2007:H2	Japan Real Estate Institute	Land prices, urban, residential index, Japan
Malaysia	2000:Q1–2007:Q4	Bank Negara	House price index, Malaysia
Norway	1970–2007	Bank of International Settlements	House price index, all dwellings, Norway
	1819–2007	Norges Bank	Housing prices, Norway
Philippines	1994:Q4–2007:Q4	Colliers International: Philippines	Prime 3-bedroom condominium, Makati Central Business District
South Korea	1986:1–2006:12	Kookmin Bank	Housing price index
	2007:Q1–2008:Q1	Kookmin Bank	Housing price index
Spain	1990:Q1–2008:Q1	Banco de España	House price index, appraised housing, Spain
	1970–2007	Bank of International Settlements	House price index, appraised housing, Spain
Thailand	1991:Q1–2007:Q	Bank of Thailand	House price index, single detached house
United Kingdom	1952:1–2008:4	Nationwide	Average house price UK
	1970–2007	Bank of International Settlements	House price index, UK
United States	1890–2007	Standard and Poors	Case–Shiller national price index, US
	1987:Q1–2008:Q2		