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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 peak in real income. Forty three percent of the 100 episodes recorded double dips. Post-war business cycles are not the relevant comparator for the recent crises in advanced economies.

JEL: E32, E44, F44, G01, N10, N20

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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 its 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 crises 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, forty three 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 on our earlier work—namely, that the subprime crisis is not an anomaly in the context of the pre-WWII era. Post-war 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 III, 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 IV. 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.

II. 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. In recent years, population growth in Japan and Italy is nil to slightly negative while Mexico and Turkey, for instance, growth rates are around 1 ½ percent; many low income countries have twice that rate of growth.

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

[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).

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 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. It is important to note, however, that normalizing by population allows for time variation in the underlying trend. Slowing population growth is presumably correlated with slowing potential 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

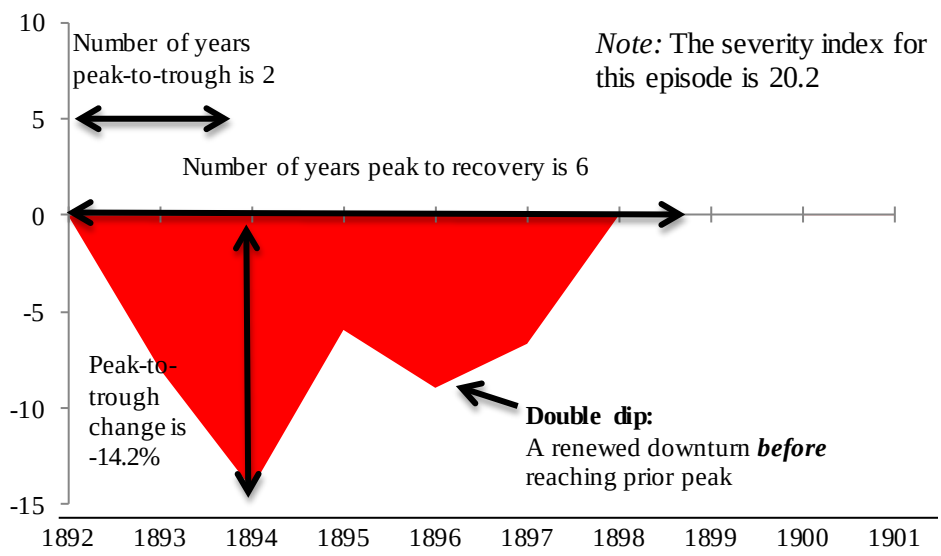
[3] Reinhart and Rogoff (2014) and the database associated with this study provide the details on an episode-by-episode basis.

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 a double dip.

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

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

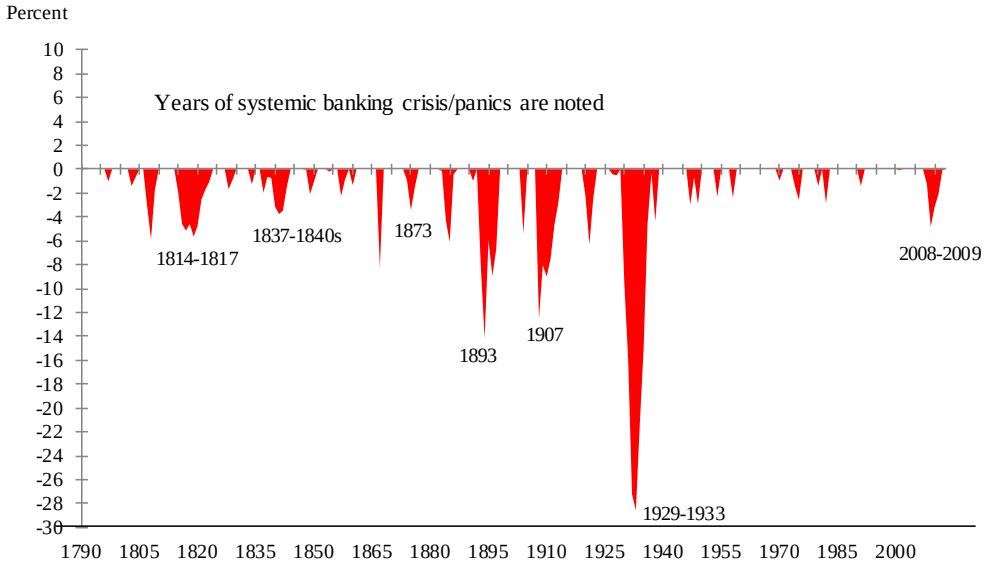


Sources: Reinhart and Rogoff (2014) and sources cited therein.

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 and Rogoff (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 2007to 2013) to reach the pre-crisis peak per capita income level. The most salient feature of Figure 2,

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 and Rogoff (2014) and sources cited therein.

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 post-war 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 post war recessions and especially the early 1980s would look less benign.

III. 100 Systemic Financial Crises

While the particulars for each of the 100 crises studied are presented in a longer companion paper (Reinhart and Rogoff, 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 4 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 evidenced in the relatively high incidence of double dips (or secondary downturns before the previous peak

[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.

is reached). For all the crises the share recording a double dip is 43 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

			% change	Number of years			
	Year	Country	Peak to trough	Peak to trough	Peak to recovery	Severity index	Double dip, yes=1
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	1929	India	-8.2	9	31	39.2	1
13	1929/1933	US	-28.6	4	10	38.6	1
14	1939	Netherlands	-16.0	6	21	37.0	1
15	*2008*	*Greece*	*-24.0*	*6*	*12*	*36.0*	*0*
16	1980/1985	Argentina	-16.9	6	18	34.9	1
17	1920	UK	-18.7	3	16	34.7	1
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	2001	Argentina	-20.9	4	8	28.9	0
23	1980	Chile	-18.9	2	8	26.9	0
24	2002	Uruguay	-18.9	4	8	26.9	0
25	1930	France	-15.9	3	10	25.9	1
26	*2007*	*Ireland*	*-12.9*	*3*	*12*	*24.9*	*1*
27	1931	Germany	-17.8	4	7	24.8	0
28	*2008*	*Italy*	*-11.3*	*6*	*12*	*23.3*	*1*
29	1890	Argentina	-18.3	2	5	*23.3*	0
30	*2007*	*Iceland*	*-12.2*	*3*	*11*	*23.2*	*0*
31	1997	Indonesia	-15.1	2	8	23.1	0
32	1866	Italy	-8.8	1	14	22.8	1
33	*2008*	*Ukraine*	*-14.4*	*1*	*8*	*22.4*	*0*
34	1931	Romania	-10.1	11	12	22.1	1
35	1907	US	-12.5	1	9	21.5	1
	Memorandum item:						
	Share of crises having a *double dip*						65.7

Sources: Reinhart and Rogoff (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

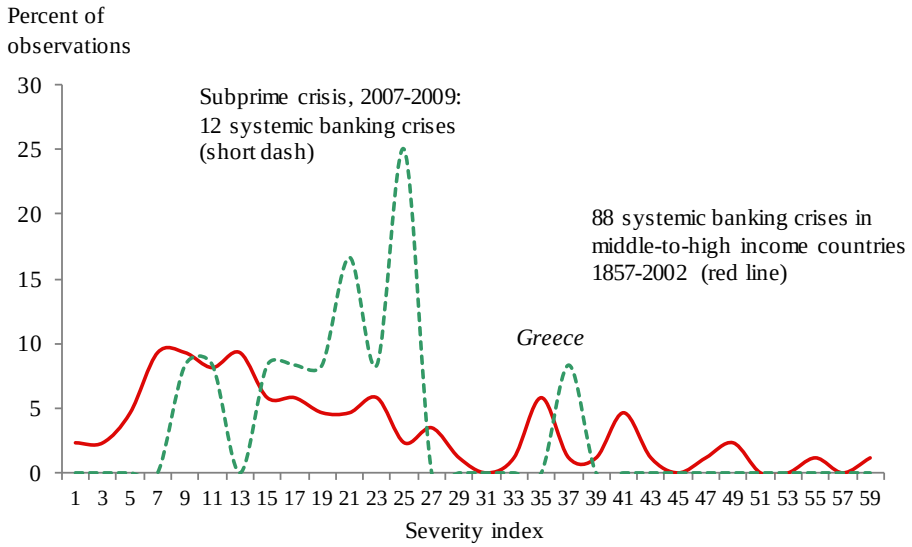
Descriptive statistic	% change Peak to trough	Number of years Peak to trough	Peak to recovery	Severity index	
100 Crises: Full sample					
Mean	-11.3	3.0	8.4	19.6	
Median	-8.6	2.0	6.5	15.8	
Standard deviation	9.1	2.2	6.2	14.0	
Share of episodes with double dip					43.0
63 Crises: Advanced economies					
Mean	-9.6	2.9	7.4	17.0	
Median	-7.1	2.0	6.0	13.0	
Standard deviation	7.8	1.9	5.2	12.2	
Share of episodes with double dip					42.9
37 Crises: Emerging markets					
Mean	-14.2	3.2	9.9	24.2	
Median	-13.3	2.0	8.0	22.1	
Standard deviation	10.4	2.7	7.4	15.9	
Share of episodes with double dip					43.2
Difference in means test (emerging minus advanced)					
Difference	-4.7	0.3	2.5	7.2	
p value	0.020**	0.523	0.072	0.020**	

IV. 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 by the measures presented here, as the crises are ongoing in most cases. 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 GDP and prior peak in 2019. As shown in Figure 3, these crises in Europe are on track to reach extremely high severity index levels, importantly also because of their protracted multi-year nature. For Greece and 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 and Rogoff (2014) and sources cited therein.

V. 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 (see Reinhart and Rogoff, 2014).

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 in the fifth or sixth 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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