

# **IMF Research on Macro-Financial Linkages: Context, Relevance, and Diversity of Approaches**

Andrés Solimano<sup>1</sup>

June, 2010

## **Abstract**

Macroeconomic frameworks that are useful in an era of financial crises must incorporate the reality of inherent financial instability. The IMF conducts substantial research in the field of macro-financial linkages and this has generally been of good quality, but it has suffered from a limited diversity of conceptual approaches. Financial crises have been considered more as outside events rather than endogenous outcomes of market economies with insufficiently regulated financial systems; the Fund should give more credence to the view that financial markets are inherently unstable. The research on several important topics seems to have had only a small influence on policymaking, partly because the Fund has failed to present more definite conclusions on the inevitability of financial crises in a world of high capital mobility and under-regulated financial markets, even though abundant evidence pointed in that direction. IMF research still falls short of offering clear guidance and intellectual leadership to the global community on how to prevent future financial crises, and how to build a more stable global economy.

---

<sup>1</sup> Andrés Solimano es economista chileno. Actualmente se desempeña como Director de FLACSO-Chile.

## CONTENTS

PAGE

I. INTRODUCTION .....	1
II. THE BROAD CONTEXT OF THE RESEARCH ON MACRO-FINANCIAL INTERACTIONS.....	1
A. The Policy Consensus of the Great Moderation .....	3
B. The Emerging Critique of the Pre-Crisis Policy Consensus .....	4
III. MAIN APPROACHES TO FINANCIAL MARKETS AND MACRO INTERACTIONS IN THE LITERATURE .....	6
A. The Efficient Markets Hypothesis .....	6
B. Imperfect Capital Markets.....	7
C. The Financial Instability View .....	8
D. Early Work on Financial Crisis.....	10
E. The IMF and Debates on Macroeconomics and Finance .....	11
F. A Dissenting Economic Counselor.....	11
IV. IMF RESEARCH ON MACRO-FINANCIAL LINKAGES .....	12
A. Transmission of Monetary Policy to the Real Economy .....	13
B. The Credit Channel in Advanced Economies .....	14
C. The Credit Channel in Emerging Economies.....	15
D. Credit Booms .....	16
E. Credit Crunches, Asset Prices, and Output Contraction.....	18
V. IMF RESEARCH ON MACRO AND FINANCIAL CRISES .....	18
VI. EVALUATION AND CONCLUSIONS .....	21
A. Openness to Alternative Approaches.....	21
B. Missing and Under-Researched Topics.....	22
C. Methodological Approaches and Macro Modeling.....	22
D. Balance of Research between Country/Cross-Country Studies and Advanced/Emerging Economies.....	23
E. Is IMF Research Useful to Prevent Financial Crises and Recessions? .....	24
REFERENCES .....	24

## I. INTRODUCTION

1. The big financial crisis of 2008–09 in mature economies, following almost three decades of frequent financial crises in emerging economies and developing countries, has reawakened interest in the role played by financial factors in macroeconomic theory and management. Recurrent crises, cycles of boom and recession, financial contagion effects, and bubbles in asset prices have been central features of the economic landscape of the last 30 years, and the growing literature on macro-financial linkages is expected to provide satisfactory explanations of these phenomena.

2. A critical question in this regard is whether the macroeconomic approaches developed at the IMF adequately acknowledge the contribution of financial markets to the financial destabilization and macroeconomic cycles that often end up in recessions, unemployment, and economic insecurity.<sup>2</sup> The question is especially relevant as the IMF is the only global institution that has a mandate of macroeconomic surveillance and is also a lender of last resort to countries in times of balance of payments and fiscal crises.

3. In a first attempt to address a very complex set of issues, this review of IMF research between 1999 and 2008 asks several questions. Is the IMF conceptually well equipped to understand, and successfully intervene in, today’s highly complex world economy? Does the Fund have an adequate macroeconomic-financial framework to address the economic challenges of the 21st century? How open are the Fund’s research activities to alternative analytical approaches in finance and macroeconomics? Has the Fund’s macroeconomics been influenced by the prevailing “consensus” on macroeconomic theory and methodology, largely dominated by the New Classical Macroeconomics? And how influential has been the theory of efficient markets in the Fund’s financial analysis?

## II. THE BROAD CONTEXT OF THE RESEARCH ON MACRO-FINANCIAL INTERACTIONS

4. Over the last two decades deceptively tranquil macro conditions coexisted with volatile and crisis-prone financial markets. Macroeconomic conditions, up until the crash of 2008, were characterized by low inflation and reduced variance of output, mainly in advanced economies but to some extent also in emerging countries. Several influential macroeconomists labeled this period an era of “great moderation.” The great moderation and the retreat of Keynesianism led them to the perhaps controversial conclusion that macroeconomic theory was converging to a sensible consensus between

---

<sup>2</sup> At the IMF, knowledge generation on macro-financial linkages is conducted mainly by the Research Department (RES), the Monetary and Capital Markets Department (MCM), the IMF Institute, and the area departments. This work is disseminated through the policy and analytical chapters of the *World Economic Outlook (WEO)* and the *Global Financial Stability Report (GFSR)*, working papers, issues papers, and other vehicles. Area departments conduct their own work on macro-financial linkages in the context of Article IV missions and bilateral and multilateral surveillance. A special unit was created in the Research Department of the Fund to study the linkages between macroeconomics and finance, and the topic has been treated in various issues of the *WEO*, *GFSR* and other publications and conferences in recent years.

the New Classical macroeconomics and New Keynesianism and that “the state of the macro” economy was good (Blanchard, 2008). And, at the policy level, low inflation and reduced output gaps engendered a belief that the secrets of macro stabilization were well within the command of central banks and ministries of finance. Meanwhile, the process of financial globalization, starting in the 1970s, was characterized by rapid financial innovation and institutional change and accompanied by substantial financial volatility and frequent financial crises in emerging markets and advanced economies.<sup>3</sup> These events included the debt crisis of Latin America in the 1980s, the protracted slump combined with problems in the banking system in Japan since the late 1980s, the banking crisis in Nordic countries in the early 1990s, the Exchange Rate Mechanism crisis in Europe in 1992–93, the Mexican crisis of 1994–95, the East Asian crisis of 1997, the Russian crisis of 1998, the crisis of the Long-Term Capital Management Fund in the U.S. in 1998, Ecuador in 1999–2000, the dot.com correction in the early 2000s, the Argentinean and Turkish crises of 2001, and the global financial crisis of 2008–09.

5. In this paradoxical situation, one group of economists was writing about a great moderation and a welcome convergence in macroeconomic thinking and methodology, while another group—and it is fair to say that the IMF probably was more in the second group—was busy studying the causes and consequences of financial crises.

6. Seen in historical perspective, the last 25–30 years resembles the first wave of globalization (c. 1870–1913), in which the gold standard led to very low rates of inflation and a prosperous world economy, but the low inflation and steady growth did not prevent the occurrence of several financial crises. Episodes of financial panic and crisis occurred in 1873, 1890, 1893, and 1907 in the financial centers of New York, Paris, London, and Vienna<sup>4</sup>, and also in countries at the periphery of the world economy, particularly Argentina.<sup>5</sup> In recent decades, the recurrence of financial crises has belied the belief that growth and financial stability could be secured by stabilizing inflation (no longer through the gold standard but through inflation targeting).

---

<sup>3</sup> There is a vast variety of crises: (a) inflation crises, (b) currency crises, and (c) currency debasement. In financial crises we include: (d) banking crises, (e) internal debt crises, (f) external debt crises, or sovereign debt crises (Reinhart and Rogoff, 2009). Other definitions include sudden stops (often associated with a sharp cut in external financing leading to cuts in absorption and real exchange rate adjustments) and twin crises which combine currency crises and banking crises. Other combinations of the different types of crises listed from (a) to (f) have been observed in several instances.

<sup>4</sup> Previous financial crises occurred in 1825–26 in London and 1837 and in 1857 in the United States.

<sup>5</sup> Analysis of these and other financial crises include Newbold (1932), Musson (1959), Saul (1969), Marichal (1989), Solimano (1990, 1991), Friedman (1992), Brunner and Carr (2007), and Reinhart and Rogoff (2009).

## A. The Policy Consensus of the Great Moderation

7. Before the crash of 2008, the prevailing ideas<sup>6</sup> among central bankers and ministries of finance and mainstream macroeconomists in mature and emerging economies were that:

- A monetary policy of “inflation targeting” must be geared to the achievement of low consumer price inflation.
- Stabilization of asset prices and the exchange rate should *not* be an explicit objective of central banks, which are poorly placed to detect bubbles (despite being staffed by top macroeconomists).
- Ensuring low inflation indirectly helps to reduce output variability.
- Fiscal policy must take a back seat, since for countercyclical purposes it is generally less effective, and politically more contentious, to formulate and apply than monetary policy.
- Financial markets are generally efficient in the sense that participants use all relevant information, and (besides the standard prudential regulation of banks) it is safe to rely on their self-regulation. The growth of hedge funds, derivatives, debt-equity swaps, and other vehicles of financial innovation does not pose obvious macroeconomic risks. This view was probably more influential in advanced economies that had not been affected by large-scale financial crisis for a long time before 2008.
- In a world of high capital mobility, exchange rate regimes such as currency boards, dollarization, unified currency, and flexible exchange rates (the so called “corner solutions”) are better than are intermediate options such as crawling pegs and exchange rate bands (Frankel, 2009).

8. The role of the IMF in actively crafting and promoting this pre-crisis policy consensus is an open question. Recently, the Fund has begun a cautious reassessment of this consensus (Blanchard and others, 2010), probably seeking to derive useful policy implications from the crash of 2008 and to change policies that do not work. Such revisionism also allows the Fund to distance itself from policies that by action or omission contributed to the financial crisis of 2008–09 in the center economies.

9. Outside the Fund, criticism of the pre-crisis consensus in macroeconomics has been less guarded (Sachs, 2009a, b; Krugman, 2009; and the Special Issue of the *Cambridge Journal of Economics*, edited by Blanckenburg and Palma, 2009).

---

<sup>6</sup> The role of prevailing ideas in shaping research and policy was underscored long ago by important thinkers such as John Maynard Keynes and Friedrich Von Hayek. Keynes always thought that *ideas* and dominant views were more important than *interests* in shaping policy views and research (see Keynes, 1936). Hayek (1988) also wrote extensively on the history of ideas and their influence, over time, on policy formulation.

10. The pre-crisis policy consensus reflects an evolutionary process in which theories are contrasted with reality and a synthesis emerges. Clearly the consensus was significantly influenced by a variety of free-market schools such as monetarism, the rational expectations school, the efficient markets hypothesis, supply-side economics, and real business cycles theories. In a different vein, commenting on the state of macroeconomics before the crisis, Blanchard (2008) identified a convergence in vision and methodology between the New Classical and the New Keynesian schools. This convergence largely followed the research program promoted by the New Classical economists (Lucas, Sargent, Wallace, and others in the 1970s), which was strongly critical of traditional Keynesianism and sought to “reconstruct” macroeconomic theory around the straitjackets of market clearing, rational expectations, optimizing behavior, and general equilibrium.<sup>7</sup> As a concession to realism and to the New Keynesians, the new consensus somewhat accepted wage and price rigidities and other “imperfections” around a market-clearing and general equilibrium framework.<sup>8</sup>

11. Clearly this theoretical macroeconomics portrays the workings of a capitalist economy very different from what Keynes described in his *General Theory*. Keynes’ vision emphasized involuntary unemployment, disequilibrium, irreversible investment, fundamental uncertainty, and volatile financial markets—features that the New Classicists consider either non-existent or part of a very distant past. Of course, the crash of 2008 is a reminder that financial crisis and recessions are real in today’s world.

### **B. The Emerging Critique of the Pre-Crisis Policy Consensus**

12. In the run-up to the crisis, an emerging critical reassessment of the pre-crisis policy consensus acknowledged:

- The need to move beyond the narrow tools of macroeconomic policy guided by inflation targeting, neutral fiscal policy, and financial deregulation.
- The role of credit booms in generating asset price bubbles, external imbalances, and financial crises.

---

<sup>7</sup> The New Classicists have a strong predilection for building macroeconomic models of “representative” agents based on “first principles” (meaning a simple form of maximization now put in question by the rise of behavioral economics). Needless to say, the device of the representative agent sweeps under the rug all types of distributive and aggregation issues. The search for “essentials” is often bought at the price of departure from reality. In addition, more mundanely, the New Classicists also have a strong faith in the role of free markets to solve all problems of society and a distrust of activist policies by governments.

<sup>8</sup> The term New Keynesianism needs clarification. Currently the New Keynesian group seems to consist mostly of mainstream academic macroeconomists who are Keynesian in the sense of emphasizing wage and price rigidities and the importance of aggregate demand in the determination of macroeconomic equilibrium, but otherwise are not too distant from New Classical macroeconomists. This said, not every academic macroeconomist who considers himself/herself Keynesian or New-Keynesian would agree that the New Classical-New Keynesian (NC-NK) consensus represents a good direction for macroeconomic research and policy. In this context the question that arises is why the Neo-Keynesians (in the conventional sense of the word) have accepted a research agenda so separated from the analytical perspectives of Keynes himself, with his emphasis on lack of equilibrium, non-rational expectations, volatile stock markets, and other features that are largely left off the agenda in today’s academic macroeconomics. The NC-NK consensus has seemed unconcerned by the fact that globalization and liberalization were accompanied by substantial financial volatility and recurrent financial and exchange rate crises in emerging markets and Europe in the 1990s, along with rising indebtedness and macro imbalances in the U.S.

- The need for central banks to espouse broader goals than low consumer price inflation and to engage in ensuring financial stability.
- The need for more democratic control of independent and technocratic central banks.
- The role of fiscal policy in counter-cyclical demand management when low inflation makes more rapidly binding the zero-level constraint on nominal interest rates.
- The need to make explicit that inequality is a policy problem and that very unequal societies are affected by distributive conflict, which makes a consensual policymaking process more difficult to conduct.
- The need to revise the belief that self-regulation in financial markets is possible and that deregulated financial markets can competently manage and diversify risks.
- That useful tools for cyclical macro-prudential regulation include capital/asset ratios, liquidity indicators, value/asset ratios, and other instruments.
- The need to revise the economics teaching and research of the last 30 years, which has become dominated by highly unrealistic theories that replace an understanding of the working of the real world by an idealized view of free markets, omniscient consumers and producers, and equilibrium economics.<sup>9</sup>

13. Clearly a sensible research agenda on macro-financial interactions at the Fund should address several elements of this emerging criticism. As mentioned above, part of this revision has been initiated in Blanchard and others (2010).

14. A central part of a relevant macro-financial research agenda should focus on the growing importance of financial factors in macroeconomics, and on the causes and consequences of repeated financial crises in emerging economies, developing countries, and mature economies. The agenda should also reappraise the policy stance of central banks focused mainly on consumer price inflation targeting, and seek further understanding of the role played by financial accelerators, changes in expectations,

---

<sup>9</sup> The new reassessment of macro-financial policy also points out that: (a) advanced economies were not immune to the possibility of large scale macro-scale financial crisis; (b) the lessons from past local and large-scale crisis in emerging economies and mature economies (such as Japan, Finland, the U.S. and others in the 1990s) needed to be considered more seriously; (c) tighter international coordination to prevent and mitigate large-scale financial crises is required; (d) the role played in the crisis by non-bank financial intermediaries needs to be further understood; and (e) better knowledge is needed of the dynamics of complex systems such as highly integrated financial markets. The spreading from a local sub-prime crisis in the U.S. to a global financial crisis highlights the importance of positive feedback between price excursions and the real economy and the existence of cascading effects that transmit local shocks into global shocks (Sachs, 2009a). Corner solutions for exchange rates need to be reassessed after the collapse of some currency boards (Argentina in 2001) and given the volatility of flexible exchange rates (Frankel, 2009).

bounded rationality, and herd behavior in propagating shocks in the boom phase of the cycle and the reversion toward recession, financial distress, and crash.

### **III. MAIN APPROACHES TO FINANCIAL MARKETS AND MACRO INTERACTIONS IN THE LITERATURE**

15. The intellectual history of the interactions among money, credit, asset prices, inflation, expectations, and business cycles (macro-finance links) includes the work on business cycles by the Swedish school of Wicksell and of Austrian economics associated with Von Mises and Hayek; the work of Keynes and its focus on uncertainty and underemployment equilibrium related to the behavior of investment, “animal spirits,” and incomplete and volatile financial markets; the work of Irving Fisher on risk, money, prices, debt-deflation and crisis; the neoclassical synthesis of Keynes around the IS-LM model; the generation of economists in the U.S. (Hansen, Samuelson) and the U.K. (Kaldor, Robinson) that popularized and extended Keynes’ thinking to the medium run; the Modigliani-Miller irrelevance theorems of the financial structure of firms; the work of Minsky, in the tradition of Keynes, on the instability of finance under capitalism; the work on imperfect markets, asymmetric information, and principal-agent problems; and the work on credit channels and the financial accelerator associated with Bernanke, Gertler, and others. The recent literature on sudden stops, credit booms, asset bubbles, credit crashes, and recessions shows the lively but unsettled nature of this field.

16. In this section we review the different approaches to financial markets and their integration into macroeconomics. These approaches include the efficient markets hypothesis, the theories of imperfect capital markets, the unstable finance approach, and early theories of financial crisis. For this review, critical questions are: to what extent has the Fund been influenced by dominant views and analytical fashions such as the efficient markets hypothesis? Did the efficient markets hypothesis underpin the Fund’s approach to financial markets in advanced economies? Did the Fund’s research arm care about the work of authors such as Hyman Minsky and others who viewed financial markets as inherently prone to instability, fragility, and crisis? Did the Fund ultimately keep an independent, eclectic, and pragmatic view on financial markets? And was it influenced by the self-regulation mantra?

#### **A. The Efficient Markets Hypothesis**

17. The efficient markets hypothesis (EMH), associated with the work of Eugene Fama (1970), Paul Samuelson (1965), Robert Merton, and others<sup>10</sup>, was originally oriented to test some technical propositions such as the random walk hypothesis of the behavior of asset prices and the use of information by participants in financial markets. A basic proposition of the EMH is that in buying and selling assets, investors and market participants use all relevant information. Thus, variations in asset prices are expected to follow a pattern known as a random walk: they do not have a systematic component that the market can easily anticipate (otherwise profit opportunities would

---

<sup>10</sup> For a review, see Beechey and Vickrey (2000).



be unexploited, which is inefficient). In this context nobody, including the government, can systematically outperform the market. It is worth noting that some of the early proponents of the efficient markets hypothesis such as Paul Samuelson were careful not to derive the policy-wide implication that self-regulated financial markets deliver a stable and socially efficient equilibrium.

18. The efficient markets hypothesis acquired further influence in policy formulation over the last two to three decades as macroeconomics and financial theory started to be dominated by the rational expectations school, market clearing approaches ] and real business cycle theories. These theories emphasized optimal individual behavior in all markets and the importance of supply-driven real shocks (instead of shocks in aggregate demand) in generating cyclical fluctuations in output and employment, which themselves are often considered optimal.<sup>11</sup> In an interesting article, Krugman (2009) traced the rise of a “Panglossian macroeconomics” (i.e. a rather rosy macroeconomic view of the world) in the last two decades to a belief in rational behavior and optimal financial markets that leaves little room for real-world features such as herding behavior, bounded rationality, and cognitive dissonance, which in fact generate the sub-optimal market equilibrium and destabilizing dynamics that are the staples of financial crises.

19. At the policy level, the EMH and equilibrium macroeconomics gave analytical support to the notion (promoted by, among others, Alan Greenspan, Chairman of the US Federal Reserve between 1987 and 2006) that financial markets have strong self-equilibrating mechanisms. In line with the EMH, financial markets are expected to make socially efficient use of all relevant information, leading to correct asset pricing and to adequate diversification and pooling of risk. Moreover, most financial innovation is welfare-improving—there is no destructive financial innovation.

## **B. Imperfect Capital Markets**

20. The EMH has not been the only strand in financial market theorizing in recent decades. In the 1970s and 1980s, in contrast with the main conclusions of the EMH, authors such as George Akerloff, Joseph Stiglitz, Ben Bernanke, and others derived several inefficiency results showing sub-optimal equilibrium in financial markets.<sup>12</sup> To explain failures in credit markets, they developed substantial work on asymmetric information, principal-agent problems, bounded rationality, and other departures from perfect market clearing. This line of research has identified the differences between external finance (more costly) and internal finance, the monitoring costs of asymmetric information between borrowers and lenders, and the practice of credit rationing. Recently, work on behavioral finance has been applied to explaining macroeconomic puzzles including low savings, short horizons, myopic expectations, and financial destabilization (Akerloff and Shiller, 2009).

---

<sup>11</sup> A key proposition is that observed unemployment is always voluntary.

<sup>12</sup> See Akerloff and Shiller (2009).

21. A main macroeconomic implication of the work on imperfect capital markets is that it identified a much larger role for the financial markets in transmitting disturbances to the real economy and in transmitting feedback from the real economy to the financial position of households and firms. Bernanke, Blinder, Gertler, and others emphasized the credit channel and the financial accelerator. Bernanke applied these ideas to explain the slump of the 1930s and stressed the nonmonetary causes of the Great Depression, in contrast to the monetary explanations of Milton Friedman and Anna Schwarz.<sup>13</sup>

### C. The Financial Instability View

22. The view that financial markets are intrinsically unstable is associated with the work of Hyman Minsky (1963, 1975, 1986). Minsky was inspired by the work of Keynes, but he was critical of the Hicks-Hansen synthesis of the IS-LM model that cast Keynes's as an equilibrium theory devoid of the complexities posed by uncertainty and imperfect knowledge.

23. A central theme in Keynes's *General Theory* was the role of (ex ante) discrepancies between savings and investment as a main source of macroeconomic disturbances and underemployment equilibrium.<sup>14</sup> Keynes emphasized the role of private investment and "animal spirits" in generating economic cycles.<sup>15</sup> He also stressed that stock markets can be destabilizing, given the inability of economic agents to deal with uncertainty. (The demand for money, or preference for liquidity, has as a main motive to hedge against uncertainty.) Leaving volatile stock markets to decide inter-temporal resource allocation in the economy was a practice he described as "casino economics"—an insight that has been largely forgotten in the two last decades.

24. Minsky developed further the analysis of the financial dimension of investment, which Keynes had identified as the most unstable component of aggregate demand (see "Financial Theory of Investment" in Chapter 5 of Minsky, 1975).<sup>16</sup> Minsky held a dialectical view of economic change in which "stability is destabilizing:" periods of prosperity, tranquility, and reasonable stability such as during the two decades after

---

<sup>13</sup> See Bernanke (2007) for a synthesis of this work; also Bernanke and Gertler (1989).

<sup>14</sup> One difference between Keynes and the pre-Keynes tradition was that the interest rate was determined in the money market (a stock equilibrium) and not in the equilibrium between savings and investment (a flow equilibrium). See Solimano and Gutierrez (2008).

<sup>15</sup> In the *General Theory* (1936), Keynes identified private investment as a main source of macroeconomic instability. He used the metaphor of "animal spirits" to note that investment—a process that involves a gap between the moment that decisions are made and the moment that results (profits or losses) are obtained—is inherently risky and uncertain, making critical the role of expectations and guesses, which are not always fully rational. Keynes emphasized that this process was often strongly influenced by the dominant mood of the investment community. Keynes also stressed the importance of liquidity (demand for money) as a cushion against uncertainty and irreversibility. He commented amply on the unstable features of financial markets and stock markets in particular and elaborated on the importance of the way investment is funded.

<sup>16</sup> After the crash of 2008, this author who worked for decades on the fringe of mainstream macroeconomics was rediscovered by the financial press (Martin Wolf in the *Financial Times*) and by part of the economics profession.

World War II (roughly up to 1966) generated internal forces leading to inflationary pressures, deficit financing, and financial instability. He argued that the post-war institutional settlement in advanced economies—and to some extent in developing countries—combining “big government” (in charge of countercyclical macro policies) and a “big bank” (the central bank as lender of last resort) prevented big financial crises but nevertheless created inflationary biases in macro policies. In retrospect, Minsky’s belief was valid until the 1970s but was no longer so once financial globalization had set in.

25. Minsky was nonetheless essentially right that after a long period of growth, prosperity, and low inflation the seeds of a crisis were sown.<sup>17</sup> Like the Austrian school of Von Mises, Hayek and others<sup>18</sup>, he considered that the seeds were sown during a boom through excessive risk-taking, overinvestment, and excessive leverage.

26. Minsky stressed the importance of the financial structure of firms and corporations in creating endogenous financial fragility and instability. Methodologically, he refrained from deriving financial structures of firms from first principles<sup>19</sup>; he preferred to observe the actual modes of financing of firms and corporations in a capitalist economy. Following his observations, he developed a taxonomy of three main patterns of financing: hedge financing, speculative financing, and Ponzi financing. In hedge financing, operational net cash flows (earned profits) exceed the servicing of debt (interest payments). In speculative financing, firms need to refinance loans and credits recurrently because their net cash flows tend to fall short of interest payments. In Ponzi financing, firms finance debt servicing with new borrowing in a process that is unstable and eventually explosive. In Minsky’s terminology, an economy whose firms (and/or the government) tend to follow a mix of speculative and Ponzi financing is more prone to financial crisis and economic slumps than an economy whose financial structure is more “hedged” or “speculative.”

27. Both the work of Minsky on unstable finance and that of Stiglitz, Akerloff, Bernanke, and Minsky on imperfect financial markets represent a departure from the work of Franco Modigliani, another follower of Keynes, who with Merton Miller derived the neutrality result: the irrelevance of the financing mix of firms. In the

---

<sup>17</sup> Another example of the notion that stability can be destabilizing is the fact that the “great moderation” ended up in a major crisis. A problem of the pre-crisis consensus on the great moderation was to identify “stability” only with low inflation in the prices of goods and services, while neglecting asset price inflation and macro imbalances as sources of future instability.

<sup>18</sup> These economists held that the origin of an investment boom is created when monetary policy (set by central banks) keeps the interest rate below the “natural rate” (a concept developed by the Swedish economist Knut Wicksell)—for example the interest rate that equilibrates the demand for loans (investment) with the supply of funds (savings). A boom turns into a bust (crisis) through a self-reversing market process (Cochrane and Glahe, 1999). According to the Austrian school, a central bank policy of easy money is the source of instability, while according to Minsky such a policy can be a source of instability but its effect is amplified by financial fragility in the private sector.

<sup>19</sup> For example, by solving a problem of optimization under the assumptions of full information and perfect capital markets, as Modigliani and Miller (1958) had done.

Modigliani-Miller world, the structure of financing of firms among bonds, equity, and debt is irrelevant under perfect capital markets, no taxes, full information, and absence of uncertainty. And there is no role for financial markets to create financial accelerators, credit booms, and financial crises.

#### **D. Early Work on Financial Crisis**

28. An early and influential work on financial crisis is Fisher (1933).<sup>20</sup> In that article Irving Fisher, a Yale economist, emphasized the interaction between credit crunches (sharp contractions in credit) and falls in asset prices, profits, and the general price level in generating a dynamics of deflation and crisis. Fisher underscored that the accumulation of debts in the boom phase of the cycle invites the subsequent phases of distress and crash and may even turn a recession into a depression. In this context, to arrest a depression the credit mechanism needs to be restarted. This, in turn, will lead to a recovery in asset prices.

29. Half a century later, MIT economic historian Charles Kindleberger wrote an important book entitled *Manias, Panics, and Crashes* (1989), in which he applied Minsky's and Fisher's ideas to understand the dynamics of financial crises. Kindleberger identifies several phases of a cycle including boom, stress, crash, and contagion to the real sector. He stresses the role of credit and debt in fueling booms to leverage the acquisition of speculative assets, and observes that indebtedness makes the recovery from crashes and recessions more complex and protracted—in line with the predictions by Fisher (and Minsky) that debt amplifies cycles and complicates the recovery from a recession.

30. Kindleberger poses that to understand episodes of financial crisis, one must abandon assumptions of rational behavior in financial markets and stable expectations. In episodes of speculative mania, people acquire a variety of assets and objects (such as precious metals, land, real estate, commodities, gold, foreign exchange) in the search for capital gains. In this phase, asset prices climb well above fundamentals, monetary and credit policy is largely accommodative, expectations are overly optimistic, regulation is lax, and governments do not want to stop the party. However, the fun does not last forever. Bad news, a financial scandal, a negative external shock, or a political event may be enough to trigger the reversal of speculative mania. In the phase of distress and crisis, asset prices collapse, banks cut credit sharply, liquidity disappears, and confidence plummets. Kindleberger also aptly describes how the collapse of a single but important bank may spread to other banks and financial institutions in a spiral of domestic and, often, international contagion. (Provision of liquidity is essential to stop this process.) The financial crisis is then transmitted to the real sector, affecting employment, production, and sales. (The mechanism often involves a credit crunch, pessimistic expectations that reduce private investment, and the firing of workers and employees by firms seeking to cut labor costs.)

---

<sup>20</sup> The French mathematician Henri Bachelier, a student of Henri Poincaré, at the turn of the 20<sup>th</sup> century studied stock price fluctuations in the French stock market. His results influenced Irving Fisher and were similar to what later would be called the random walk hypothesis, see Fox (2009), Chapter 1.

31. Kindleberger's (non-mathematical) model of financial crisis fits very nicely the stylized facts of the crisis of 2008 and many other crises of the last 30 years in emerging markets and advanced economies. The IMF's early warning systems (see below) share several of the variables identified by Kindleberger, in their specification of "underlying vulnerabilities" and "triggers."

#### **E. The IMF and Debates on Macroeconomics and Finance**

32. Are these theories and debates reflected in IMF research? Is there a tradition at the IMF of studying the intellectual history of ideas at the intersection of macroeconomics and finance?

33. Apparently the Fund has no tradition of research on the evolution of ideas and the intellectual history of macro-financial theory: a cursory search of work on Minsky, Keynes, and Austrian economics in IMF working papers, staff papers, and other publications yields very scant results.<sup>21</sup>

34. Research conducted at the Fund on financial crises and credit booms, credit crashes, recessions, exchange rate crises, and banking crises, as well as applied vulnerability analysis and the early warning systems, shows an awareness of the imperfect and potentially unstable nature of capital markets and the macroeconomic consequences of that instability.<sup>22</sup> A deeper question is the extent to which IMF research embraces the working hypothesis that financial markets are (intrinsically?) unstable and that market failures can be very relevant in market economies. Macroeconomic frameworks that are useful in an era of financial crises must incorporate the reality of inherent financial instability.

#### **F. A Dissenting Economic Counselor**

35. A conference paper that took a contrarian view of the virtues of unregulated financial markets was written in 2005 by Raghuram Rajan, then Economic Counselor and Director of Research at the IMF. Though the paper ("Has Financial Development Made the World Riskier?") was apparently written in a personal capacity, it does not escape attention that its author was a high official in charge of research activities at the Fund. The study (Rajan, 2005) presents an alternative perspective to the then-prevalent view in policy circles of the US and other advanced countries that (largely) unregulated capital markets were an effective way to allocate savings to profitable investment opportunities and that financial innovation enhanced the capacity of financial markets to diversify and pool risks.

---

<sup>21</sup> Still, the IMF is the only Bretton Woods institution that has an in-house official historian.

<sup>22</sup> However, at the same time the very job of the IMF is in dealing with systemic breakdowns, macro imbalances, financial fragilities, and balance of payments and financial crises. These features of actual economies are obvious departures from a world of perfect markets, rational expectations, and self-correcting mechanisms.

36. Rajan highlights that rapid technical change, deregulation, and institutional change in the last two to three decades have altered completely—and in a risky way—the way financial markets operate, at least in the United States and other industrial countries. He stresses that the structure of incentives faced by financial managers has not necessarily been well aligned with the interest of investors, let alone internalizing to the rest of the economy the potential negative externalities of risky financial behavior. Ex post, he notes, it is clear that these new incentives encouraged excessive risk taking; in addition, “tail risks” (events that are unlikely but have large negative impacts if they do occur) were routinely underestimated. Rajan’s paper also emphasizes the role of herding effects and volatile expectations in driving instability. One of his main conclusions is that even though financial innovation and expanded capital markets create new opportunities they also open the door for larger risks, some of them potentially catastrophic, as in the case of a large-scale financial crisis. He calls for reviewing the traditional forms of financial regulation, compensation of financial managers, and pricing of risk, in view of their potential destabilizing effects.

37. An open question is whether Rajan encouraged, internally at the Fund, a research agenda oriented to exploring the risks of unregulated financial markets that he pointed out in his paper. A review of the research literature at the Fund in his period, and interviews by the author of this report with IMF officials, suggests this was not the case.

#### **IV. IMF RESEARCH ON MACRO-FINANCIAL LINKAGES**

38. This section reviews, selectively, research conducted at the Fund on macro-financial linkages. It focuses on the mechanisms through which monetary policy is transmitted to the real sector of the economy; the credit channel in advanced and emerging economies; credit booms and asset prices; and credit crashes and recessions.

39. This is a largely unsettled field in macroeconomics. The transmission mechanisms of monetary policy to the real economy involve both prices and quantities. In price-mediated mechanisms, money affects real activity through its effects on interest rates, asset prices, exchange rates, and spending. Money and credit induce changes in interest rates that affect aggregate demand and output, through the cost of capital for investment and through the cost of borrowing for working capital and consumer durables. Exchange rates affect the profitability of exports and the costs of imports, and they affect domestic prices directly through the costs of imported inputs and indirectly through expectations. Asset prices determine the value of net real wealth and therefore affect consumption and the value of collateral, which is relevant in borrowing for consumption purposes and for investment.<sup>23</sup> Monetary policy acts also through quantities (monetary aggregates), particularly in emerging and developing countries and

---

<sup>23</sup> In turn, feedback effects create second-round effects from variations in real economic activity to the monetary sector and financial markets. For example, a recession will make it more difficult for firms and households to service their debts with banks and other financial intermediaries, increasing the degree of financial fragility. In turn, this may delay a recovery of credit, making more sluggish the resumption of economic growth and the emergence from a recession.

post-socialist economies. In advanced economies, “quantities” are considered less important than price-mediated mechanisms in normal times, but they became relevant again in the management of the financial crisis of 2008-09. During the crisis, central banks provided liquidity not only by lowering interest rates but also by easing credit and directly buying assets of troubled banks as collateral.

40. Credit and financial markets play a role in transmitting and amplifying the effects of real or monetary shocks on real economic activity, through the so-called credit channel and financial accelerator (Bernanke, 2007). Ample evidence from the history of financial crises (including the Great Depression of the 1930s and several crises of the 1980s, 1990s, and 2000s and the crash of 2008) indicates that financial markets play a critical role in amplifying the effects of disturbances on economic activity. Typically, credit is pro-cyclical: we observe credit booms in periods of optimism and credit contractions in busts and recessions.<sup>24</sup> This is in line with the notion of a “financial accelerator.”

41. Debt and balance sheet effects constitute an important link between financial conditions and the real economy. An expansion of credit has as a counterpart an increase in the debt of households, firms, or the government; therefore credit booms increase the levels of debt in the economy. As noted above, Irving Fisher (1933) long ago emphasized the role of debt in turning a recession into a depression or a protracted slump. We have emphasized in this review that credit and debt play an important role in fueling a boom and also in the reversion of the cycle, in which deleveraging by banks, and attempts to reduce previous debt accumulation, tend to deepen a recession by making credit more scarce and expensive.<sup>25</sup>

42. The relevance of these mechanisms in actual economies will vary over time and across countries, depending on the degree of institutional development, depth, breadth, and liquidity of financial markets, modalities for conducting monetary policy, degree of financial integration with the rest of the world, and other factors.

#### **A. Transmission of Monetary Policy to the Real Economy**

43. The Fund’s work on the transmission mechanisms of monetary policy has tended to find that in emerging economies and developing countries that have underdeveloped financial markets, quantitative regulations on credit, and significant degrees of dollarization and de-monetization, the price-mediated mechanism of interest rates is not the most important mechanism.

---

<sup>24</sup> Credit tends to grow more than in normal times thereby increasing liquidity and helping to finance investment. However, quality tends also to deteriorate and standards become more relaxed in the booming phase of a cycle. In contrast, in periods of distress and crisis banks reduce credit and exacerbate the real effects of shocks.

<sup>25</sup> Deleveraging leaves fewer resources available to finance working capital and investment outlays, and reduces consumers’ access to credit for smoothing consumption in the face of adverse shocks. All this conspires against a quick recovery of aggregate demand and output.

44. Three studies consistent with this finding are Dabla-Norris and Floerkemeier (2006) for Armenia, Kuijs (2002) for Slovakia, and Horvath and Maino (2006) for Belarus. The three studies show that in these economies interest rates remain a weak transmission mechanism, although their effects have increased as financial development has progressed. In the three economies, exchange rates play an important role in transmitting monetary disturbances to prices and to activity through the supply side (cost effects) and through net exports via aggregate demand. Methodologically, the studies use VAR (vector auto-regressive) models, which are rich in dynamic interactions among the different variables but, unlike other econometric methods, do not include relationships derived from a structural model of the variables.

### **B. The Credit Channel in Advanced Economies**

45. Bayoumi and Melander (2008) focus on the macroeconomic role of credit in the United States. The authors explore the effect of credit on income in the U.S. using a framework that links the capital/asset ratios of banks, lending standards, credit, aggregate spending, and income. They add feedback effects from income through the balance sheets of banks, firms, and households, and distinguish the allocation of credit for consumption, fixed investment, housing, and inventories. Their study highlights that after a credit boom, (leveraged) banks often end up with lower capital/asset ratios. This raises concerns about the quality of credit and about borrowers' ability to repay, triggering tighter lending standards, reduced availability of credit, and a decline in spending. These developments open the door to a reversion from boom to distress and eventually financial crisis (or crash), as actually happened in 2007–08. The authors find evidence that a tightening of loan standards in the U.S. led to a cut in the availability of credit for various types of loans, and they also identify the effect of credit on spending. The paper's main contribution is in identifying and empirically testing a particular—and very relevant—set of channels for credit, acting through capital/asset ratios, lending standards, credit, spending, and income, and it provides interesting simulations of the effects on GDP of shocks in capital adequacy ratios. However, the paper falls short of predicting that a severe deterioration of balance sheets of banks and a cut in credit could lead to a large-scale financial crisis in the U.S., such as emerged in September 2008, two months after the paper was published.

46. Another IMF research paper on financial conditions in the U.S. is Swiston (2008), which constructs an index of financial conditions. This paper postulates a credit channel similar to that in Bayoumi and Melander (2008), involving lending standards, credit availability, spending, and GDP. It uses a VAR model to capture dynamic interactions between credit and output but it does not provide structural estimates of parameters in the transmission mechanisms that are econometrically estimated by Bayoumi and Melander. Swiston stresses that monetary policy and credit have a lagged effect on real activity in the U.S.

47. Both these papers strongly shaped the Fund's July 2008 Issues Paper for the U.S., which was prepared in the IMF area department. The paper (IMF, 2008a) emphasizes the role of lending standards and credit in driving the business cycle of the



U.S. and also affecting housing prices. It falls short of highlighting the high probability of a subsequent credit crunch, collapse in asset prices, and recession in the U.S.

48. For Canada, a paper with several common features to Swiston (2008) and Bayoumi and Melander (2008) is Duttagupta and Barrera (2010). This uses VAR analysis and highlights the role of lending standards and credit availability in Canadian business cycles. It finds a correlation of 0.4 between the financial conditions index and GDP in Canada.

### **C. The Credit Channel in Emerging Economies**

49. The Fund has also studied the workings of the credit channel in emerging economies and developing countries. Though some of these studies were published after the 2008 financial crisis in the U.S., they probably reflect work done before the crisis.

50. Benes, Ötoker, and Vavra (2009) provide a model and parameterization of financial-macro linkages for a stylized small open economy. A positive feature of this research is its awareness of the differences in macro and financial structures between emerging and advanced economies. The authors stress the relatively limited role of interest rate policy as a transmission mechanism of monetary policy, and the use of direct bank regulation to constrain credit growth (reflecting the prevalence of quantitative mechanisms in emerging and developing countries). They also highlight the interventions by central banks in foreign exchange markets, intended to stabilize the exchange rate and indirectly affect inflation. Other realistic features of these economies incorporated in the model include financial dollarization, the importance of state and private banks as providers of financing to the enterprise sector (more than bonds and equity), the effects of capital market integration with the rest of the world, the risk of excess borrowing, the exposure to sudden stops in foreign lending, and the fragility and indebtedness of the banking system. Methodologically, the study uses a dynamic stochastic general equilibrium (DSGE) model with sticky prices and maximizing agents, parameterized for Central, Eastern, and Southern Europe. The results highlight the greater financial fragility and macro risk that often exist in emerging economies (albeit this started to change, after the crisis of 2008 showed the scope for financial vulnerability in advanced economies).

51. A critical appraisal of this paper suggests several points. A missing element that could perhaps have been incorporated is credit segmentation between the formal and informal sectors—a pervasive feature of financial markets in developing countries. Also, the DSGE models, with their emphasis on economies comprised of forward-looking optimizing agents and market clearing, are not particularly well suited to grasp the typical destabilizing dynamics we encounter in countries exposed to financial fragilities and frequent financial crises. And other factors such as distributive conflicts, which make policymaking more difficult in the unequal economies of the developing world, tend to be obscured by the device of modeling heterogeneous economies in terms of “representative agents.” Finally, the device of the “stylized open economy” tends to overlook the need for some additional taxonomy across developing countries and regions (e.g., Latin America, Asia, Africa, Central-Eastern Europe, and the Baltics) that

differ significantly in economic structure, resource endowment, institutions to conduct monetary policy, and degree of financial development.

52. An analysis of macro-financial linkages for India is Anand, Peiris, and Saxegaard (2010). This paper considers financial frictions and the role of the financial accelerator in amplifying and propagating transitory shocks to the real economy, and highlights some important features of India's financial structure. The paper calls attention to the balance sheet or net worth channel in an economy in which banks and firms borrow in foreign currency while the banking system lends in local currency—a practice that creates room for currency mismatches. The paper uses a DSGE model that incorporates financial frictions and a financial accelerator to simulate the effects of monetary policy and other disturbances.

53. For Mexico, a paper exploring macro-financial linkages is Blavy and Souto (2009). This paper looks at the credit risks and soundness of the Mexican banking system and studies its capacity to intermediate funds and provide credit and liquidity to the economy. The paper focuses mainly on vulnerability analysis and derives some predictions for macro-financial stability in Mexico.

#### **D. Credit Booms**

54. Credit booms received increased attention in the period 1999–2008 at the Fund. Outside the IMF, work on credit conditions and booms has been conducted at the US Federal Reserve (Fed), the Bank of England, the Bank for International Settlements (BIS), and other organizations and academia. The Fed studies have focused mainly on lending booms in consumer credit and mortgage in the U.S., and the Bank of England's research has looked more at credit conditions in the U.K. (see the Bank's *Financial Stability Report*). In contrast, the IMF and BIS have taken a broader international perspective. Academic work on the credit channel and financial accelerator since the 1980s has given a central place to credit in macro-financial analysis.

55. The IMF *World Economic Outlook (WEO)* of April 2004 (IMF, 2004), in its Chapter 4, analyzed the impact of credit booms using a sample of 28 emerging economies in the period 1970–2002.<sup>26</sup> Credit booms are often associated with overoptimistic expectations, asset price booms, and improved balance sheets.<sup>27</sup> IMF (2004) identifies several features of credit booms in emerging economies: they are less frequent than rapid credit growth; they tend to coincide with a consumption and investment boom and to a lesser extent with output booms; are associated with current account deficits; and lead to increases in the relative price of non-traded goods (real exchange rate appreciation). Very importantly, more than 75 percent of the credit booms

---

<sup>26</sup> The same report also examines the relation between credit and development levels in a longer-run perspective. After considering causality issues it concludes that financial development tends to lead to higher development levels through its positive effects on credit availability for financing capital formation and productivity growth.

<sup>27</sup> A credit boom exceeds the standard deviation of credit fluctuations by a factor of 1.75 (IMF 2004:151) and tends to last, on average, three and half years (including build-up and reversion).

led to banking and currency crises. IMF (2004) highlights the risks of unsustainable credit expansions and their costly aftermath in lost output and employment. The report recommends, rightly, improved banking sector surveillance, better oversight of corporate borrowing, and prudent macro and credit policies.

56. Notably, the 2004 *WEO* was devoted entirely to emerging economies at a time when credit booms were also taking place in advanced economies. In retrospect the report is somewhat complacent about the risks of credit booms in advanced economies; for example, it states: “credit booms are less frequent—and if they occur—less costly in industrial countries, largely reflecting stronger institutional frameworks.” The financial crisis of 2008–09 centered in advanced economies provides counter-evidence to this claim, and in fact has shown the large potential costs of a credit boom when followed by large-scale financial crisis and international contagion.

57. In the run-up to the crisis (and afterwards), the Fund expanded and updated the 2004 *WEO* analysis. Background work in this connection includes Mendoza and Terrones (2008); Dell’Ariccia, Igan, and Laeven (2008); and Barajas, Dell’Ariccia, and Levchenko (2009). Country studies on credit booms in emerging economies and post-socialist countries are Tamirisa and Igan (2008) and Duenwald, Gueorguiev, and Schaechter (2005), respectively.

58. Mendoza and Terrones (2008)<sup>28</sup> further the analysis of credit booms by incorporating advanced economies, augmenting the number of countries to 48, and lengthening the time period to 1960–2006. The authors identify 27 credit booms in industrial economies and 22 in emerging economies. They refine the measure of credit booms (using threshold methods) and incorporate microeconomic evidence at the firm and bank level of the effect of credit expansions.

59. The authors show that credit booms are unambiguously associated with a macro-dynamics of spending, asset prices, currency appreciation, and macro imbalances in the boom phase of the cycle.<sup>29</sup> They also show that the economic fluctuations associated with credit booms are smaller in industrial countries than in emerging nations: total government expenditure, current account deficits, and real exchange rates fluctuate less in industrial countries, as do indicators at the firm level and indicators of the liquidity and creditworthiness of banks. The paper finds a clear association between credit booms and financial crises, although not all credit booms end in financial crisis. In emerging economies, 68 percent of credit booms led to a currency crisis, 55 percent to a banking crisis, and 32 percent to sudden stops. In industrial countries, credit booms are associated with currency crises and banking crises but not with sudden stops.<sup>30</sup>

---

<sup>28</sup> They are the authors of the 2004 *WEO* Chapter 4 on credit booms.

<sup>29</sup> These cycles in general do not generate an acceleration of inflation—a finding consistent with the great moderation.

<sup>30</sup> In the U.S., the crisis was not initially followed by a collapse of the dollar (on the contrary the dollar appreciated in the last quarter of 2008); in addition, there were no sudden stops in the U.S., U.K., or Spain.

60. Mendoza and Terrones (2008) can be considered an important contribution by the Fund to the (growing) literature on the macroeconomic consequences of credit booms. However, it would have been useful to have included in that paper a fuller discussion of three issues: why credit booms tend to be associated with *low* inflation (particular in the 1990s and 2000s); the role played by central banks and regulatory bodies in tolerating or even encouraging these credit booms; and the implications of the findings for targeting inflation and managing asset price bubbles.

### **E. Credit Crunches, Asset Prices, and Output Contraction**

61. The reversal of a credit boom is often a credit crunch. The most comprehensive study for OECD countries at the IMF—covering a period of nearly 50 years—on the interplay between episodes of declines in credit, asset prices, and real economic activity is Claessens, Kose, and Terrones (2008). *WEO* work on credit, asset price dynamics, and business cycles includes Morsink, Helbling, and Tokarick (IMF, 2002a: 104-137); Helbling and Terrones (IMF, 2003: 61-94); Terrones (IMF, 2004: 147-166); and Cardarelli, Elekdag, and Lall (IMF, 2008b: 131-159). [**<OK?**] yes.

62. Claessens, Kose, and Terrones (2008) use a sample of 122 recessions in emerging and advanced economies for the period 1960–2007, covering 118 episodes of credit contractions, of which 28 were credit crunch episodes, and more than 100 episodes of declines in asset prices, including a smaller sub-set of asset price “collapses” or busts. Their paper provides a host of interesting results. The most salient is that recessions that are accompanied by a decline in credit and house prices tend to be more severe, with a larger decline in output, and to last longer than other recessions. This important result highlights the role played by financial factors in amplifying cycles of real activity. The study also shows that macroeconomic and financial variables have a high degree of pro-cyclicality; that recessions tend to be highly synchronized across countries; that the cyclical decline in credit and house prices tends to last much longer than the decline in output; and that the effect of a credit crunch on output involves a relatively substantial lag. Compared with research conducted outside the Fund on the subject<sup>31</sup>, this paper is an original contribution not only in its empirical coverage of a long period in the world economy but also in focusing on the recessionary phase of the cycle. An obvious extension of this research on credit crunch and recessions would be to include emerging economies and developing countries, to gauge the extent to which the findings hold for them.

### **V. IMF RESEARCH ON MACRO AND FINANCIAL CRISES**

63. In 1999–2008 the Fund conducted a vast amount of research (working papers, *World Economic Outlook* and *Global Financial Stability Report* chapters, issues papers, and other products) on financial crises, a topic that acquired new importance after the

---

<sup>31</sup> There is, of course, a vast literature on business cycles started by work at the National Bureau of Economic research in the 1920s. The role of financial factors in propagating cycles was given a boost by the work of Bernanke and associates cited above. Extensions for an open economy were developed by Mendoza and Calvo and Reinhart in their work on “sudden stops.”

crash of 2008. The Fund's research has evolved somewhat in waves: the Mexican and East Asian crisis of the mid- to late-1990s spurred a first wave of work on exchange rate crises, banking crises, twin crises, and sovereign debt crises at the Fund and outside (see Reinhart and Rogoff, 2009a; Berg, Borenztein, and Patillo, 2005; and Edison, 2003 for references). IMF country studies of financial crisis (the list is not exhaustive) cover Japan (Kanaya and Woo, 2000; Dekle and Kletzer, 2005); Russia and Ukraine (Pastor and Damjanovic, 2001; Huang, Marin, and Xu, 2004); Argentina (Ramos, 1998); Ecuador (Jacome, 2004); Indonesia (Enoch, Baldwin, Frécaut, and Kovanen, 2001); and Korea (Baliño and Ubide, 1999).

64. In general, these studies do not use a single, unified conceptual framework to examine the national characteristics of each crisis but they are useful in telling the story of what happened in each respective country. The explanations of the causes of the crisis in the different country-studies are eclectic: they combine a variety of factors including credit growth, currency overvaluation, fiscal and current account deficits, over-lending by the banking sector, level of international reserves, and ratios of M2/reserves.

65. A comprehensive multi-country study on financial crises in emerging economies occurring in the 1990s and early 2000s is Berg, Jarvis, Stone, and Zanello (2008). The episodes studied are: Brazil (1999), Bulgaria (1997), Ecuador (2000), Indonesia (1997), Korea (1997), Malaysia (1997), Mexico (1994), Russia (1998), Thailand (1997), and Turkey (2001). The paper offers a rich and detail account of the main components of the crises in credit, exchange rate, fiscal, and regulatory areas and examines the role of nominal anchors in restoring stability in the aftermath of a crisis.

66. As seen above, the 2003–07 period saw a relative absence of financial crisis, along with tranquility, optimism, and complacency about the capacity of macro and financial policies to ensure stability and prosperity. But despite the belief in “great moderation,” during those years the world economy was incubating imbalances and increases in credit and asset prices that went beyond reasonable estimates of fundamentals. Fiscal and current account deficits widened in major industrial countries and in several Eastern Europe economies and the Baltic countries. The proliferation of credit derivatives and other instruments and the emergence of the sub-prime crisis in the housing markets of the U.S., U.K., and Spain were other contributors to the subsequent crisis.

67. At the Fund there was an awareness of some of these trends: the *GFSR* issues of 2006 and 2007 analyzed the nature and possible consequences of credit derivatives and structured credit markets for financial stability, the growth of household credit, the nature of global financial risk, and financial globalization. The 2007 *WEO* devoted chapters to the impact of financial systems on cycles, the management of capital inflows, and global business cycles. The analysis was generally technically sound and very informative but, as in the case of credit booms, it did not actively “ring bells” that a mega-crisis such as the crash of 2008–09 was in the making.

68. A third wave of IMF papers, reports, and publications started to appear after the financial crisis of 2008–09. But because this review covers only the period up to the onset of the 2008 crisis they will not be analyzed here.<sup>32</sup>

69. As a consequence of the Asian and Russian crises, the Fund (and private banks and financial organizations) in the late 1990s started to develop models to predict or anticipate the occurrence of balance of payments, currency, and financial crises which in several cases had caught countries and the international community largely by surprise. These early warning systems (EWS) aim to identify the vulnerabilities of countries to shocks and to increase the capacity of the Fund and member countries to anticipate or predict the next crisis. Evaluations of these efforts are Chapter 4 of the 2002 *GFSR* (IMF, 2002b: “Early Warning System Models: The Next Step Forward”); Edison (2003); and Berg, Borenztein, and Patillo (2005). A more recent commentary is Gosh, Ostry, and Tamirisa (2009).

70. Until the crisis of 2008, the EWS were used mainly to assess the risk of crises in emerging economies. Later the exercise was extended to advanced countries. In general, the EWS models require a definition of a crisis, the setting of certain thresholds, the identification of the “fundamentals” (the underlying vulnerability), and possible triggering factors that are shown to be empirically associated with the onset of a currency, banking, or other type of crisis. The underlying vulnerabilities often include a credit boom, asset price bubble, balance sheet mismatch, currency overvaluation, and other factors. The most complex issue in these exercises is the timing of a crisis, which is often a critical consideration in anticipating a disruption: the information contained in the fundamentals is often not enough to predict *when* a crisis will occur. Another limitation of the EWS, or indeed any other method of anticipating systemic breakdowns, is that the triggers of a crisis can be varied and random (for example the unexpected bankruptcy of a bank, a political event, an adverse external shock, or another event) and therefore almost impossible to anticipate systematically.

71. There are obvious synergies between the research on credit booms, asset prices, the dynamics of financial crisis, and the EWS. The Fund has accumulated very substantial knowledge in this area, as this overview shows. But anticipating a crisis will always be tricky.

72. Outside the Fund, research on financial crises is becoming an industry. Indirectly this industry may extend to the macro-financial linkages that provide the underpinnings of work on crises and cycles. Probably the most comprehensive work on financial crises, in terms of analytical depth, evidence, and historical perspective, is the recent book, *This Time is Different: Eight Centuries of Financial Folly*, by Carmen Reinhart and Kenneth Rogoff (2009b). Interestingly both authors, now in academia, are former IMF staff: Rogoff was Economic Counselor in the early- to mid-2000s and Reinhart was a senior economist in the research department. This gives an indication of the role of the IMF as a source of knowledge and inspiration for work on financial crises.

---

<sup>32</sup> A useful reference on this recent literature is Claessens and others (2010).

73. The Fed, European Central Bank, and the Bank of England have all conducted work on financial crises and macro-financial linkages. Though they tend to focus more on a single country or a smaller number of countries than does the Fund, their theoretical models and conclusions differ little from those of the Fund.

## VI. EVALUATION AND CONCLUSIONS

74. At this point let us take stock of the main findings of this review and offer some criteria for evaluating the research on macro-financial linkages conducted at the Fund.

### A. Openness to Alternative Approaches

75. As mentioned above, the research conducted at the Fund has *not* given much attention to the intellectual origin of current ideas on macroeconomics and finance or to the ensuing controversies among different schools about macroeconomics and the nature of financial markets. The review found no evidence that IMF research was significantly influenced by the efficient market hypothesis or by any other specific school, including the New Classical Macroeconomics. IMF's *WEO* and *GFSR* flagship publications in 1999–2008 provided useful and relevant analysis of modalities to regulate financial markets in emerging markets and in mature economies.

76. The Fund's research on macroeconomics and finance largely *ignored* the work of the school associated with scholars such as Hyman Minsky, on instability in financial markets. Though significant work was done on financial crises and financial fragility the Fund refrained from explicitly warning, clear and loud, that financial crises were a real possibility in mature economies such as the U.S., the U.K., and to some extent Spain—countries that were accumulating increasing levels of internal (and external) debt. The fact that financial capitalism is very prone to financial crises was rarely mentioned explicitly. Financial crises were considered more as outside events rather than endogenous outcomes of market economies with insufficiently regulated financial systems.

77. The Fund should give more attention to the view that financial markets are inherently unstable, since a core part of its responsibility is to work with economies in disequilibrium, facing macro imbalances, instability, fragilities, and recurrent financial crises.

78. The Fund has conducted substantial work on credit booms, crashes, recessions, and financial crises, whose features are consistent with various propositions about the instability of finance, imperfect financial markets, behavioral finance, and the financial accelerator, as well as the Fisher-Minsky-Kindleberger models of financial crisis. However, the Fund's research seems to have been more open to mainstream approaches, leaving heterodox views largely overlooked. Its research would gain in credibility if the Fund would admit that its frameworks need revision to better understand and anticipate repeated financial crises and large recessions.

## **B. Missing and Under-Researched Topics**

79. One topic clearly neglected in the Fund’s research is the history of macroeconomic thought and the history of ideas on financial markets. Studying this would not be just an academic exercise—it is a necessity to get further insights on how financial markets work in the real world and on the historical precedents of current travails.

80. Another under-researched topic is the political economy of regulation of the financial industry. Though the political power of the financial industry seems to have been largely ignored by the IMF research agenda in 1999–2008, an outstanding exception in this regard is Igan, Mishra, and Tressel (2009). This study provides an empirical analysis of the linkages between lobbying activities and housing lending in the run-up to the crisis of 2008 in the United States. One of its main contributions is its use of information on political contributions, lobbying expenditure, lending standards, and other variables, and the testing of some relations among these variables. The authors recognize that theirs is the first systematic effort at the Fund to explore the political influence of the financial sector on policy formulation and policymaking in the U.S. This pioneering research could be expanded to cover other mechanisms of political influence wielded by “big money:” job rotation between government and financial institutions, the funding of research favorable to anti-regulation stances in think-tanks and universities, and the influence of Wall Street on the media for the propagation of similar ideas.

81. The events of the last few years have revealed further topics where more research is needed: the behavior of hedge funds and derivatives, the management of uncertainty, the role of bounded rationality and herd behavior in propagating shocks in the boom phase of the cycle, the links between macro-financial shocks and various components of aggregate demand such as consumption, investment, exports, the effects of household indebtedness, the development of second- and third-generation early warning systems, and the intellectual origins of macro-financial analysis.

## **C. Methodological Approaches and Macro Modeling**

82. (CHECK PARA. .NUMBERING) The quality of research papers and *WEO* and *GFSR* chapters on macro-financial linkages is in general comparable to, and at times better than, what can be found in academia, the Fed, the Bank of England, and the European Central Bank and other organizations. The Fund’s research also benefits from access to large data bases, the country experience of the Fund staff, and wide geographic and country coverage of the topics. Research tends to be conducted by staff with ample command of econometric and quantitative methods and knowledge of current literature on the topics at hand. It is apparent that the conceptual views and empirical methods used in the research tend to be dominated by what has been taught in mainstream macroeconomics in the U.S. and European universities in the last 20–30 years. This reduces the diversity of approaches used in research. A comment on methodology is in order. *Macroeconomic* modeling at the Fund is largely dominated by stochastic dynamic general equilibrium DSGE models, which may not be the most



appropriate tools for the purpose. This family of macro models is based on “first principles”, with optimizing, forward-looking agents, rational expectations, and market-clearing; (light) Keynesian features such as price stickiness and nominal rigidities are added to make the models more realistic. Though this is the dominant type of applied macro model in academic and policymaking circles, including many central banks around the world, the DSGE strategy of modeling and empirical calibration has serious drawbacks. First, it is apparent that using rational expectations, optimizing, and an equilibrium framework may be more useful (if useful at all) for simulating incremental policy changes and small shocks than for exploring the causes and consequences of boom and bust cycles, recessions, and financial crises—which constitute large disturbances or are endogenous results that occur when the whole economy or large markets are out of equilibrium. In addition, it is unclear how well these models deal with volatile expectations, herding effects, large departures of asset prices from fundamentals, and other disequilibrium paths.

83. Critical or at least skeptical assessments of DSGE models come both from Keynesian economists such as Alex Leijonhufvud (2009) and central bankers such as Sir John Gieve, former Deputy Governor of the Bank of England (Gieve, 2009). Leijonhufvud argues that a main weakness of DSGE models is their treatment of uncertainty and risk: these two fundamental (Keynesian and Knightian) problems tend to be assumed away by the assumption that agents are forward looking and (on average) have correct expectations (the rational expectations assumption). As argued above, this assumption is very limiting when considering, among other things, tail-risk situations such as financial crises. In turn, Gieve (2009) asserts that the treatment of the financial sector in DSGE models in general seems not to do justice to the sector’s increasing importance in explaining macro failures.

84. An additional shortcoming of this family of models is its strong built-in tendency to quickly restore equilibrium in the wake of large shocks. It would be interesting to compare the actual duration of recessions (with or without a financial component) to the paths of main variables in cycles of boom and bust with those simulated in DSGE models.

#### **D. Balance of Research between Country/Cross-Country Studies and Advanced/Emerging Economies**

85. In research on macro-financial linkages, the appropriate balance between country studies, which provide more historical and institutional detail, and cross-country analyses, which provide wider geographical coverage, is always an open question. Increasingly we see a preponderance of cross-country studies, focusing on credit booms, credit crunches, and recessions—as is understandable and perhaps appropriate given the Fund’s broad country membership and character as a global institution. In general, the *WEO* and *GFSR* seem to strike an adequate balance between cross-country analysis and country-specific illustrations.

86. The mix of IMF research between emerging markets and advanced economies has shifted over time. For example, the first wave of research on financial crises, in the

late 1990s and early to mid-2000s, was dominated by models of crisis in emerging economies that were largely inspired by the Mexican and East Asian crises of the mid- to late 1990s. Then, in 2003–07, a second wave of research gave more attention to macro-financial topics of more relevance to advanced economies, such as credit derivatives, the housing market, and the management of risk in sophisticated financial markets. In the aftermath of the 2008 crisis, new work focused on *advanced* economies (at the center of the crisis) though also to some extent on emerging economies and developing countries. In general the mix has often been dictated by events and data availability.

#### **E. Is IMF Research Useful to Prevent Financial Crises and Recessions?**

87. Though the IMF has conducted substantial research in the field of macro-financial linkages and on financial crises, the impact on policymakers has been somewhat limited. In the opinion of this reviewer, a problem is that the Fund has failed to present more definite conclusions on the inevitability of financial crises in a world of high capital mobility and under-regulated financial markets, even though abundant evidence pointed in that direction.

88. In several important topics the research seems to have had only a small influence on policymaking. For example, in 1999–2008 the Fund conducted ample research on asset prices and bubbles but this did not alter the prevailing central bank consensus—which was not to interfere in asset markets by pricking bubbles or warning of excessive overvaluation. The Fund also conducted very valuable research on credit booms in mature economies, but this research did not apparently move policymakers to take action to prevent the main financial crash of 2008–09. *WEO*, *GFSR*, and working papers considered the pricing of risk, leverage, and financial regulation, but they did not sound a strong and explicit warning that unregulated financial markets, off-balance sheet lending practices, and the proliferation of credit derivatives could undermine stability and trigger financial crises.

89. To sum up, IMF research on macro-financial linkages on several topics is generally of good quality but suffers from a limited diversity of conceptual approaches. In addition, the IMF still falls short of offering clear guidance and intellectual leadership to the global community on how to prevent future financial crises, and how to build a more stable global economy that leaves behind 30 years of financial instability exacerbated by the crash of 2008.

#### **REFERENCES**

- Akerloff, G. A., and R. J. Shiller (2009), *Animal Spirits*. Princeton, NJ: Princeton University Press.
- Anand, R., S.J. Pieris, and M. Saxegaard (2010), *An Estimated Model with Macro-financial Linkages for India*. IMF Working Paper No. 10/21. Washington, DC: International Monetary Fund.

- Baliño, T., and A.J. Ubide (1999), *The Korean Financial Crisis of 1997—A Strategy of Financial Sector Reform*. IMF Working Paper No. 99/28. Washington, DC: International Monetary Fund.
- Barajas, A., G. Dell’Ariccia, and A. Levchenko (2009), “Credit Booms: the Good, the Bad, and the Ugly.” Mimeo. Washington, DC: IMF.
- Bayoumi, T., and O. Melander, (2008), *Credit Matters: Empirical Evidence on U.S. Macro-Financial Linkages*. IMF Working Paper No. 08/169. Washington, DC: International Monetary Fund.
- Beechey, M., D. Gruen, and J. Vickrey (2000), “The Efficient Markets Hypothesis: A Survey.” Reserve Bank of Australia.
- Benes, J., I. Ötker-Robe, and D. Vávra (2009), *Modeling with Macro-Financial Linkages: Credit and Policy Shocks in Emerging Markets*. IMF Working Paper No. 09/123. Washington, DC: International Monetary Fund.
- Berg, A. E. Borenztein, and C. Patillo (2005), “Assessing Early Warning Systems: How Have They Worked in Practice?” *IMF Staff Papers* 52 (3).
- Berg, A., C. Jarvis, M. Stone, and A. Zanello (2003), *Re-Establishing Credible Nominal Anchors After a Financial Crisis: A Review of Recent Experience*. IMF Working Paper No. 03/76. Washington, DC: International Monetary Fund.
- Bernanke, B. (2007), *Speech at The Credit Channel of Monetary Policy in the Twenty-first Century Conference*, Federal Reserve Bank of Atlanta, Georgia, June 15.
- Bernanke, B., and M. Gertler (1989), “Agency Costs, Net Worth, and Business Fluctuations,” *American Economic Review* 79 (March 8): 14–31.
- Blanchard, O. (2008), *The State of Macro*. NBER Working Paper No. 14259. Cambridge, MA: National Bureau of Economic Research.
- Blanchard, O., G. Dell’Ariccia, and P. Mauro (2010), “Rethinking Macroeconomic Policy.” IMF Staff Position Note. February, SPN/10/03.
- Blanckenburg, S., and J. G. Palma (2009), eds., “Special Issue on the Global Financial Crisis,” *Cambridge Journal of Economics* 33.
- Blavy, Rodolphe, and M. Souto (2009), *Estimating Default Frequencies and Macrofinancial Linkages in the Mexican Banking Sector*. IMF Working Paper No. 09/109. Washington, DC: International Monetary Fund.

- Brunner, R. F., and S.D. Carr (2007), *The Panic of 1907: Lessons Learned from the Market's Perfect Storm*. Hoboken, NJ: John Wiley and Sons.
- Claessens, S., M.A. Kose, and M.E. Terrones (2008), "What Happens During Recessions, Crunches and Busts?" Ninth Jacques Polak Annual Research Conference, November 13–14. Washington DC: International Monetary Fund.
- Claessens, S., G. Dell'Ariccia, D. Igan, and L. Laeven (2010), *Lessons and Policy Implications from the Global Financial Crisis*. IMF Working Paper No.10/44. Washington DC: International Monetary Fund.
- Cochrane, J., and F. Glahe (1999), *The Hayek-Keynes Debate: Lessons for Current Business Cycle Research*. Lampeter, Wales: Edwin Mellen.
- Dabla-Norris, E., and H. Floerkemeier (2006), *Transmission Mechanisms of Monetary Policy in Armenia: Evidence from VAR Analysis*. IMF Working Paper No. 06/248. Washington DC: International Monetary Fund.
- Dekle, R., and K. Kletzer (2005), *Deposit Insurance Regulatory Forbearance and Economic Growth: Implications for the Japanese Banking Crisis*. IMF Working Paper No. 05/169. Washington, DC: International Monetary Fund.
- Dell'Ariccia, G., D. Igan, and L. Laeven (2008), *Credit Booms and Lending Standards. Evidence from the Sub-prime Mortgage Market*. IMF Working Paper No. 08/106. Washington, DC: International Monetary Fund.
- Duenwald, C., N. Gueorguiev, and A. Schaechter (2005), *Too Much of a Good Thing? Credit Booms in Transition Economies: The Cases of Bulgaria, Romania, and Ukraine*. IMF Working Paper No. 05/128. Washington, DC: International Monetary Fund.
- Duttgupta, R., and N. Barrera (2010), *The Impact Of The Global Crisis on Canada: What Do Macro-Financial Linkages Tell Us?* IMF Working Paper No. 10/5. Washington, DC: International Monetary Fund.
- Edison, H.J. (2003), "Do Indicators of Financial Crises Work? An Evaluation of an Early Warning System," *International Journal of Finance and Economics* 8: 11–53.
- Enoch, C., B. E. Baldwin, O. Frécaut, and A. Kovanen (2001), *Indonesia: Anatomy of a Banking Crisis*. IMF Working Paper No. 01/52. Washington, DC: International Monetary Fund.
- Fama, E. (1970), "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance* 25: 383–417. doi:10.2307/2325486.
- Fisher, I. (1933), "The Debt-Deflation Theory of Great Depressions," *Econometrica* 1(4): 337-357.

- Fox, J. (2009), *The Myth of the Rational Market*. Harper Collins Publishers.
- Frankel, J. (2009), “What is In and Out in Global Money?” *Finance and Development*, IMF, 46 (3).
- Friedman, M. (1992), “The Crime of 1873.” Chapter 3 in M. Friedman, *Money Mischief: Episodes in Monetary History*. A Harvest Book. San Diego, New York, and London: Harcourt Brace.
- Gieve, J. (Sir) (2009), “Seven Lessons From the Last Three Years.” Speech, London School of Economics and Bank of England.
- Gosh, A. J. Ostry, and N. Tamirisa (2009), “Anticipating the Next Crisis,” *Finance and Development* 46 (3).
- Hayek, F. (1988), *The Fatal Conceit*. Chicago, IL: University of Chicago Press.
- Horváth, B., and R. Maino (2006), *Monetary Transmission Mechanisms in Belarus*. IMF Working Paper No. 06/246. Washington, DC: International Monetary Fund.
- Huang, H., D. Marin, and C. Xu (2004), *Financial Crisis, Economic Recovery and Banking Development in Russia, Ukraine, and Other FSU Countries*. IMF Working Paper No. 04/105. Washington, DC: International Monetary Fund.
- Igan, D., P. Mishra, and T. Tressel (2009), *A Fistful of Dollars: Lobbying and the Financial Crisis*. IMF Working Paper No 09/287. Washington, DC: International Monetary Fund.
- International Monetary Fund (2002a), *World Economic Outlook: Recessions and Recoveries*. April. Washington, DC: International Monetary Fund.
- \_\_\_\_\_ (2002b), *Global Financial Stability Report*. Washington, DC: International Monetary Fund.
- \_\_\_\_\_ (2003), *World Economic Outlook: Real and Financial Effects of Bursting Asset Price Bubbles*. April. Washington, DC: International Monetary Fund.
- \_\_\_\_\_ (2004), *World Economic Outlook: Advancing Structural Reforms*. April. Washington, DC: International Monetary Fund.
- \_\_\_\_\_ (2008a), *United States: Selected Issues*. IMF Country Report 08/256, July. Washington, DC: International Monetary Fund.
- \_\_\_\_\_ (2008b), *World Economic Outlook: Financial Stress and Economic Downturns*. April. Washington, DC: International Monetary Fund.
- Jácome, L. I. (2004), *The Late 1990s Financial Crisis in Ecuador: Institutional Weaknesses, Fiscal Rigidities, and Financial Dollarization at Work*. IMF Working Paper No. 04/12. Washington, DC: International Monetary Fund.

- Kanaya, A., and D. Woo (2000), *The Japanese Banking Crisis of the 1990s – Sources and Lessons*. IMF Working Paper No. 00/7. Washington, DC: International Monetary Fund.
- Keynes, J.M. (1936; new edition 1998), *The General Theory of Employment, Interest and Money*. Boston, MA: Mariner Books, Houghton Mifflin.
- Kindleberger, C. (1989), *Manias, Panics, and Crashes*. John Wiley and Sons, Inc.
- Krugman, P. (2009), “How Did Economists Get It So Wrong”? *The New York Times*, September 6, 2009.
- Kuijs, L. (2002), *Monetary Policy Transmission Mechanisms and Inflation in Slovakia*. <http://www.imf.org/external/pubs/cat/longres.cfm?sk=15759.0> IMF Working Paper No. 02/80. Washington, DC: International Monetary Fund.
- Leijonhufvud, A. (2009), “Out of the Corridor: Keynes and the Crisis,” *Cambridge Journal of Economics* 33: 741–757.
- Marichal, C. (1989), *A Century of Debt Crises in Latin America. From Independence to the Great Depression, 1820–1930*. Princeton, NJ: Princeton University Press.
- Mendoza, G., and M. Terrones (2008), *An Anatomy of Credit Booms: Evidence from Macro Aggregates and Micro Data*. IMF Working Paper No. 08/226. Washington, DC: International Monetary Fund.
- Modigliani, F., and M. H. Miller (1958), “The Cost of Capital, Corporation Finance, and the Theory of Investment,” *American Economic Review* 48 (3): 261-297.
- Musson, A.E. (1959), “The Great Depression in Britain, 1873–1896,” *Journal of Economic History* 19 (2).
- Minsky, H.P. (1963; new edition 1982), *Can “It” Happen Again? Essays on Instability and Finance*. Armonk, NY: M.E. Sharpe, Inc.
- \_\_\_\_\_ (1975), *John Maynard Keynes*. New York, NY: Columbia University Press.
- \_\_\_\_\_ (1986), *Stabilizing an Unstable Economy*. Newhaven, CT: Yale University Press.
- Newbold, J.T.W. (1932), “The Beginnings of World Crisis, 1873-1896,” *Economic History* 2 (7).
- Pastor, G.C., and T. Damjanovic (2001), *The Russian Financial Crisis and its Consequences for Asia*. IMF Working Paper No. 01/169. Washington, DC: International Monetary Fund.

- Rajan, Raghuram G., 2005, "Has Financial Development Made the World Riskier?" Paper prepared for Conference on Financial Markets, Financial Fragility, and Central Banks, Jackson Hole, Wyoming, August 27.
- Ramos, A. M. (1998), *Capital Structures and Portfolio Composition During Banking Crisis: Lessons from Argentina 1965*. IMF Working Paper No. 98/121. Washington, DC: International Monetary Fund.
- Reinhart, C., and K. Rogoff (2009a), "The Aftermath of Financial Crises," *American Economic Review* 99 (2): 466–72.
- \_\_\_\_\_ (2009b), *This Time is Different: Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press.
- Sachs, J.D. (2009a), "Rethinking Macroeconomics," *Capitalism and Society* 4 (3): Article 3, "The Future of Capitalism."
- \_\_\_\_\_ (2009b), "Comment on 'Financial Markets and the State: Long Swings, Risk and the Scope of Regulation (T. Roman Frydman and Michael D. Goldberg),' *Capitalism and Society* 4 (2), Article 7.
- Samuelson, P. (1965), "Proof That Properly Anticipated Prices Fluctuate Randomly," *Industrial Management Review* 6: 41–49.
- Saul, S.B. (1969), *The Myth of the Great Depression, 1873-96*. London: MacMillan.
- Solimano, A. (1990), "Inflation and the Costs of Stabilization: Historical and Recent Experiences and Policy Lessons," *The World Bank Research Observer* 5 (2).
- \_\_\_\_\_ (1991), "The Economies of Central and Eastern Europe: An Historical and International Perspective." In V. Corbo, F. Coricelli, and J. Bossak, eds., *Reforming Central and Eastern European Economies. Initial Results and Challenges*. A World Bank Symposium. Washington, DC: World Bank.
- \_\_\_\_\_, and M. Gutierrez (2008), "Savings, Investment, and Capital Accumulation." Chapter 19 in A.K. Dutt and J. Ross, eds., *International Handbook of Development Economics*, Volume One. Cheltenham, UK and Northampton, MA: Edward Elgar Publishers.
- Swiston, A. (2008), *A U.S. Financial Conditions Index: Putting Credit Where Credit is Due*. IMF Working Paper No. 08/161. Washington, DC: International Monetary Fund.
- Tamirisa, N.T., and D. Igan (2008), *Are Weak Banks Leading Credit Booms? Evidence from Emerging Europe*. IMF Working Paper No. 08/219. Washington, DC: International Monetary Fund.