This draft: December 30, 2007

Is the 2007 U.S. Sub-Prime Financial Crisis So Different? An International Historical Comparison

Carmen M. Reinhart
University of Maryland and the NBER

and

Kenneth S. Rogoff
Harvard University and the NBER

Sunday, January 6, 10:15 AM **Session:** New Perspectives on Financial Globalization (AEA) **Presiding:** Jeffrey Frankel (*Harvard University*)

REINHART (corresponding author): School of Public Policy and Department of Economics, 4105 Van Munching Hall, College Park, Maryland 20742; Tel: (301) 405-7006; Fax: (301) 403-8107; email: creinhar@umd.edu; Webpage: http://www.wam.umd.edu/~creinhar

ROGOFF: Economics Department, Littauer Center, Harvard University, Cambridge MA 02138-3001; Tel: 617-495-4022; Fax: 617-495-7330; email: krogoff@harvard.edu; Webpage: http://ws1.ad.economics.harvard.edu/faculty/rogoff

The first major financial crisis of the 21st century involves esoteric instruments, unaware regulators, and skittish investors. It also follows a well-trodden path laid down by centuries of financial folly. This time is a problem of sub-prime mortgages, but this time is not different. In fact, there are stunning quantitative parallels across a number of major crisis indicators from the standard literature on international financial crises. For example, the run-up in U.S. equity and housing prices, which Graciela L. Kaminsky and Carmen M. Reinhart (1999) find to the be best leading indicators of crisis in countries experiencing large capital inflows, closely tracks the average of the nineteen major post World War II banking crises in industrial countries. So, too, is the inverted v-shape of real growth in the years prior to the crisis. Despite widespread concern about the effects on national debt of the early 2000s tax cuts, the run-up in U.S. public debt is actually somewhat below the average of other crisis episodes. In contrast, the pattern of United States current account deficits is markedly worse.

The book is still open on the how the current dislocations in the United States will play out, but some precedent can be found in the aftermath of other bank-centered financial crises in industrial economies. Depending on the degree of trauma to the banking system, they can be quite severe. A severe banking crisis typically has a far deeper and more protracted effect on growth than does a severe currency crisis, if the latter occurs in isolation. The average drop in (real per capita) output growth is over two percent, and it typically takes two years to return to trend. For the five most catastrophic cases (which include episodes in Finland, Japan, Norway, Spain and Sweden), the drop in annual output growth from peak to trough is over five percent, and growth remained well

below pre-crisis trend even after three years. It is, of course, the more catastrophic cases that policymakers particularly want to steer clear of.

I. Post War Bank-Centered Financial Crises: The Data

Our main purpose here is to make simple and straightforward comparisons of the United States 2007 crisis with other post-war crises, employing a small piece of a much larger and longer historical data set we have constructed (see Reinhart and Kenneth S. Rogoff, 2008.) The extended data set catalogues banking and financial crises around the entire world dating back to 1800 (in some cases earlier). In order to focus here on data most relevant to present U.S. situation, we do not consider the plethora of emerging market crises, nor industrialized country financial crises from the Great Depression or the 1800s. Nevertheless, it is striking how much the "this time is different" syndrome has already been repeated.

First came the rationalizations. This time, many analysts argued, the huge run-up in U.S. housing prices was not at all a bubble, but rather justified by financial innovation (including to sub-prime mortgages, as well as by the steady inflow of capital from Asia and petroleum exporters. The huge run-up in equity prices was similarly argued to be sustainable thanks to a surge in U.S. productivity growth a fall in risk that accompanied the "Great Moderation" in macroeconomic volatility. As for the extraordinary string of outsized U.S. current account deficits, which now soak up roughly two-thirds of all the world's current account surpluses, many analysts argued that these, too, could be justified by new elements of the global economy. Thanks to a combination of a flexible economy and the innovation of the tech boom, the United States could be expected to enjoy superior productivity growth for decades, while superior American know-how meant

higher returns on physical and financial investment than foreigners could expect in the United States.

Next came the reality. In the past few month, we have seen a striking contraction in wealth, increases in risk spreads, and deterioration in market functioning. The 2007 United States sub-prime crisis, of course, has it roots in falling U.S. housing prices, which have in turn led to higher default levels particularly among less credit worthy borrowers. The impact of these defaults on the financial sector has been greatly magnified due to complex bundling techniques that were thought to spread risk efficiently, but in fact have made the resulting instruments extremely nontransparent and illiquid in the face of falling house prices.

As a benchmark for the 2007 U.S. sub-prime crisis, we draw on data from nineteen bank-centered financial crises from the post-War period. We have included post-war episodes in which an important financial institution or segment of financial sector collapsed in a manner similar to that described by Kaminsky and Reinhart (1999). For further discussion and documentation, see Reinhart and Rogoff (2008).

These crisis episodes include:

> *The Five Big Five Crises*: Spain (1977), Norway (1987), Finland (1991), Sweden (1991) and Japan (1992), where the starting year is in parenthesis.
>
> *Other Banking and Financial Crises*: Australia (1989), Canada (1983), Denmark (1987), France (1994), Germany (1977), Greece (1991), Iceland (1985), and Italy (1990), and New Zealand (1987), United Kingdom (1974, 1991, 1995), and United States (1984, 2007).

The "Big Five" crises are all protracted large scale financial crises that are associated with major declines in economic performance for a protracted period. Japan (1992), of course, is the start of the "lost decade," although the Nordic Crises and the Spanish crisis of 1977 all left deep marks on their economies as well.

The remaining rich country financial crises represent a broad range of lesser events. The 1984 U.S. crisis is the savings and loan crisis and, of course, the 2007 crisis is the sub-prime crisis, which we have represented as a U.S. crisis though of course it has had a severe impact on banks from Europe to Central Asia.

While generally all the crises centrally involved the banking system, we have included the 1995 UK crisis that resulted from the bankruptcy of Barings, which was essentially an investment bank.

We note that one crisis episode not encompassed by our selection criteria is the period of severe bank stress in the U.S. and Europe, especially, caused by the developing country debt crisis that began in 1982. We omit it because the bank crisis was not clearly at the epi-center of problem (which had it roots in U.S. disinflation and a drop in world commodity prices). Moreover, it overlaps somewhat with our dating of the thrift crisis. However, including it would not weaken our results.

II. Comparisons

We now proceed to a variety of simple comparisons between the 2007 U.S. crisis and previous episodes. Drawing on the standard literature on financial crises, we look at asset prices, growth and public debt. We begin in Figure 1 by comparing the run-up in housing prices. Period *T* represents the year of the onset of the financial crisis. So period *T-4* is four years prior to the crisis, and the graph in each case continues to *T+3*, except of

course in the case of the U.S. 2007 crisis.[1] The chart confirms the case study literature, showing the significant run-up in housing prices prior to a financial crisis, with the affect being particularly pronounced for the "Big five" severe cases. Housing prices in the United States, however, have risen even further.

Figure 1: Real Housing Prices and Banking Crises

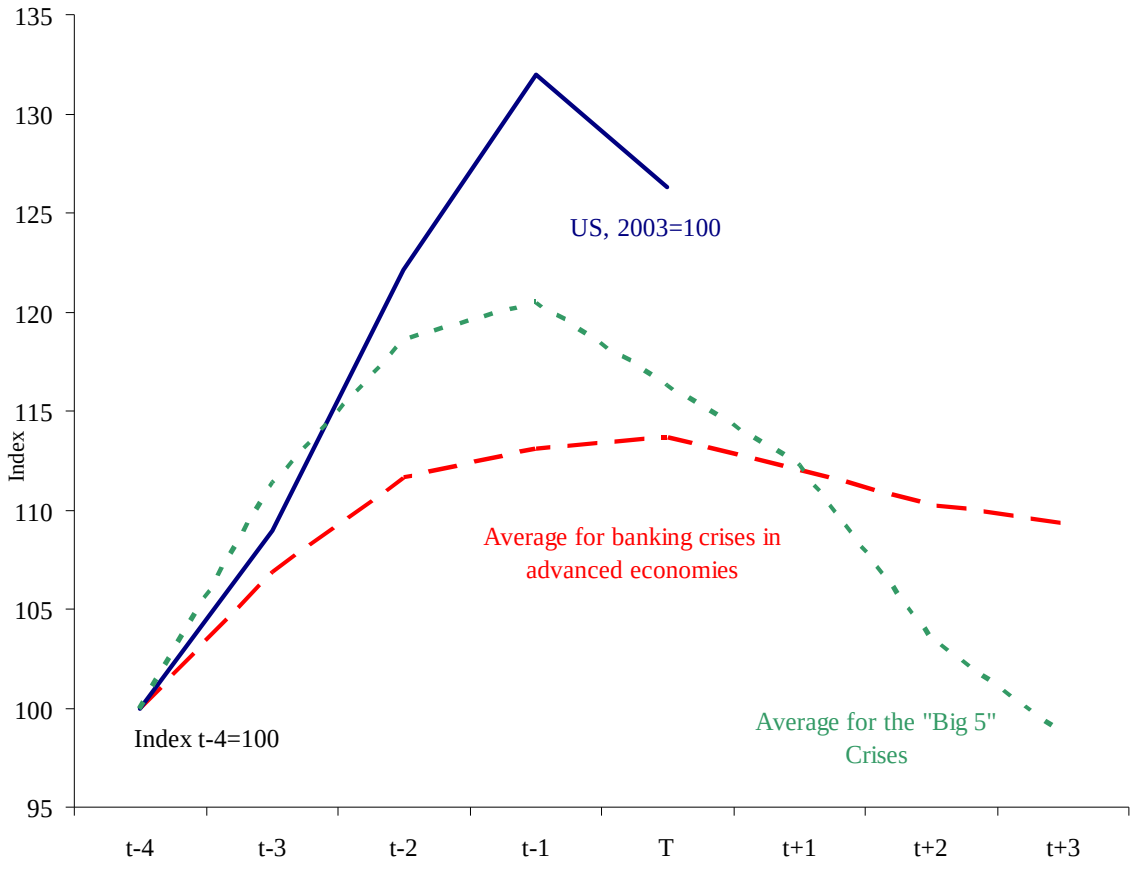


Figure 2 looks at real rates of growth in equity market price indices. (For the United States, the index is the S&P 500; Reinhart and Reinhart, 2008 provide the complete listing for foreign markets.)

[1] For the United States, house prices are measured by the Case-Shiller index, described and provided in Robert Shiller (2005). The remaining house price data were made available by the Bank for International Settlements and are described in Gregory D. Sutton (2002).

`The U.S. again looks like the archetypical crisis country, only more so. Here, however, the big five crisis countries tended to experience equity price falls earlier on. Of course, each of these crises occurred at different points in the global productivity cycle, which may explain some of the difference. Then, too, the monetary responses differed across these episodes, with the Federal Reserve pumping in an extraordinary amount of stimulus in the early part of the most recent episode.

Figure 2: Real Equity Prices and Banking Crises

Figure 3: Current Account Balance/GDP on the Eve of Banking Crises

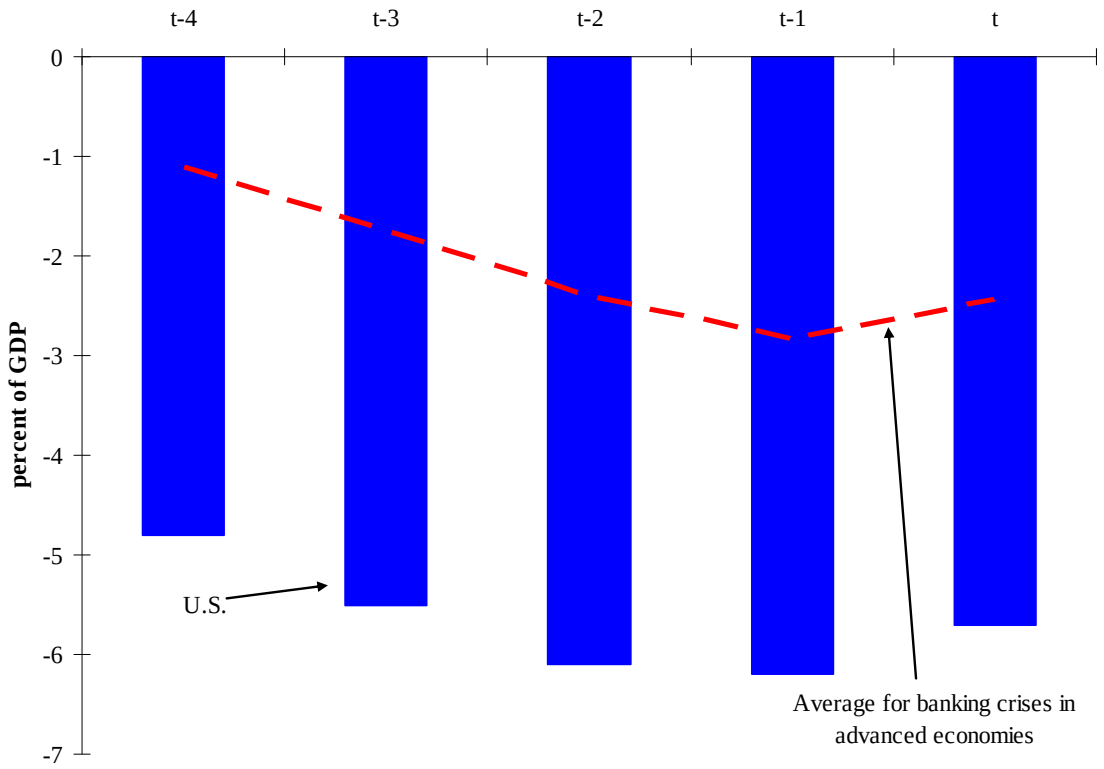


Figure 3 looks at the current account as a share of GDP, again starting four years before the crisis. Again, the United States looks like the typical pre-crisis country, in the capital inflows accelerate going into the crisis. However, the U.S. deficits are more severe, reaching over six percent of GDP. As already mentioned, there is a large and growing literature that attempts to rationalize why it might be beneficial for the United States to a sustained current deficit. The simplest argument is that increasing global trade and financial globalization supports larger current account imbalances (Obstfeld and Rogoff, 2001). The various rationales for the massive U.S. current account deficit would be more reassuring if the U.S. deficit were not almost twice the average of the earlier pre-crisis episodes.

Real per capita GDP growth in the run-up to debt crises is illustrated in Figure 4. The United States 2007 crisis follows the same inverted V shape that characterizes the earlier episodes. Growth momentum falls going into the typical crisis, and remains low for two years after. In the more severe "Big Five" cases, however, the growth shock is ever larger and more prolonged. Not encouraging for the U.S. economic outlook, the aftermath of a banking crisis tends to have a protracted effect on real growth.[2]

Figure 4: Real GDP Growth per Capita and Banking Crises (PPP basis)

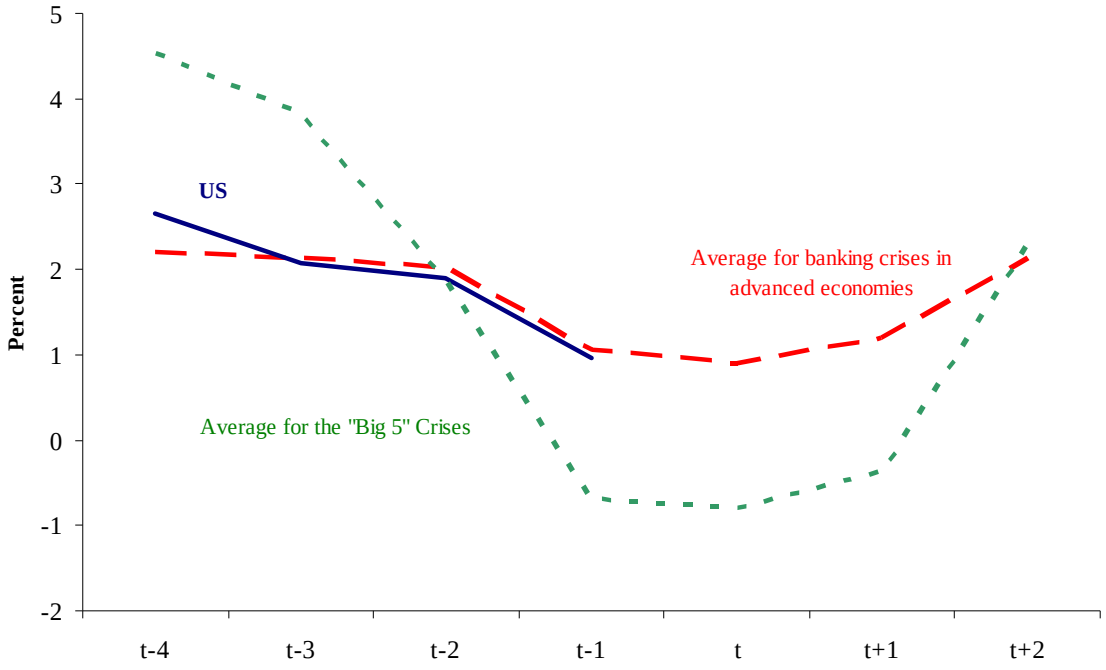


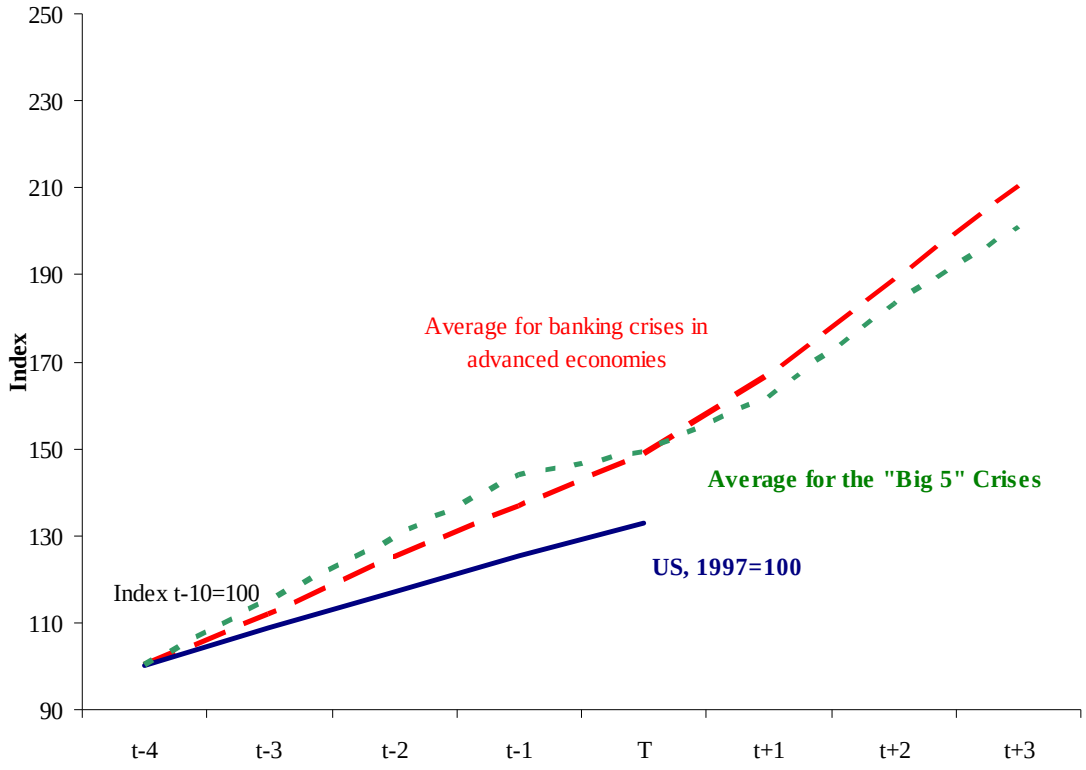
Figure 5 looks at public debt as a share of GDP. Rising public debt is a near universal precursor of other post-war crises, not least the 1984 U.S. crisis. Nevertheless, although public debt is rising prior to the 2007 U.S. crisis, it is rising notably more slowly than in the average of the other 18 episodes, and much more slowly

[2] The fiscal costs of cleaning up after banking crises can also be enormous. The 1980s US S&L clean-up cost 3.2 % of GDP, Sweden's 1990s crisis 6% and Norway's 1980s crisis 8%. Spain's post-1977 cleanup cost over 16% of GDP. Japan's final bill remains unknown, estimates vary widely.

than the Big Five. This shallow path of U.S. public debt also makes it clear that the large current account deficits shown earlier owe to factors other than just government excess.

The correlations in these graphs are not necessarily causal, but in combination nevertheless suggest that if the United States does not experience a significant and

Figure 5: Public Debt and Banking Crises



protracted growth slowdown, it should either be considered very lucky or even more "special" that most optimistic theories suggest. Indeed, given the severity of most crisis indicators in the run-up to its 2007 financial crisis, the United States should consider itself fortunate if it can have post-crisis trajectory parallel to the milder banking crises in the comparison set, as opposed to the much larger growth pauses experiences by Spain, Japan, Sweden, Norway and Finland during their severe financial crises.

Conclusions

Tolstoy famously begins his classic novel *Anna Karenina* with the line "Every happy family is alike, but every unhappy family is unhappy in their own way." While each financial crisis no doubt has its own distinctions, there are also striking similarities, in the run-up of asset prices, in debt accumulation, in growth patterns, and in current account deficits. The majority of historical crises are preceded by financial liberalization, as documented in Kaminsky and Reinhart (1999). While in the case of the United States, there has been no striking de jure liberalization, there certainly has been a de facto liberalization. New unregulated, or lightly regulated, financial entities have come to play a much larger role in the financial system, undoubtedly enhancing stability against some kinds of shocks, but possibly increasing vulnerabilities against others.

Perhaps the United States will prove a different kind of happy family. Despite many superficial similarities to a typical crisis country, it may yet suffer a growth lapse comparable only to the mildest cases. Perhaps this time will be different as so many argue. Whatever the long-term outcome, the quantitative parallels to earlier post-war industrialized-country financial crises, at least in the pre-crisis period, is worthy of note. Of course, inflation is lower and better anchored today worldwide, and this may prove an important mitigating factor.

One last parallel deserves mention. During the 1970s, the U.S. banking system stood as an intermediary between oil-exporter surpluses and emerging market borrowers in Latin America and elsewhere. While much praised at the time, 1970s petro-dollar recycling ultimately led to the 1980s debt crisis, which in turn placed enormous strain on

money center banks.[3] It is true that this time, a great deal of petro-dollars are again flowing into the United States, but many emerging markets have been running current account surpluses, lending rather than borrowing. Instead, a large chunk of money has effectively been recycled to a developing economy that exists within the United States' own borders. Over a trillion dollars was channeled into the sub-prime mortgage market, which is comprised of the poorest and least credit worth borrowers within the United States. The final claimant is different, but in many ways, the mechanism is the same.

[3] See Rudi Dornbsuch's concise assessment of the recycling of petrodollars in the third and fourth chapters of Dornbusch (1986).

REFERENCES

Dornbusch, Rudiger. 1986. *Dollars, Debts, and Deficits*. Cambridge, MA: MIT Press.

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

Reinhart, Carmen M. and Kenneth S. Rogoff. *This Time is Different: Six Centuries of Financial Folly.* Forthcoming.

Shiller, Robert. 2005. *Irrational Exuberance* (Second Edition). Princeton, NJ: Princeton University Press.

Sutton, Gregory D. 2002. "Explaining Changes in House Prices." *BIS Quarterly Review.* (September): 46-55.