

NBER WORKING PAPER SERIES

THE AFTERMATH OF FINANCIAL CRISES

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Working Paper 14656
<http://www.nber.org/papers/w14656>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
January 2009

The authors would like to thank Pierre-Olivier Gourinchas and Vincent R. Reinhart for helpful comments. The views expressed herein are those of the authors and not necessarily those of the National Bureau of Economic Research.

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JEL No. E32,E44,F3,N20

ABSTRACT

This paper examines the depth and duration of the slump that invariably follows severe financial crises, which tend to be protracted affairs. We find that asset market collapses are deep and prolonged. On a peak-to-trough basis, real housing price declines average 35 percent stretched out over six years, while equity price collapses average 55 percent over a downturn of about three and a half years. Not surprisingly, banking crises are associated with profound declines in output and employment. The unemployment rate rises an average of 7 percentage points over the down phase of the cycle, which lasts on average over four years. Output falls an average of over 9 percent, although the duration of the downturn is considerably shorter than for unemployment. The real value of government debt tends to explode, rising an average of 86 percent in the major post-World War II episodes. The main cause of debt explosions is usually not the widely cited costs of bailing out and recapitalizing the banking system. The collapse in tax revenues in the wake of deep and prolonged economic contractions is a critical factor in explaining the large budget deficits and increases in debt that follow the crisis. Our estimates of the rise in government debt are likely to be conservative, as these do not include increases in government guarantees, which also expand briskly during these episodes.

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I. Introduction

A year ago, we (Carmen M. Reinhart and Kenneth S. Rogoff, 2008a) presented a historical analysis comparing the run-up to the 2007 U.S. subprime financial crisis with the antecedents of other banking crises in advanced economies since World War II. We showed that standard indicators for the United States, such as asset price inflation, rising leverage, large sustained current account deficits, and a slowing trajectory of economic growth, exhibited virtually all the signs of a country on the verge of a financial crisis—indeed, a severe one. In this paper, we engage in a similar comparative historical analysis that is focused on the aftermath of systemic banking crises.

In our earlier analysis, we deliberately excluded emerging market countries from the comparison set, in order not to appear to engage in hyperbole. After all, the United States is a highly sophisticated global financial center. What can advanced economies possibly have in common with emerging markets when it comes to banking crises? In fact, as Reinhart and Rogoff (2008b) demonstrate, the antecedents and aftermath of banking crises in rich countries and emerging markets have a surprising amount in common. There are broadly similar patterns in housing and equity prices, unemployment, government revenues and debt. Furthermore, the frequency or incidence of crises does not differ much historically, even if comparisons are limited to the post-World War II period (provided the ongoing late-2000s global financial crisis is taken into account). Thus, this study of the aftermath of severe financial crises includes a number of recent emerging market cases to expand the relevant set of comparators. Also included in the comparisons are two prewar developed country episodes for which we have housing price and other relevant data.

Broadly speaking, financial crises are protracted affairs. More often than not, the aftermath of severe financial crises share three characteristics. *First*, asset market collapses are deep and prolonged. Real housing price declines average 35 percent stretched out over six years, while equity price collapses average 55 percent over a downturn of about three and a half years. *Second*, the aftermath of banking crises is associated with profound declines in output and employment. The unemployment rate rises an average of 7 percentage points over the down phase of the cycle, which lasts on average over four years. Output falls (from peak to trough) an average of over 9 percent, although the duration of the downturn, averaging roughly two years, is considerably shorter than for unemployment. *Third*, the real value of government debt tends to explode, rising an average of 86 percent in the major post–World War II episodes. Interestingly, the main cause of debt explosions is not the widely cited costs of bailing out and recapitalizing the banking system. Admittedly, bailout costs are difficult to measure, and there is considerable divergence among estimates from competing studies. But even upper-bound estimates pale next to actual measured rises in public debt. In fact, the big drivers of debt increases are the inevitable collapse in tax revenues that governments suffer in the wake of deep and prolonged output contractions, as well as often ambitious countercyclical fiscal policies aimed at mitigating the downturn.

I. The Historical Comparison Group

Reinhart and Rogoff (2008a) included all the major postwar banking crises in the developed world (a total of 18) and put particular emphasis on the ones dubbed “the big five” (Spain 1977, Norway 1987, Finland, 1991, Sweden, 1991, and Japan, 1992). It is now beyond contention that the present U.S. financial crisis is severe by any metric. As a

result, we now focus only on systemic financial crises, including the “big five” developed economy crises plus a number of famous emerging market episodes: the 1997–1998 Asian crisis (Hong Kong, Indonesia, Korea, Malaysia, the Philippines, and Thailand); Colombia, 1998; and Argentina 2001. These are cases where we have all or most of the relevant data that allows for thorough comparisons. Central to the analysis is historical housing price data, which can be difficult to obtain and are critical for assessing the present episode.¹ We also include two earlier historical cases for which we have housing prices, Norway in 1899 and the United States in 1929.

II. The Downturn after the Crisis: A Comparison of Depth and Duration

Figure 1 looks at the bust phase in housing price cycles surrounding banking crises, including the current episode in the United States and a number of other countries now experiencing banking crises: Austria, Hungary, Iceland, Ireland, Spain, and the United Kingdom. Ongoing crises are in dark shading, past crises are in light shading. The cumulative decline in real housing prices from peak to trough averages 35.5 percent.² The most severe real housing price declines were experienced by Finland, the Philippines, Colombia and Hong Kong. Their crashes were 50 to 60 percent, measured from peak to trough. The housing price decline experienced by the United States to date during the current episode (almost 28 percent according to the Case–Shiller index) is already more than twice that registered in the U.S. during the Great Depression.

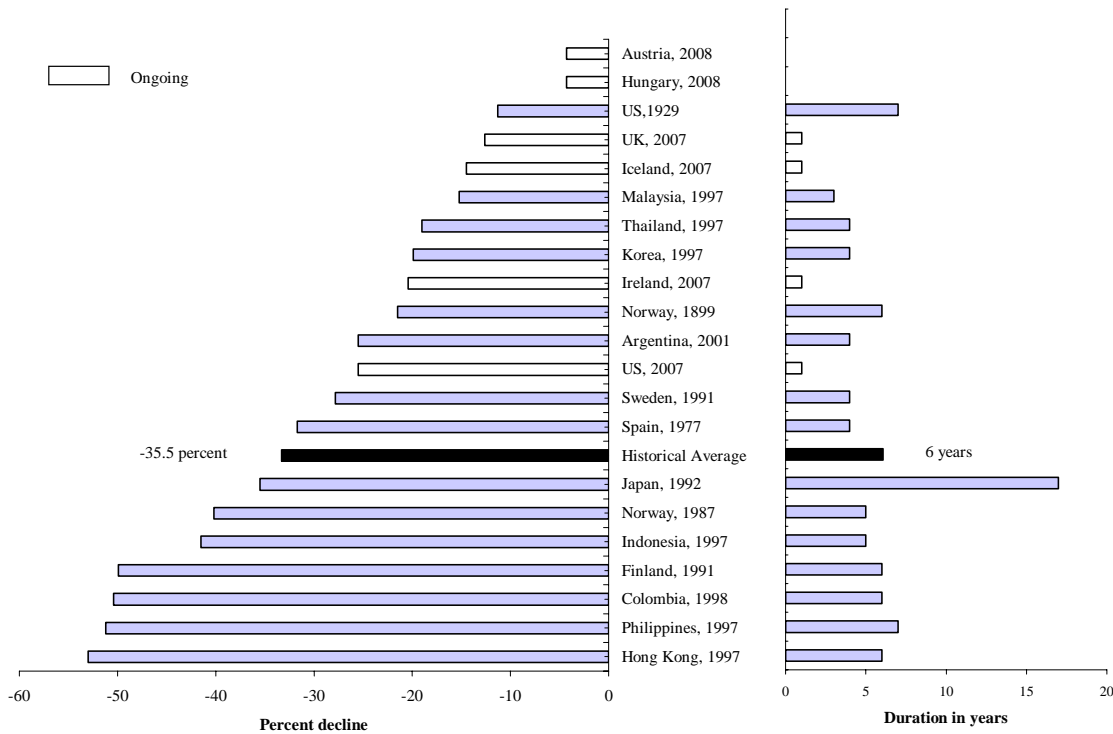
¹ In Reinhart and Rogoff (2008b), we look at financial crises in 66 countries over 200 years, emphasizing the broad parallels between emerging markets and developing countries, including for example the nearly universal run-up in government debt.

² The historical average, which is shaded in black in the diagram, does not include the ongoing crises.

Notably, the duration of housing price declines is quite long-lived, averaging roughly six years. Even excluding the extraordinary experience of Japan (with its 17 consecutive years of price declines), the average remains over five years.

Figure 1

Past and Ongoing Real House Price Cycles and Banking Crises:
Peak-to-trough Price Declines (left panel) and Years Duration of Downturn (right panel)



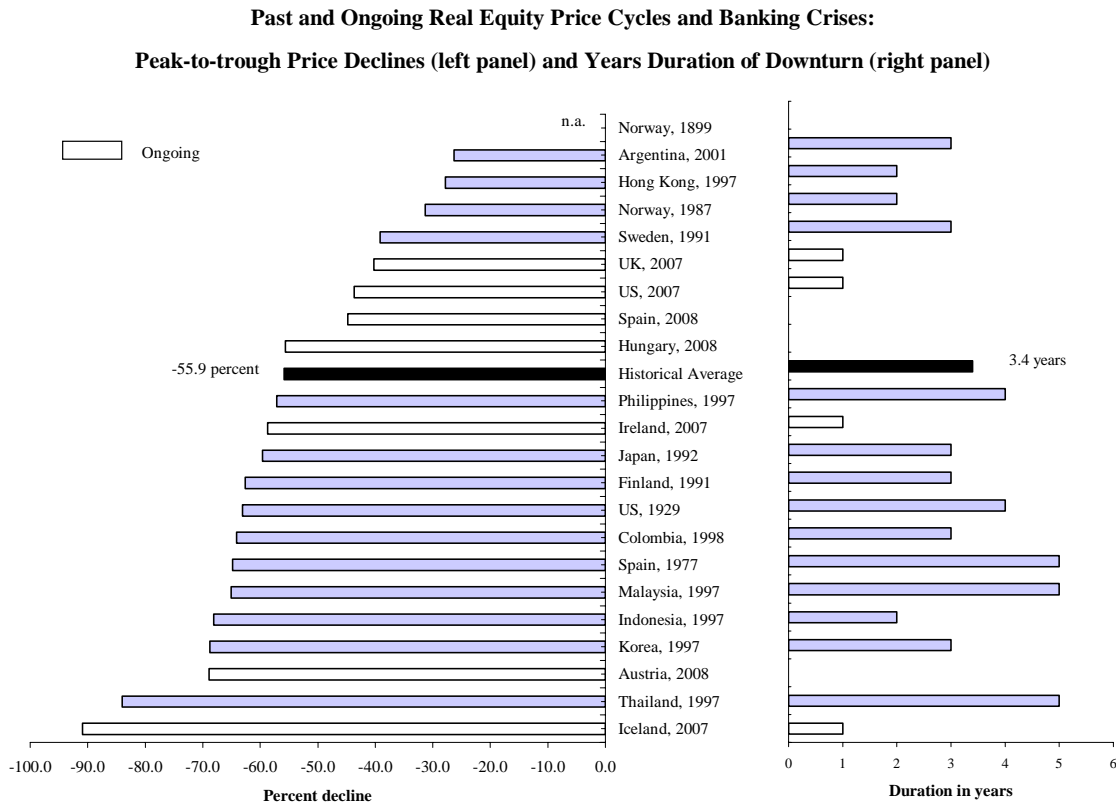
Sources: Reinhart and Rogoff (2008b) and sources cited therein.

Notes: Each banking crisis episode is identified by country and the beginning year of the crisis. Only major (systemic) banking crises episodes are included, subject to data limitations. The historical average reported does not include ongoing crises episodes. For the ongoing episodes, the calculations are based on data through the following periods: October 2008, monthly, for Iceland and Ireland; 2007, annual, for Hungary; and 2008:Q3, quarterly, for all others. Consumer price indices are used to deflate nominal house prices.

As figure 2 illustrates, the equity price declines that accompany banking crises are far steeper than are housing price declines, if somewhat shorter lived. The shorter duration of the downturn when compared with real estate prices is consistent with the observation that equity prices are far less inertial. The average historical decline in equity prices is 55.9 percent, with the downturn phase of the cycle lasting 3.4 years. Notably, during the

current cycle, Iceland and Austria have already experienced peak-to-trough equity price declines far exceeding the average of the historical comparison group.

Figure 2



Sources: Reinhart and Rogoff (2008b) and sources cited therein.

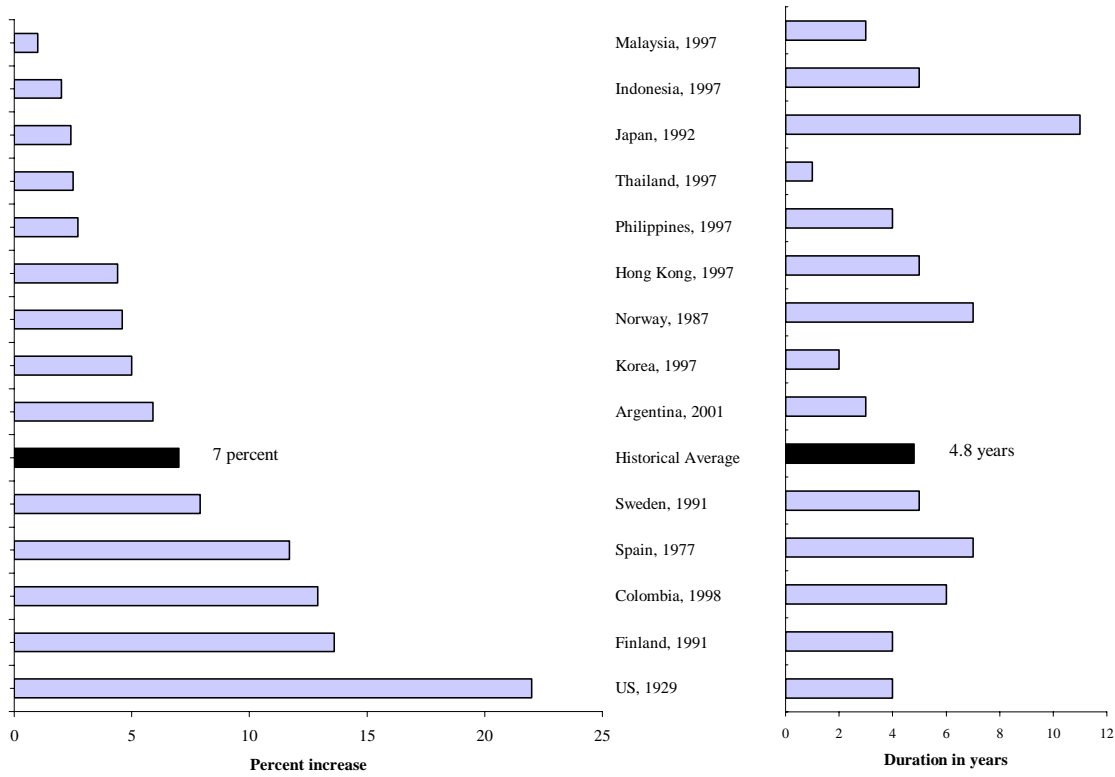
Notes: Each banking crisis episode is identified by country and the beginning year of the crisis. Only major (systemic) banking crises episodes are included subject to data limitations. The historical average reported does not include ongoing crises episodes. For the ongoing episodes, the calculations are based on data through December 2, 2008. Consumer price indices are used to deflate nominal equity prices.

Figure 3 looks at increases in unemployment rates across the historical comparison group. (As the unemployment rate is classified as a lagging indicator, we do not include the current crisis.) On average, unemployment rises for almost five years, with an increase in the unemployment rate of about 7 percentage points. While none of the postwar episodes rivals the rise in unemployment of over 20 percentage points

experienced by the United States during the Great Depression, the employment consequences of financial crises are nevertheless strikingly large in many cases.

Figure 3

**Past Unemployment Cycles and Banking Crises: Trough-to-peak
Percent Increase in the Unemployment Rate (left panel) and Years Duration of Downturn (right panel)**



Sources: OECD, IMF, Historical Statistics of the United States (HSOUS), various country sources, and authors' calculations.

Notes: Each banking crisis episode is identified by country and the beginning year of the crisis. Only major (systemic) banking crises episodes are included, subject to data limitations. The historical average reported does not include ongoing crises episodes.

It is interesting to note in Figure 3 that when it comes to banking crises, the emerging markets, particularly those in Asia, seem to do better in terms of unemployment than do the advanced economies. While there are well-known data issues in comparing

unemployment rates across countries,³ the relatively poor performance in advanced countries suggests the possibility that greater (downward) wage flexibility in emerging markets may help cushion employment during periods of severe economic distress. The gaps in the social safety net in emerging market economies, when compared to industrial ones, presumably also make workers more anxious to avoid becoming unemployed.

Figure 4 looks at the cycles in real per capita GDP around banking crises. The average magnitude of the decline, at 9.3 percent, is stunning. Admittedly, for the post–World War II period, the declines in real GDP are smaller for advanced economies than for emerging market economies. A probable explanation for the more severe contractions in emerging market economies is that they are prone to abrupt reversals in the availability of foreign credit. When foreign capital comes to a “sudden stop,” to use the phrase coined by Guillermo Calvo, Alejandro Izquierdo, and Rudy Loo-Kung (2006), economic activity heads into a tailspin.⁴

Compared to unemployment, the cycle from peak to trough in GDP is much shorter, only two years. Presumably, this is partly because potential GDP growth is positive, and we are measuring only absolute changes in income, not gaps relative to potential output. Even so, the recessions surrounding financial crises have to be considered unusually long compared to normal recessions that typically last less than a year.⁵ Indeed, multiyear recessions typically only occur in economies that require deep restructuring, such as

³ Notably, widespread “underemployment” in many emerging markets is not captured in the official unemployment statistics.

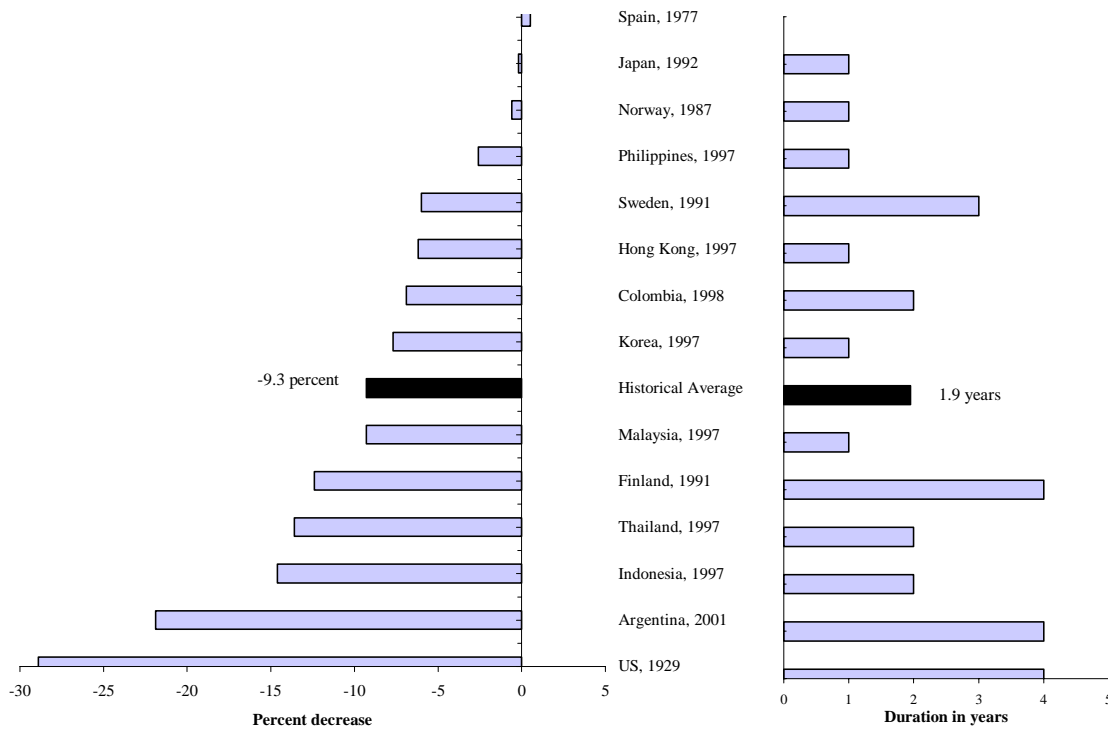
⁴ When no foreign financing is possible, emerging markets have seen consumption and investment implode during severe financial crises.

⁵ See IMF *World Economic Outlook*, April 2002, Chapter 3.

Britain in the 1970s (prior to Thatcher), Switzerland in the 1990s, and Japan post-1992 (the latter not only due to its financial collapse, but also due to the need to reorient the economy in light of China’s rise). Banking crises, of course, usually require painful restructuring of the financial system, and so are an important example of this general principle.

Figure 4

Past Real Per Capita GDP Cycles and Banking Crises: Peak-to-trough
Percent Decline in Real GDP (left panel) and Years Duration of Downturn (right panel)



Sources: Total Economy Database (TED), Historical Statistics of the United States (HSOUS), and authors’ calculations.

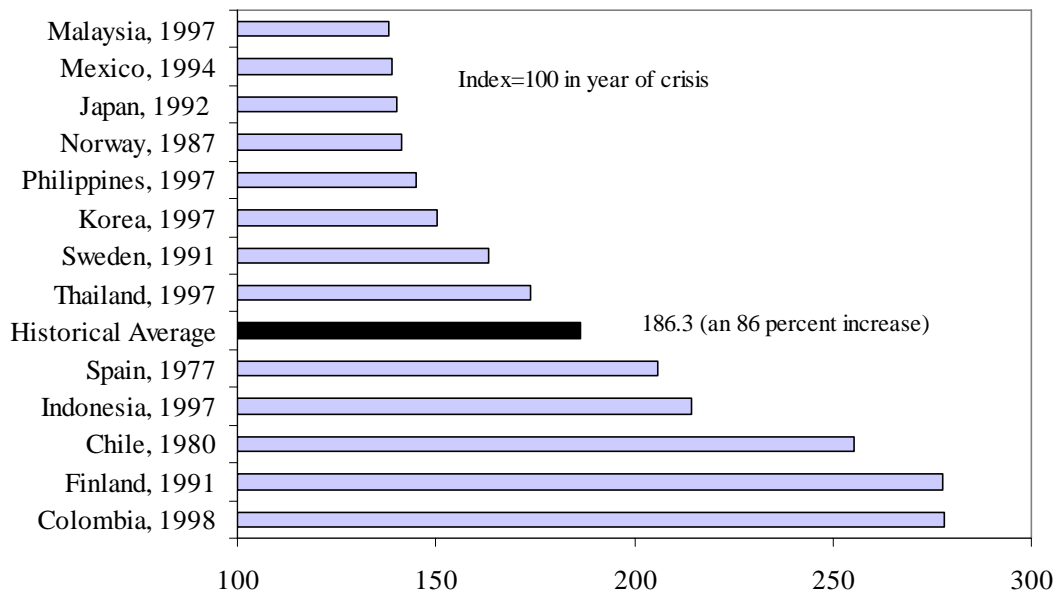
Notes: Each banking crisis episode is identified by country and the beginning year of the crisis. Only major (systemic) banking crises episodes are included, subject to data limitations. The historical average reported does not include ongoing crises episodes. Total GDP, in millions of 1990 US\$ (converted at Geary Khamis PPPs) divided by midyear population.

Figure 5 shows the rise in real government debt in the three years following a banking crisis. The deterioration in government finances is striking, with an average debt rise of over 86 percent. Reinhart and Rogoff (2008b), taking advantage of newly unearthed

historical data on domestic debt, show that this same buildup in government debt has been a defining characteristic of the aftermath of banking crises for over a century. We look at percentage increase in debt, rather than debt-to-GDP, because sometimes steep output drops would complicate interpretation of debt-GDP ratios. As Reinhart and Rogoff (2008b) note, the characteristic huge buildups in government debt are driven mainly by sharp falloffs in tax revenue and, in many cases, big surges in government spending to fight the recession. The much ballyhooed bank bailout costs are, in several cases, only a relatively minor contributor to post-financial crisis debt burdens.

Figure 5

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



Sources: Reinhart and Rogoff (2008b) and sources cited therein.

Notes: Each banking crisis episode is identified by country and the beginning year of the crisis. Only major (systemic) banking crises episodes are included, subject to data limitations. The historical average reported does not include ongoing crises episodes, which are omitted altogether, as these crises begin in 2007 or later, and debt stock comparison here is with three years after the beginning of the banking crisis.

III. Concluding Remarks

An examination of the aftermath of severe financial crises shows deep and lasting effects on asset prices, output and employment. Unemployment rises and housing price declines extend out for five and six years, respectively. On the encouraging side, output declines last only two years on average. Even recessions sparked by financial crises do eventually end, albeit almost invariably accompanied by massive increases in government debt.

How relevant are historical benchmarks for assessing the trajectory of the current global financial crisis? On the one hand, the authorities today have arguably more flexible monetary policy frameworks, thanks particularly to a less rigid global exchange rate regime. Some central banks have already shown an aggressiveness to act that was notably absent in the 1930s, or in the latter-day Japanese experience. On the other hand, one would be wise not to push too far the conceit that we are smarter than our predecessors. A few years back many people would have said that improvements in financial engineering had done much to tame the business cycle and limit the risk of financial contagion.

Since the onset of the current crisis, asset prices have tumbled in the United States and elsewhere along the tracks laid down by historical precedent. The analysis of the post-crisis outcomes in this paper for unemployment, output and government debt provide sobering benchmark numbers for how the crisis will continue to unfold. Indeed, these historical comparisons were based on episodes that, with the notable exception of the Great Depression in the United States, were individual or regional in nature. The global nature of the crisis will make it far more difficult for many countries to grow their

way out through higher exports, or to smooth the consumption effects through foreign borrowing. In such circumstances, the recent lull in sovereign defaults is likely to come to an end. As Reinhart and Rogoff (2008b) highlight, defaults in emerging market economies tend to rise sharply when many countries are simultaneously experiencing domestic banking crises.

REFERENCES

Calvo, Guillermo A., Alejandro Izquierdo, and Rudy Loo-Kung. 2006. “Relative Price Volatility Under Sudden Stops: The Relevance of Balance Sheet Effects.” *Journal of International Economics* Vol. 9 No. 1: 231–254.

International Monetary Fund. 2002. *World Economic Outlook*. Washington DC: International Monetary Fund.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2008a. “Is the 2007 U.S. Subprime Crisis So Different? An International Historical Comparison.” *American Economic Review* Vol. 98 No. 2: 339–344.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2008b. “Banking Crises: An Equal Opportunity Menace.” National Bureau of Economic Research Working Paper 14587.