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RECOVERY FROM FINANCIAL CRISES:
EVIDENCE FROM 100 EPISODES

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Recovery from Financial Crises: Evidence from 100 Episodes
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ABSTRACT

We examine the evolution of real per capita GDP around 100 systemic banking crises. Part of the costs of these crises owes to the protracted nature of recovery. On average, it takes about eight years to reach the pre-crisis level of income; the median is about 6 ½ years. Five to six years after the onset of crisis, only Germany and the US (out of 12 systemic cases) have reached their 2007-2008 peaks in real income. Forty-five percent of the episodes recorded double dips. Postwar business cycles are not the relevant comparator for the recent crises in advanced economies.

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Examining the evolution of real per capita GDP around 100 systemic banking crises reveals that a significant part of the costs of these crises lies in the protracted and halting nature of the recovery. On average it takes about eight years to reach the pre-crisis level of income; the median is about 6 ½ years. Five to six years after the onset of the current crisis only Germany and the US (out of 12 systemic crisis cases) have reached their 2007-2008 peaks in per capita income. In a sample that covers 63 crises in advanced economies and 37 in larger emerging markets, more than forty percent of the post-crisis episodes experienced double dips. The analysis summarized here adds another dimension to an observation we have been emphasizing on the basis of our earlier work—namely, that the subprime crisis is not an anomaly in the context of the pre-WWII era. Postwar business cycles are not the right comparator for the severe crises that have swept advanced economies in recent years.

In the next section, we sketch the methodology used to study the characteristics of cycles in GDP associated with systemic financial crises. We illustrate the basic concepts by applying these to US data. In Section II, we examine the output consequences of 100 crises spanning nearly two centuries. The emphasis is on the most severe crises. The unfolding post-2007 crisis in many advanced economies and how these compare to the historical norms is the focus of Section III. We conclude by arguing that speeding up recovery may require that advanced-economy governments adopt some of the approaches that have been relegated to the emerging markets over the last few decades—but that advanced countries themselves once practiced vigorously.

I. Methodology

Our aim is to approximate the loss in living standards (as measured by real per capita GDP) associated with systemic financial crises. As a preamble, we need to describe what defines

a systemic crisis, why we stress normalizing by population (in lieu of the more common practice in business cycle literature of focusing on the macroeconomic aggregates), how the depth and duration of the cycle are measured, and how we characterize the often halting nature of the post-crisis recovery to incorporate the widespread prevalence of “double dips.” We also present a simple composite measure of crisis severity as another summary statistic.

A. Systemic crises and per capita GDP

The distinction of financial crises (or panics) into systemic and borderline varieties has a long tradition in this literature. In the days prior to deposit insurance, Charles Calomiris and Gary Gorton (1991), for example, distinguish between episodes where convertibility is suspended and more minor types of bank distress. Gerard Caprio et al. (2005) characterize modern systemic crises as those episodes where there are bank runs, a significant share of nonperforming assets, bank liquidations, and large-scale policy intervention to support banks.¹

We anchor our analysis of the economic cycle around financial crises on real per capita GDP for three reasons: (i) Recovery (to be defined) following financial crises is often a five-to-ten-year process.² As long as the population is growing, a recovery of the prior peak in real GDP will still leave the average person worse off than prior to the crisis. (ii) We compare crises that are decades and sometimes centuries apart. During the 1850s, US population growth peaked at about 3.8 percent per annum, while it is less than one percent at present. (iii) There are substantive cross-country variations that persist to this day.

B. The Ds: Depth, duration, and double dips

As our primary interest is dating long and rather infrequent cycles associated with deep crises and going as far back as the data permit, the frequency of our study is annual. Peaks and

¹ A full listing of the post-WWII advanced economy systemic and borderline episodes prior to the subprime crisis can be found in Carmen M. Reinhart and Kenneth S. Rogoff (2008).

² The next section presents evidence on this as does Reinhart and Rogoff (2009).

troughs are not dated by the quarter or the month. The typical recurring pattern across time and space in these cycles is one in which economic activity reaches a peak either the year before the onset of crisis or the year of the financial crisis.³ There are cases where the downturns start earlier but these are less frequent. As in our earlier work, our measure of the depth of the recession is standard and focuses on the peak-to-trough decline in real per capita GDP. We also tally the number of years it takes to reach bottom in each episode. While the view that recessions associated with financial crises are deeper has gained ground in recent years, academic opinion is more divided on how to characterize recoveries from crises. Antonio Fatás and Ilian Mihov (2013) provide an excellent discussion of these and other issues relating to the measurement of economic cycles. Their analysis is informed by both the modern literature and the early work pioneered at the National Bureau of Economic Research (NBER).

As in Reinhart and Rogoff (2009), our duration measure is the number of years it takes to reach the prior peak in real per capita income. Fatás and Mihov (2013) and others note that this definition does not capture a return to potential output or to some predetermined trend. Of course, normalizing by population does allow for some time variation in underlying trend output. In contrast to NBER dating of turning points, our approach treats any renewed downturn that takes place before the economy reaches the prior peak as a double dip and part of the same cycle (our dating is based on the global peak to date). For instance, the upturn in economic activity in 1937 in the US is dated by the NBER as the peak of a new cycle (followed by a trough in 1938). Because in 1937 per capita GDP remained below its 1929 (global) peak, we record 1938 as a double dip.

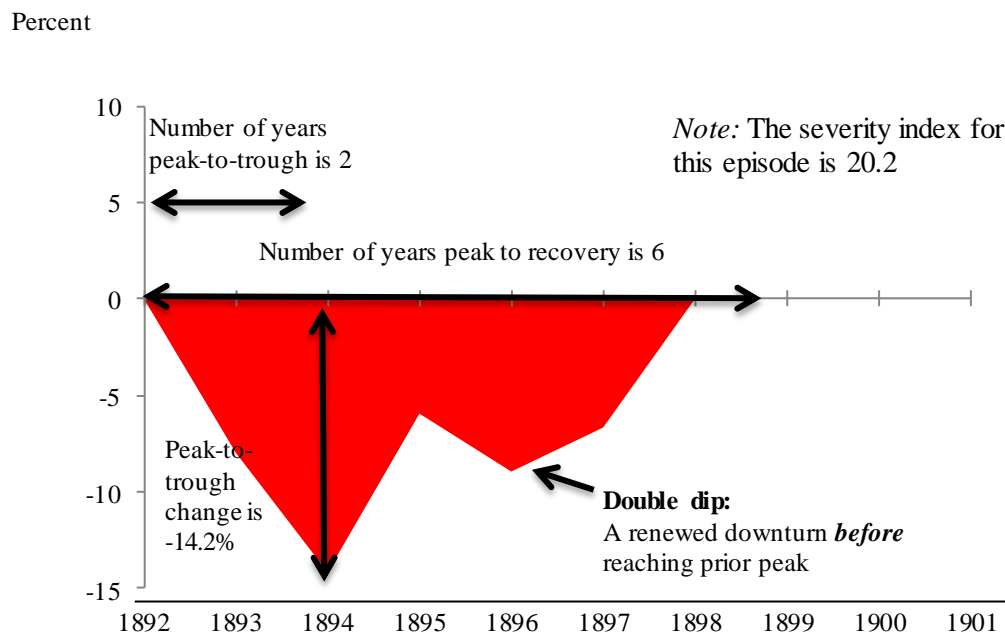
³ Reinhart, Rogoff, and Harris (2014) and the present study's database provide episode-by-episode details.

Figure 1 illustrates these conventions for the US banking crisis of 1893, where the peak was in 1892. To summarize two dimensions of crisis severity, we define an index that captures some of the depth and duration aspects for each crisis episode (denoted by subscript i),

(1) $Severity\ index_i = -Peak\text{-to}\text{-trough}\ \% \ change_i + Number\ of\ years\ from\ peak\ to\ recovery\ of\ prior\ peak_i$.

Alternative severity measures are discussed in the longer companion paper.

Figure 1. Basic Concepts: An Illustration with the US Banking Crisis of 1893

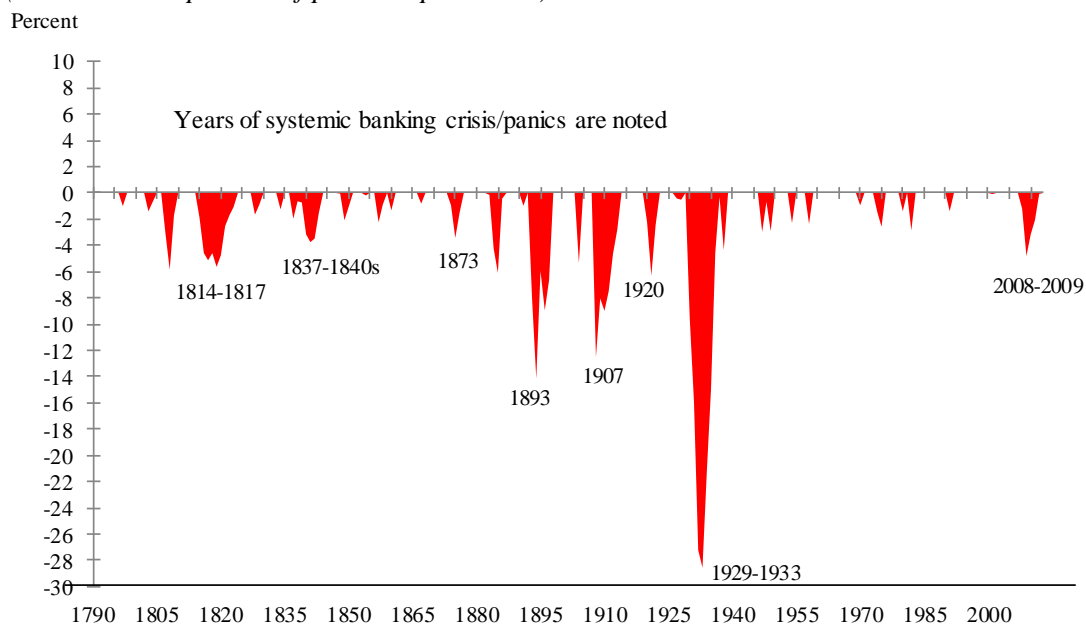


Sources: Reinhart, Rogoff, and Harris (2014) and sources cited therein.

Figure 2 places the detail of the 1893 banking crisis shown in Figure 1 in historical context for the US from 1790 until 2013. The Depression of the 1930s predictably stands out for its virulent contraction and duration (ten years). During the suspension of convertibility over the 1814-1817 banking crisis and its aftermath it also took ten years for the economy to climb back to its previous peak in real per capita GDP. The depression ushered in by the 1837 panic,

characterized by Calomiris and Gorton (1991) as the longest banking crisis (extending until 1843), left per capita GDP trailing below its peak for almost a decade. As shown in Reinhart, Rogoff, and Harris (2014), the average peak-to-trough decline for the US real per capita GDP across nine major crises is about nine percent and it takes an average of 6.7 years to reclaim the pre-crisis peak. During the post-crises years, five of the nine (56 percent) US episodes were associated with a double dip. The subprime crisis clocks below these averages with about a 5 percent drop in per capita GDP (subject to the usual revisions) and a duration of six years (from 2007 to 2013) to reach the pre-crisis peak per capita income level. The most salient feature of

Figure 2. Deviation of Real Per Capita GDP from its Previous Peak, United States 1790-2013
(deviation as a percent of previous peak level)



Sources: Reinhart, Rogoff and Harris (2014) and sources cited therein.

Figure 2, however, is an observation we have emphasized on the basis of our earlier work (Reinhart and Rogoff, 2009) that the subprime crisis is not an anomaly in the context of the pre-WWII era. A corollary is that postwar business cycles are not the right comparator for the recent severe crises, as is also obvious from Figure 2. Of course, as Fatás and Mihov (2013) show, if Figure 2 was recast as deviations from a measure of potential output (rather than deviations from

the previous peak) several postwar recessions and especially those of the early 1980s would look less benign.

II. 100 Systemic Financial Crises

While the particulars for each of the 100 crises studied are presented in a longer companion paper (Reinhart, Rogoff and Harris, 2014), Table 1 shows the basic statistics on depth and duration for the most severe 35 crises in the sample ranked in descending order by the severity index. Some dramatic output collapses and lost decades occur among primary commodity producers faced simultaneously with a severe banking crisis and collapsing terms of trade. Chile 1926 and Australia 1893 figure among that group.

Also a substantial number of these crises are not “pure” banking crises in that these unfold alongside a currency crash and often involve a sovereign default as well. This twin or triplet crisis scenario is prevalent for both emerging markets and for a number of the advanced economy crises (notably during the 1930s) as well as the Greek crisis of 2008.^{4,5} Of course the distinction between emerging and advanced economies is quite blurred, especially prior to WWII, as a number of modern-day advanced economies were still emerging markets at the time. If credit ratings inform the distinction, the dividing line between emerging and advanced economies has also been blurred in recent years. With these caveats in mind, Table 2 presents descriptive statistics for the full sample as well as for the advanced and emerging subgroups, consisting of 63 and 37 crises episodes, respectively. Not surprisingly, emerging market peak-to-trough average output declines are about 5 percent larger than those in the advanced economies. But they are not significantly more protracted. The halting, tentative nature of the post-crisis recoveries (even in cases where there is a sharp—but not sustained— growth rebound) is

⁴ See Reinhart and Rogoff (2009).

⁵ The calculations for the ongoing crises in Table 1 (in italics) will be discussed in the next section.

evidenced in the relatively high incidence of double dips (or secondary downturns before the previous peak is reached). For all the crises, the share recording a double dip is 45 percent, while for the most severe crises (shown in Table 1) about 2/3 of the post-crisis trajectories involved a double dip.

Table 1. Crisis Severity: Percent Decline in Per Capita GDP, Duration of Contraction, and Years to Full Recovery in 35 of the Worst Systemic Banking Crises, 1857-2013

Year	Country	% change		Number of years		Severity index	Double dip, yes=1
		Peak to trough	Peak to trough	Peak to recovery	Peak to recovery		
1	1926 Chile	-46.6	3	16	62.6	1	
2	1931 Spain (Civil War)	-34.6	9	26	60.6	1	
3	1983 Peru	-32.0	11	25	57.0	1	
4	1931 Uruguay	-36.1	3	17	53.1	1	
5	1893 Australia	-28.0	8	20	48.0	1	
6	1929 Mexico	-31.1	6	16	47.1	1	
7	1921 Italy	-25.5	3	21	46.5	1	
8	1890 Brazil	-21.7	4	21	42.7	1	
9	1923 Canada	-30.1	4	10	40.1	0	
10	1890 Uruguay	-21.0	2	19	40.0	1	
11	1981 Philippines	-18.8	3	21	39.8	1	
12	1980/1985 Argentina	-21.8	11	18	39.8	1	
13	1929 India	-8.2	9	31	39.2	1	
14	1929/1933 US	-28.6	4	10	38.6	1	
15	1994 Venezuela	-24.2	11	14	38.2	1	
16	1939 Netherlands	-16.0	6	21	37.0	1	
17	2008 Greece	-24.0	6	12	36.0	0	
18	1931/1934 Argentina	-19.4	3	15	34.4	1	
19	1931 Poland	-24.9	4	9	33.9	0	
20	1929/1931 Austria	-23.4	4	10	33.4	0	
21	1981 Mexico	-14.1	7	17	31.1	1	
22	1920 UK	-18.7	3	11	29.7	1	
23	2001 Argentina	-20.9	4	8	28.9	0	
24	1980 Chile	-18.9	2	8	26.9	0	
25	2002 Uruguay	-18.9	4	8	26.9	0	
26	1930 France	-15.9	3	10	25.9	1	
27	2007 Ireland	-12.9	3	12	24.9	1	
28	1931 Germany	-17.8	4	7	24.8	0	
29	2008 Italy	-11.3	6	12	23.3	1	
30	1890 Argentina	-18.3	2	5	23.3	0	
31	2007 Iceland	-12.2	3	11	23.2	0	
32	1997 Indonesia	-15.1	2	8	23.1	0	
33	1866 Italy	-8.8	1	14	22.8	1	
34	2008 Ukraine	-14.4	1	8	22.4	0	
35	1931 Romania	-10.1	11	12	22.1	1	
Memorandum item:							
Share of crises having a <i>double dip</i>							65.7

Sources: Reinhart, Rogoff and Harris (2014) and sources cited therein.

Table 2. Descriptive Statistics for 100 Financial Crises, 1857-2013: Percent Decline in Per Capita GDP, Duration of Contraction, Years to Full Recovery, and Severity Index

Descriptive statistic	% change Peak to trough	Number of years Peak to trough	Peak to recovery	Severity index	
<i>100 Crises: Full sample</i>					
Mean	-11.5	3.2	8.3	19.8	
Median	-8.8	2.0	6.5	15.8	
Share of episodes with double dip					45.0
<i>63 Crises: Advanced economies</i>					
Mean	-9.6	2.9	7.3	16.9	
Median	-7.1	2.0	6.0	13.0	
Share of episodes with double dip					42.9
<i>37 Crises: Emerging markets</i>					
Mean	-14.8	3.7	10.0	24.8	
Median	-13.6	3.0	8.0	22.4	
Share of episodes with double dip					48.6
<i>Kolmogorov–Smirnov (K-S) test for difference between advanced and emerging economies</i>					
Maximum difference	0.302	0.119	0.245	0.298	

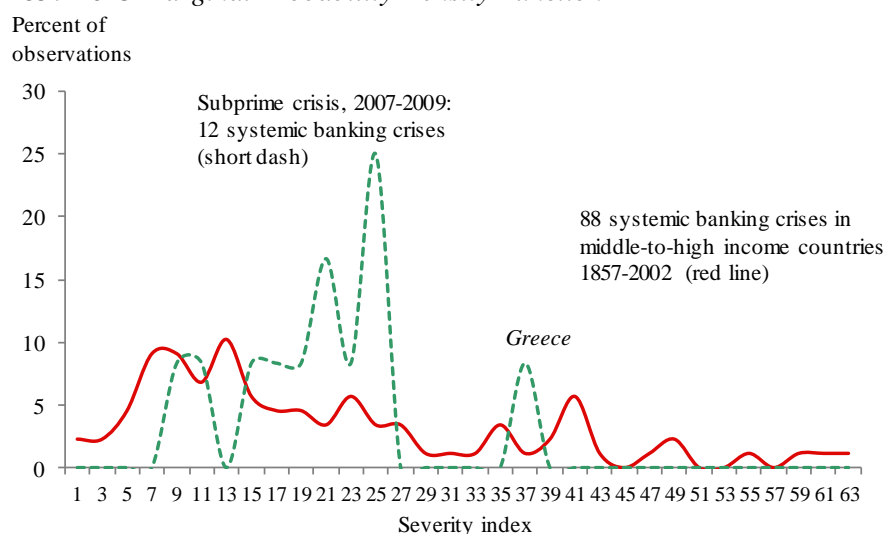
Note: Italics denote significant differences in the K-S test at the 10% level.

III. The 2007-2009 Crisis in Historical Perspective

It is premature to construct a definitive measure of the severity of the crises ushered in by the subprime debacle as the crises are ongoing in most cases by our metric. Of the twelve countries experiencing a systemic crisis starting in 2007-2008 (France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Portugal, Spain, Ukraine, UK, and US), only Germany and the US have reached their pre-crisis peak in per capita GDP. In Greece, Italy, Netherlands, Portugal and Spain, per capita GDP continued to contract through 2013 (so 2013 is a trough only insofar as 2014 shows a rebound, however mild). The 24 percent decline in real per capita GDP shown for Greece in Table 1, for instance, assumes that 2013 marks the bottom on the basis of the forecast published by the International Monetary Fund in their latest *World Economic Outlook*. Determining the years it will take to return to the pre-crisis output peak is even more tentative. For countries other than Germany and the US we use the IMF estimates (which have

been often noted for their optimistic assessment) through 2018. Even by 2018, these projections do not show periphery Europe recovering to pre-crisis levels of per capita GDP. The calculations in Table 1 and in Figure 3, which compares the frequency distribution for the twelve 2007-2009 crises with the remaining 88 crises, arbitrarily close the gap between actual per capita GDP and prior peak in 2019. As shown in Figure 3, the crises in Europe are on track to reach extremely high severity index levels, importantly because of their protracted multi-year nature. For Greece, Italy and the UK, the severity of the 2007-2009 crises outstrips that recorded in the 1930s (even in the unlikely scenario that output would rise to match its prior peak in 2014).⁶

Figure 3. Crisis Severity Index: Per Capita GDP in 100 Systemic Banking Crises and Their Aftermath, 1857-2013 *Marginal Probability Density Function*



Sources: Reinhart, Rogoff and Harris (2014) and sources cited therein.

IV. Concluding Observations

Even after one of the most severe multi-year crises on record in the advanced economies, the received wisdom in policy circles clings to the notion that high-income countries are completely different from their emerging-market counterparts. The current phase of the official

⁶ From the vantage point of output losses, as measured here, the banking crisis of the early 1920s was worse for the UK than the depression of 1930s.

policy approach is predicated on the assumption that growth, financial stability and debt sustainability can be achieved through a mix of austerity and forbearance (and some reform). The claim is that advanced countries do not need to resort to the more eclectic policies of emerging markets, including debt restructurings and conversions, higher inflation, capital controls and other forms of financial repression. Now entering the sixth or seventh year (depending on the country) of crisis, output remains well below its pre-crisis peak in ten of the twelve crisis countries. The gap with potential output is even greater. Delays in accepting that desperate times call for desperate measures keeps raising the odds that, as documented here, this crisis may in the end surpass in severity the depression of the 1930s in a large number of countries.

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Appendix

Appendix: 100 Crises, 1857-2013, Part I.

Year	Country	% change		Number of years		Severity index	Advance dummy	Double dip dummy
		Peak to trough	Peak to trough	Peak to recovery	Peak to recovery			
1	1857 France	-6.9	3	4	10.9	1	1	
2	1857 Germany	-1.8	2	3	4.8	1	0	
3	1864/1867 France	-8.8	3	5	13.8	1	1	
4	1866 Italy	-8.8	1	14	22.8	1	1	
5	1866 UK	-1.8	1	2	3.8	1	0	
6	1873 Austria	-3.3	2	3	6.3	1	0	
7	1873 Canada	-11.7	4	7	18.7	1	1	
8	1873 Germany	-6.2	6	9	15.2	1	1	
9	1873 US	-3.4	2	4	7.4	1	0	
10	1890 Argentina	-18.3	2	5	23.3	0	0	
11	1893 Australia	-28.0	8	20	48.0	1	1	
12	1890 Brazil	-21.7	4	21	42.7	0	1	
13	1891/1892 Italy	-7.4	7	8	15.4	1	1	
14	1894 New Zealand	-5.8	2	4	9.8	1	0	
15	1890 Portugal	-4.3	4	7	11.3	1	1	
16	1890 UK	-5.3	4	5	10.3	1	0	
17	1890/1892 US	-14.2	2	6	20.2	1	1	
18	1890 Uruguay	-21.0	2	19	40.0	0	1	
19	1908 Canada	-7.8	1	3	10.8	1	0	
20	1907 France	-0.8	1	2	2.8	1	0	
21	1908 India	-7.0	4	6	13.0	0	1	
22	1907 Italy	-4.6	1	2	6.6	1	0	
23	1907 Japan	-1.9	2	4	5.9	1	0	
24	1908 Mexico	-1.2	1	2	3.2	0	0	
25	1907 Sweden	-2.7	2	3	5.7	1	0	
26	1907 US	-12.5	1	9	21.5	1	1	
27	1923 Brazil	-3.7	2	4	7.7	0	0	
28	1921 Denmark	-4.2	1	2	6.2	1	0	
29	1923 Japan	-2.7	2	4	6.7	1	0	
30	1921 Norway	-10.8	1	5	15.8	1	1	
31	1923 Portugal	-4.9	1	4	8.9	1	1	
32	1922 Sweden	-9.4	1	3	12.4	1	0	
33	1923 Canada	-30.1	4	10	40.1	1	0	
34	1921 Italy	-25.5	3	21	46.5	1	1	
35	1920 UK	-18.7	3	11	29.7	1	1	
36	1920 US	-6.3	2	4	10.3	1	0	
37	1931/1934 Argentina	-19.4	3	15	34.4	0	1	
38	1929/1931 Austria	-23.4	4	10	33.4	1	0	
39	1931/1934 Belgium	-10.4	4	11	21.4	1	1	
40	1929 Brazil	-13.3	3	8	21.3	0	0	

Appendix: 100 Crises, 1857-2013, Part II.

Year	Country	% change		Number of years		Severity index	Advance dummy	Double dip dummy
		Peak to trough	Peak to trough	Peak to recovery	Peak to recovery			
41	1926 Chile	-46.6	3	16	62.6	0	1	
42	1931/1934 China	-9.9	2	4	13.9	0	0	
43	1931 Denmark	-3.5	1	3	6.5	1	0	
44	1931 Finland	-6.1	3	5	11.1	1	0	
45	1930 France	-15.9	3	10	25.9	1	1	
46	1931 Germany	-17.8	4	7	24.8	1	0	
47	1931 Greece	-8.9	2	4	12.9	1	0	
48	1931 Hungary	-11.4	3	7	18.4	0	1	
49	1929 India	-8.2	9	31	39.2	0	1	
50	1930 Italy	-7.0	2	6	13.0	1	1	
51	1927/1931 Japan	-9.3	2	4	13.3	1	0	
52	1929 Mexico	-31.1	6	16	47.1	0	1	
53	1939 Netherlands	-16.0	6	21	37.0	1	1	
54	1930 Norway	-8.4	1	4	12.4	1	0	
55	1931 Poland	-24.9	4	9	33.9	0	0	
56	1931 Romania	-10.1	11	12	22.1	0	1	
57	1931 Spain	-34.6	9	26	60.6	1	1	
58	1931 Sweden	-4.8	2	4	8.8	1	0	
59	1931/1932 Switzerland	-9.8	3	9	18.8	1	1	
60	1931 UK	-6.6	2	5	11.6	1	0	
61	1929/1932 US	-28.6	4	10	38.6	1	1	
62	1931 Uruguay	-36.1	3	17	53.1	0	1	
63	1980/1985 Argentina	-21.8	11	18	39.8	0	1	
64	1990 Brazil	-9.2	5	8	17.2	0	1	
65	1980 Chile	-18.9	2	8	26.9	0	0	
66	1985 Malaysia	-4.7	2	4	8.7	0	0	
67	1981 Mexico	-14.1	7	17	31.1	0	1	
68	1983 Peru	-32.0	11	25	57.0	0	1	
69	1981 Philippines	-18.8	3	21	39.8	0	1	
70	1983 Thailand	0.0	0	0	0.0	0	0	
71	1982 Turkey	0.0	0	0	0.0	0	0	
72	1991 Finland	-11.8	4	8	19.8	1	0	
73	1987 Norway	-0.6	1	3	3.6	1	0	
74	1991 Sweden	-6.2	3	5	11.2	1	0	
75	1998 Colombia	-6.0	2	6	12.0	0	0	
76	1992 Japan	-0.1	1	2	2.1	1	0	
77	1994 Mexico	-7.7	1	3	10.7	0	0	
78	1998 Russia	-5.2	1	2	7.2	0	0	
79	1994 Venezuela	-24.2	11	14	38.2	0	1	
80	1997 Indonesia	-15.1	2	8	23.1	0	0	

Appendix: 100 Crises, 1857-2013, Part III.

Year	Country	% change		Number of years		Severity index	Advance dummy	Double dip dummy
		Peak to trough	Peak to trough	Peak to recovery	Peak to recovery			
81	1992/1997 Japan	-2.7	2	6	8.7	1	0	
82	1997 Korea	-6.4	1	2	8.4	1	0	
83	1997 Malaysia	-9.8	1	6	15.8	0	1	
84	1997 Philippines	-2.7	1	3	5.7	0	0	
85	1996 Thailand	-13.6	2	6	19.6	0	0	
86	2001 Argentina	-20.9	4	8	28.9	0	0	
87	2001 Turkey	-7.3	3	5	12.3	0	1	
88	2002 Uruguay	-18.9	4	8	26.9	0	0	
89	2008 France	0.0	2	9	9.0	1	1	
90	2008 Germany	0.0	1	3	3.0	1	0	
91	2008 Greece	-24.0	6	12	36.0	1	0	
92	2007 Iceland	-12.2	3	11	23.2	1	0	
93	2007 Ireland	-12.9	3	12	24.9	1	1	
94	2008 Italy	-11.3	6	12	23.3	1	1	
95	2008 Netherlands	-5.8	5	10	15.8	1	1	
96	2008 Portugal	-7.2	6	12	19.2	1	1	
97	2008 Spain	-8.4	6	12	20.4	1	0	
98	2008 Ukraine	-14.4	1	8	22.4	0	0	
99	2007 United Kingdom	-7.1	2	11	18.1	1	1	
100	2007 United States	-4.8	2	6	10.8	1	0	

Sources: Details in Reinhart, Rogoff, and Harris (2014).