

Instability in Financial Markets: Sources and Remedies

The View from Economic History

Moritz Schularick*

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Abstract

Taking a long-run view from economic history, I make three points about instability in financial markets. First, I argue that economic historians have a relatively good understanding of the proximate causes of financial crises. Crises are typically credit booms gone bust. A rapid increase in economy-wide leverage is a powerful predictor of financial instability down the road. However, what role monetary policy, international capital flows, or moral hazard play in causing credit booms remains much less understood. Second, policy responses to financial instability, both monetary and fiscal, have become much more activist in the course of the 20th century. While this has helped cushion the fall-out from financial crises to some degree, such policies have possibly contributed to the historically unprecedented build-up in leverage during the second half of the 20th century. Finally, with regard to the debate about remedies, a historically informed view suggests a good dose of skepticism towards the policy frameworks that rely on assumptions about self-regulating and efficient financial markets.

* Professor of Economics and Economic History, Free University of Berlin, Department of Economics, John F. Kennedy Institute; email: moritz.schularick@fu-berlin.de

In this short paper, I want to make three comments about the sources of and the remedies for instability in financial markets. My propositions rely heavily on collaborative work that I have carried out with Alan Taylor (2012) and with Òscar Jordà and Alan Taylor (2011a, 2011b). In our research, we have explored the role of financial factors in the modern macroeconomy since 1870. We based our analysis on a newly compiled cross-country dataset that covers 14 countries at annual frequency over the years 1870–2008.¹ Building up this new dataset was no easy task and we are indebted to our many colleagues who provided advice and assistance.² We are currently working on an INET funded project entitled “Finance and the Welfare of Nations”. Among other things, the grant will allow us to to extend our long-run dataset.

Before the financial crisis of 2008/09 there had been no fewer than 79 systemic banking crises in the past 140 years (1870-2009) in the 14 countries for which we have a detailed body of historical financial data. The complete list of crises can be found in Jordà, Schularick and Taylor (2011a). The unconditional probability of encountering a severe banking crisis in any given year since 1870 was about four percent. In line with the previous studies, we defined systemic financial crises as events during which a country’s banking sector experiences bank runs, sharp increases in default rates accompanied by large losses of capital that result in public intervention, bankruptcy, or the forced merger of major financial institutions (Laeven and Valencia 2008). The distribution of financial crises over time can be read from figure one below.

¹ The countries covered are: Australia, Canada, Denmark, France, Germany, Great Britain, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, United States.

² We are grateful to a number of colleagues who shared their data or directed us to the appropriate sources. We wish to acknowledge the support we received from *Joost Jonker* and *Corry van Renselaar* (Netherlands); *Gianni Toniolo* and *Claire Giordano* (Italy); *Kevin O’Rourke* (Denmark); *Eric Monnet* and *Pierre-Cyrille Hautcoeur* (France); *Carl-Ludwig Holtfrerich* (Germany); *Rodney Edvinsson* and *Daniel Waldenström* (Sweden); *Youssef Cassis* (Switzerland); *Pablo Martin Aceña* (Spain); *Ryland Thomas* (Britain). In addition, we would like to thank *Michael Bordo* and *Solomos Solomou* for sharing monetary and real data from their data collections with us. *Kris Mitchener* directed us to the sources for Japan.

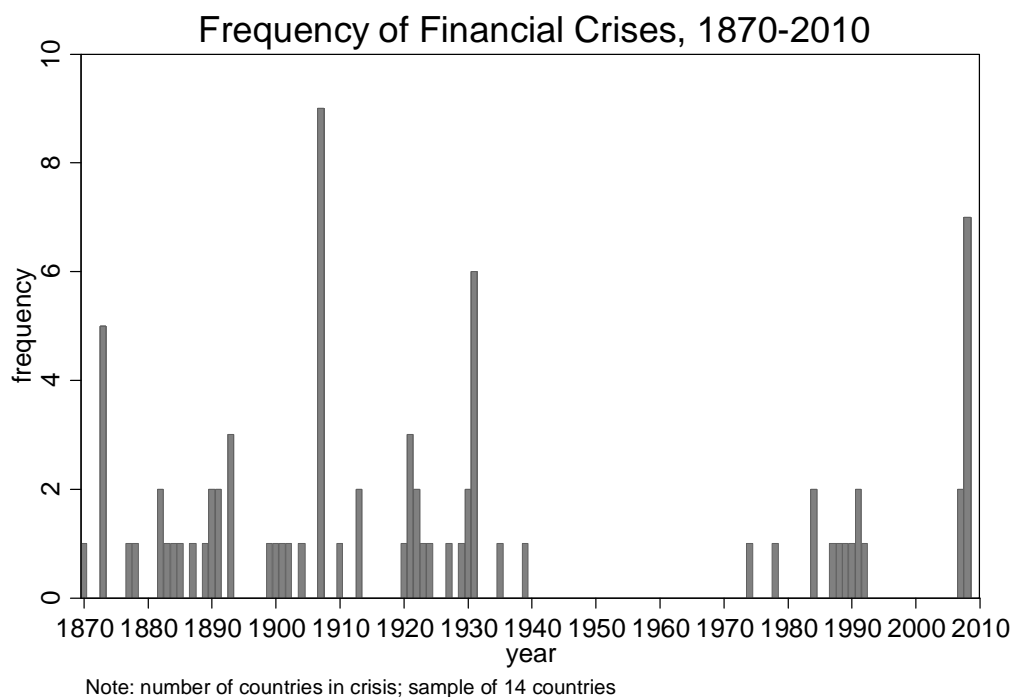


Figure 1: Frequency of Financial Crises. (Source: Jordà, Schularick and Taylor 2011a)

Looking back at 140 years of modern macroeconomic history, what do we know about the sources of financial instability in financial markets and their remedies? I will offer three propositions. First, financial crises are typically credit booms gone bust. Second, attempting to cushion the effects of crises, policy-makers (both monetary and fiscal) have stepped up their responses to financial crises over time. It is not inconceivable that these policies have contributed to the historically unprecedented build-up of leverage during the second half of the 20th century. Third, the historical experience suggests a good dose of skepticism with regard to policy regimes that rely on strong assumptions about the self-regulating and equilibrating nature of financial markets.

1. Crises as Credit Booms Gone Bust

In contemporary macroeconomics, financial instability is often modeled as an "exogenous shock" to the financial intermediation process that manifest itself for instance in a sudden widening of credit spreads or a deterioration of bank capital (f.i., Curdia and Woodford 2010). Such attempts

at modeling financial shocks are can enhance our understanding of policy options in the face of disruptions, but by definition, they do not help us understand why crises occur. Treating financial crises as exogenous events is a luxury that economic historians (or policy makers) do not have. We must ask where crises come from.

The first main point that I want to make today is that economic historians and other empirical economists have a relatively good understanding of the *proximate* causes of financial crises, but not necessarily of their *fundamental* causes. What I mean is that researchers have successfully identified the key warning signs that crisis risk is rising. In my own research with Alan Taylor and Òscar Jordà, we consistently found that an acceleration of credit growth is the single best predictor of future financial instability, a result which is robust to the inclusion of various other nominal and real variables. Other researchers at the Bank for International Settlements and elsewhere have come to similar results with shorter time horizons studying developed economies and emerging markets in the last few decades (Gourinchas, Valdes and Landerretche 2001; Mendoza and Terrones 2008; Borio and Drehmann 2009). In all this, the historical data vindicate the ideas of scholars such as Minsky (1986) and Kindleberger (1978) who have argued that the financial system is prone to produce credit booms and busts.

In a next step, we asked whether such a credit-based model of financial instability actually has sufficient predictive power to help policy makers manage credit cycles. Again, the answer was affirmative. We assessed the predictive power of our model using so-called Receiver Operating Characteristics (ROC), a standard tool to evaluate binary (crisis/no crisis) classification ability. As it turned out, the predictive power of such credit-based crisis models is respectable and can be used for early warning purposes. Even out-of-sample, the test statistics were not far off the thresholds typically used in medicine when the effectiveness of new drugs is assessed. In sum, 140 years of evidence clearly suggests that financial crises tend to arise from credit booms gone bust. This is a lesson from history that central banks should keep in mind. Credit trends can and should play a constructive role for policy.

While the proximate cause for crises is very often an expansion of the balance sheets of financial intermediaries, the reasons for the acceleration of credit growth remain obscure. Like a weather forecaster we can see the storm approaching on the satellite map, but we do not yet have a very good understanding of why the storm formed in the first place. Lax monetary policy, overoptimistic lending, international capital flows or microeconomic incentives for excessive risk taking—all these factors might play a role but are very hard to disentangle. The heated discussion about the “true” causes of the 2008/09 crisis proves this point. Limits to bank liability and a short-term bonus culture have been cited as a reason for excessive risk taking as have been political

pressures for lending as part of a mistaken social policy agenda (Rajan 2010; Calomiris 2010). Other observers have blamed Alan Greenspan and Federal Reserve policy that kept interest too low in the wake of the 2001 recession or identified flaws in the reigning doctrine of inflation targeting (Goodhart 2007; Taylor 2007; Christiano, Motto and Rostagno 2007). Yet another school of thought puts the blame not on short-term interest rates controlled by central banks but on international developments that impact on the term structure of the interest rates (Obstfeld 2010). For instance, Ben Bernanke (2009) and Mervin King (2011) have linked the crisis to a surge of capital inflows from developing into developed economies.

In Jordà, Schularick and Taylor (2011a), we tried to disentangle the role of domestic credit growth and international capital flows in the generation of financial crises. We did not find clear evidence that imbalances are a reliable indicator for financial crises, but also noted that since the end of the Bretton-Woods regime, credit booms and current account deficits tend to go hand in hand. Probably the strongest argument that international capital flows play some role in the generation of financial stability is that no financial crises occurred under the Bretton Woods system when capital controls minimized “financial entanglements” between nations. Yet domestic financial regulation was also tight at the time, making it once again difficult to identify the true cause of financial calm.

2. Policy Activism and the Rise of Leverage

The second point I want to make here is that from a historical perspective, we can observe a clear trend towards more activist monetary and financial policy responses to financial crises. It is well known that crisis management was an explicit reason for the establishment of modern central banks. For instance, the Federal Reserve was established in 1913 with the specific aim of preventing banking crises. Through liquidity provision and Lender of Last Resort functions, central banks are in a position to support the banking system in times of distress and reduce the economic impact of financial crises. Long-run historical data clearly show that central bank stabilization policies but also fiscal responses have become stronger over time.

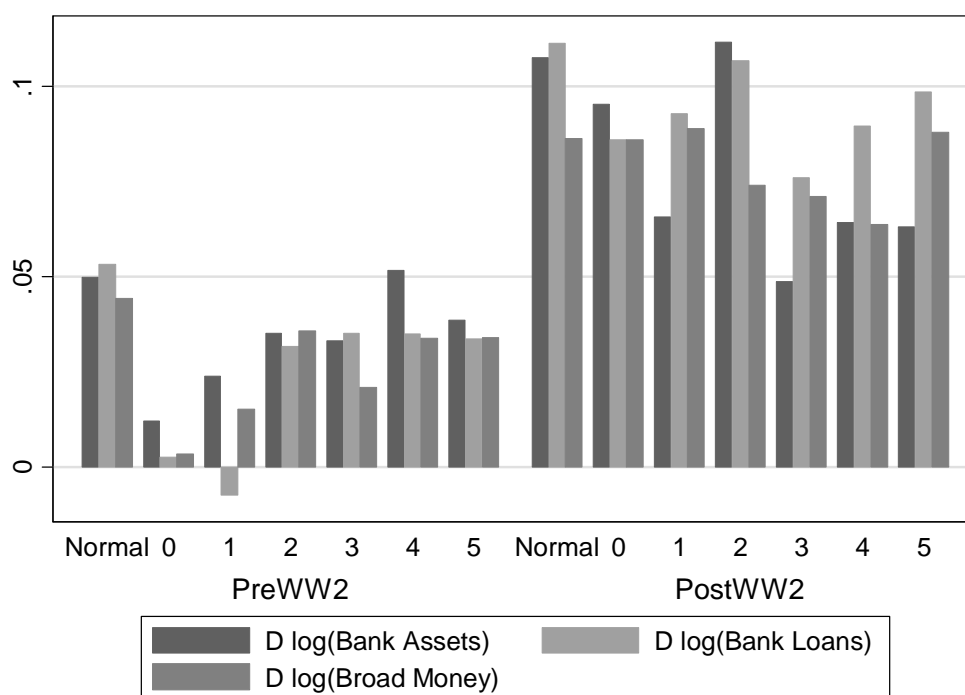


Figure 2: Monetary and Financial Variables Post-Crisis (Source: Schularick and Taylor 2012)

Figure two displays the development of monetary and credit aggregated in the five years following a financial crisis. It shows clearly that post-crisis dynamics differ sharply before and after WWII. Central banks have become much more activist in their policy response to financial crises. Before WWII, credit and money growth dipped significantly below normal levels after crisis events and did not recover to pre-crisis growth rates for many years after the crisis. In contrast, during crises after WWII, no significant dip in the growth rate of the monetary and credit aggregates appears. Through policy interventions, central banks in the post-WWII period have prevented a contraction of the money supply, deflation and rapid financial deleveraging. But the very success of central banks in moderating the fall-out from financial crises might have encouraged risk-taking on an ever-greater scale. The financial sector began to "bank on the state" as Alessandri and Haldane (2009) have remarked.

Similar dynamics can be found in the fiscal space. Table one below shows the cumulative increase of the public debt to GDP ratio in the five years following a financial crisis. Looking at the entire period from 1870 to 2010, public debt ratios increased by about 13% in the five years following financial crises with high statistical significance. Yet the dichotomy between the pre-WWII and post-WWII dynamics is notable. Before WWII, the increase of the public debt to GDP

ratio is small (3%) and statistically insignificant. Financial crises barely left a mark on public debt. Yet after WWII, financial crises have typically triggered a massive deterioration in public debt ratios of more than 30%.³ The effects are particularly pronounced when crises occur in large financial sectors. In post-1975 financial crises, public debt levels jump by nearly 50% relative to a country's trend when the financial sector is large relative to the real economy. After WWII the policy response to financial crises has been much more pronounced as governments have typically run large deficits for an extended period in order to support the real economy in the wake of a financial crisis.

Table 1: Cumulative Effects of Financial Crises

Cumulative log level increase of public debt to GDP 5 years after crisis, vs. non crisis-trend

	Coefficient	Standard error	t-value
All years	0.13***	0.04	3.08
Pre-WWII	0.03	0.06	0.53
Post-WWII	0.31***	0.07	4.15
Post-1975	0.32***	0.07	4.61
Post-1975 and large financial sector	0.48***	0.13	3.73

Note: Regression includes country fixed effects and a common time trend. *** Denotes significance at the 99% level.

It remains an open question how successful central banks have been successful in cushioning the real economy from the effects of financial disruptions. In absolute numbers, the real economic impact of financial crises was more muted in the post-war era, but of comparable magnitude relative to trend. In Jordà, Schularick and Taylor (2011b) we find, in line with other estimates in the literature, that the cumulative output costs of financial crises are around 8% over ten years. Despite the stronger policy responses, financial crises remain severe in the post-1945 period. But why have financial crises remained so costly in real terms despite more activist economic policies?

One reason could be that the financial sector has grown strongly in size. Figure three below shows the dramatic increase in leverage in Western economies in the second half of the 20th century. The figure displays the trends in credit and money aggregates (relative to GDP) for 14 countries between 1870 and 2008. ⁴ Credit grew not only strongly relative to GDP, but also relative

³ About 12 percentage points of GDP for the sample under study here.

⁴ See Schularick and Taylor (2012); the chart shows the mean of the predicted time effects from fixed country-and-year effects regressions for the dependent variable of interest in order to global average effects. That is for any

to broad money after WWII. This widening gap between the credit and money aggregates reflects the increasing reliance of financial institutions on new, non-monetary forms of financings such as interbank markets, bonds, repo transactions or the commercial paper markets. The consequence of the strong build-up in leverage could be that the shocks hitting the financial sector might now have a larger impact on the real economy. In Jordà, Schularick, Taylor (2011a,b) we present evidence that both the crisis probability as well the after-effects of credit booms are more severe in more highly financialized economies.

The troublesome possibility exists that this leverage boom was at least partly an endogenous response to activist monetary and financial policies. The potential for reverse causality running from government interventions to the increase in systemic leverage after the 1970s is particularly worrisome. Implicit government insurance and the prospect of rescue operations might have contributed to the growth of finance. If financial institutions expect to be bailed out, they might be encouraged to lend even more, aggravating the bust when it comes. Among others, Minsky (1986) was well aware of these potential inconsistencies of central bank activism. Paradoxically, stability can be destabilizing as it leads to the build-up of ever-greater risks and leverage. Over time, governments therefore assume the responsibility of stabilizing larger and larger financial systems. In the global financial crisis of 2008/09, one could observe that the task of stabilizing the financial system overpowered the fiscal capacities of countries like Ireland.

variable X_{it} we estimate the fixed effects regression $X_{it}=a_i + b_t + e_{it}$ and then plot the estimated year effects b_t to show the average global level of X in year t . Simply speaking, we construct global averages that are independent of the different levels of financial development in each country.

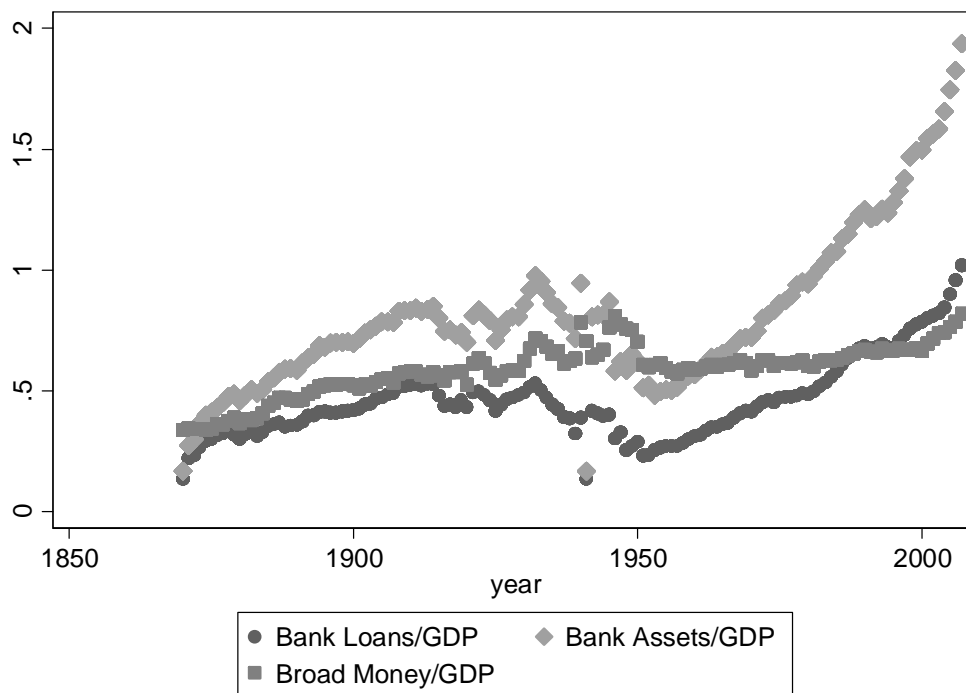


Figure 3: Credit and Money in the Long Run (Source: Schularick and Taylor 2012)

3. Remedies for Financial Instability

My last point relates to the remedies for financial crises. Historians tend to be cautious when confronted with one-size-fits-all schemes that would supposedly make the next financial crisis impossible. Crises have happened throughout history, in gold standard times and under fiat money, with or without central banks controlling the money supply. Financial crises were equally frequent during the 19th century when capital ratios in the banking systems were much higher than today and the incentives for bankers to run excessive risks consequently much lower. History therefore teaches us that bank capital should not be our only focus. It is true that financial intermediaries have dramatically reduced capital buffers over the course of the 20th century—potentially even in response to repeated government bail-outs: heads we win, tails you lose (Alessandri and Haldane 2009). Capital ratios should be much higher, but this is not a panacea.

A new problem that must be addressed is the instability of wholesale funding. For most of the 20th century, we have lived in an “age of money,” in which banks’ liabilities were exclusively or predominantly monetary assets of the public. Today, we live in an “age of credit,” wherein credit

exceeds money by a large margin. Since the 1970s, banks' access to non-monetary sources of finance has become an important factor for aggregate credit provision. Yet wholesale funding of banks has also made the financial system much more unstable. What happens in financial markets at large – borrowing conditions, liquidity, market confidence – matters much more for financial intermediation than it used to. Risks now linger on both sides of banks' balance sheets.

In this sense, our current banking system has more in common with the 19th century system prior to the introduction of deposit insurance. The increasing dependence of the banking system on access to wholesale funding also means that central banks are forced to underwrite the entire funding market during times of distress in order to avoid the collapse of the banking system as witnessed in 2008/09. The Lender of Last Resort now must step in to confront non-deposit bank runs. This is paradoxical because wholesale funding markets grew so strongly exactly because they offered cheaper funds free from reserve requirements and deposit insurance regulations that made regular deposits relatively expensive for banks. Since the financial crisis of 2008/09, central banks safeguard markets that arose in large part to evade the safety belts of central bank regulation. This represents an obvious inconsistency in the regulatory framework that will have to be closed. If the systemic importance of these wholesale markets is such that they need to be taken under the central bank umbrella in times of stress, reserve requirements, funding rules or other forms of regulations will have to be applied to avoid excess leverage through the backdoor.

In terms of policy frameworks, it is safe to say that the history of financial crises has shown time and again that it is right for policymakers to be somewhat skeptical about the inherent rationality of financial markets and to get worried when financial markets get excited. This does not mean that all accelerations of credit growth or a boom in asset prices is necessarily pernicious. But not every credit boom is an equilibrium phenomenon either. Acknowledging the inherent tendency of financial markets to live through boom and bust cycles and thinking about implications for financial stability would seem a wise beginning. A corollary of this view is that policy makers would be well advised to be more skeptical of the price signals coming from financial markets. This does not imply that central bankers are better than the market in determining the fundamental value of financial assets. But it stresses the importance of realizing that the price of an asset may be inaccurate or even far off its fundamental value, even when produced by competitive markets.

All in all, if they have not done so already, central banks will have to acknowledge that a Taylor-rule does not address all relevant knowledge of the economy. A policy framework such as inflation targeting that fails to provide a more holistic perspective of the economy and systemic stability is not only highly deficient from a historical perspective, but potentially dangerous.

Current central bank practices have already begun the swing from rules to discretion—a trajectory that is likely to continue.

References

- Allessandri, Piergorgio, and Andrew G. Haldane. 2009. "Banking on the State." Conference Paper, Federal Reserve Bank of Chicago 12th Annual International Banking Conference: The International Financial Crisis: Have the Rules of Finance Changed?
- Bernanke, Ben. 2009. Four Questions About the Financial Crisis, Chairman of the Board of Governors of the US Federal Reserve System, Speech at the Morehouse College, Atlanta, Georgia, 14 April 2009
- Borio, Claudio, and Matthias Drehman. 2009. Assessing the Risk of Banking Crises, BIS Quarterly Review, March 2009, Bank for International Settlements, pp. 29-46.
- Calomiris, Charles. 2010. Banking Crises Yesterday and Today, *Financial History Review* 17(1), 2010, pp. 3-12
- Christiano, Lawrence, Roberto Motto, and Massimo Rostagno. 2007. Two Reasons Why Money and Credit May be Useful in Monetary Policy, NBER Working Paper No. 13502, 2007.
- Vasco Curdia & Michael Woodford, 2010. Credit Spreads and Monetary Policy. *Journal of Money, Credit and Banking*, vol. 42(s1), pages 3-35, 09.
- Farhi, Emanuel, and Jean Tirole. 2009. Collective Moral Hazard, Maturity Mismatch and Systemic Bailouts, NBER Working Papers 15138, 2009.
- Goodhart, Charles. 2007. Whatever Became of the Monetary Aggregates? Peston Lecture, delivered at Queen Mary College, London, on February 28, 2007.
- Gourinchas, Pierre-Olivier, Rodrigo O. Valdes, and Oscar Landerretche. 2001. Lending Booms: Latin America and the World. *Economía* 1 (2): 47-99.
- Jordà, Òscar, Moritz Schularick, and Alan M Taylor, 2011a. Financial Crises, Credit Booms, and External Imbalances: 140 Years of Lessons. *IMF Economic Review*, vol. 59(2), pages 340-378, June.
- Jordà, Òscar, Schularick, Moritz, and Taylor, Alan M., 2011b. When Credit Bites Back: Leverage, Business Cycles, and Crises. CEPR Discussion Papers 8678.
- Kindleberger, Charles P. 1978. *Manias, Panics, and Crashes: A History of Financial Crises*. New York: Basic Books.
- King, Mervyn. 2010. Speech at the University of Exeter of the Governor of the Bank of England. January 19, 2010.
- Laeven, Luc, and F. Valencia. 2008. Systemic Banking Crises: A New Database, IMF Working Paper 08/224, 2008.

Mendoza, Enrique, and Marco Terrones. 2008. An Anatomy of Credit Booms: Evidence From Macro Aggregates And Micro Data, NBER Working Papers 14049, 2008.

Minsky, Hyman. 1986. *Stabilizing an Unstable Economy*. New Haven: Yale University Press.

Obstfeld, Maurice. 2010. The Immoderate World Economy, *Journal of International Money and Finance* 29, 2010, pp. 603-614.

Schularick, Moritz, and Alan M. Taylor. 2012. Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870-2008. *American Economic Review*, vol. 102.

Taylor, John. 2007. Housing and Monetary Policy, NBER Working Paper No. 13682, 2007.