

A Period of Intellectual Ferment

"I want you to know that never again will I use the phrase "never again.""

Congressman Vic Snyder, December 2nd, 2009, in a Joint Economic Committee hearing In response to testimony by Dr. Robert Litan on the dangers of over-promising the benefits of the financial reform.

"Success tends to breed carelessness and complacency."

Robert J. Samuelson, Washington Post, Monday, June 7th 2010

A Background Paper for "Frameworks for Systemic Risk Monitoring" Workshop June 21st and 22nd 2010¹

Charles Taylor

Director, Pew Financial Reform Project

1. Introduction

The costs of the recent crisis have been enormous. For the US, Phil Swagel of Georgetown University estimated the incremental loss over and above what one might think of as a normal downturn at about 3% of GDP². Andy Haldane, Bank of England Executive Director for financial stability, puts the loss of world output in 2009 at 6.5% without making such an allowance. If only 25% of that loss proved to be permanent, the total loss would be close to one entire year's worth of global GDP³.

The unprecedented costs as well as the complexity of the 2008 financial crisis have spurred deep intellectual ferment amongst academics and policymakers on the subject of systemic risk. In 2008 and 2009, eminent economists from across the theoretical and political spectrums offered up various explanations for the causes of the crisis and, consequently, conflicting proposals for how to prevent one in the future. No dominant consensus has yet emerged about how a relatively minor crisis in the U.S. sub-prime mortgage market spread throughout the global financial system. At the time of writing, we are witnessing new stresses in the financial system rooted in fiscal indiscipline in the Euro-zone which may well stress the fabric of the international financial system in new and dangerous ways.

¹ This note benefitted from comments and inputs from other members of the Organizing Committee for the Workshop on Frameworks for Systemic Risk Monitoring as well as my colleagues, Gordon McDonald and Katie Portnoy at Pew. Errors are mine.

²See Swagel, Phillip in *The Cost of the Financial Crisis: The Impact of the September 2008 Economic Collapse*. Page 1.

³ See Haldane, Andy in *The \$100 Billion Question*. Page 16, Table 1.

This paper reviews where the debate on systemic risk now stands. It has been written as background for the June 2010 workshop on frameworks for systemic risk monitoring. The rough-and-ready approach is to divide explanations and analyses into three broad families – macro-economic, institutional and granular. The next three sections review recent examples of each.

- *Macro-Economic Analyses* These focus on a few macro-economic causes and effects. Analysis relies on a few key phenomena such as leverage, capital adequacy, maturity transformation, asset price bubbles and credit expansion to explain the emergence of systemic instability and the subsequent collapse.
- *Institutional Analyses* These concentrate on specific features of markets and institutions, processes and practices and how details of the structure of the financial system can exacerbate stresses and strains when they emerge.
- *Granular Analyses* These tend to look for the seeds and amplifiers of instability in the characteristics and behavior of individual agents and in the patterns of individual transactions.

This taxonomy is not completely “clean” for a number of reasons. Some major themes of analysis appear in all three – such as the importance of positive feedback loops, incomplete information and information asymmetries. Each type of analysis can accommodate positive feedbacks, contagion, herd behavior and liquidity collapse. Each can employ simulations and stress testing and should consider the potential for reacting in two different ways: diverting the system away from collapse through policies that involve a timely reaction to developments and also making the system more resilient and robust through redesign.

A case can be made that some types of analysis could be put in more than one family. But, in the current context, the appeal of this three-way classification system is that analyses within each family are likely to impose similar requirements on any framework for monitoring system risk, whereas those in different families have quite different implications for data collection and system monitoring.

The last section raises some broad strategic questions regarding monitoring, that cut across all three families of analysis.

2. Macro-Economic Analyses

Macro-economic analyses have tended to focus on the business cycle.

It may be tempting to dismiss a purely macro-economic explanation for the crisis, since the long build-up in home prices took place against a background of sustained growth and low inflation. Nevertheless, some serious analysts lay blame at the feet of monetary policy. John Taylor of Stanford has argued that, if monetary policy had been steadier and tighter in the middle part of this decade, the bubble in housing

would not have happened and there would have been no crisis⁴. Perhaps there would have been a smaller recession earlier on, but that would have been a reasonable price to pay.

More detailed macro-economic explanations pay more attention to the mechanics of the financial system and to its regulation. They still remain quite high level, however. For example, the authors of the Geneva Report “The Fundamental Principles of Financial Regulation,” say that their objective was “moderating the recurring cycle of financial crises, cycles that in [their] view are not wedded to particular instruments, institutions individuals or information⁵.” This report argues that, as booms develop, financial institutions expand their balance sheets, lower their funding costs by shortening maturities and increase leverage. Institutions that don’t follow the trend are punished for under-performance. When the boom ends, assets prices fall, solvency becomes a concern, lowered profit prospects rule out raising additional capital and assets generally have to be sold creating a positive feedback loop that intensifies the asset decline and leads to wide-scale liquidity withdrawals. Over the last couple of decades, the role of current market prices has intensified, exacerbating both the boom and the bust and, in a market downturn, sophisticated risk management systems that sensibly enough drive individual institutions to demand more and better quality margin and collateral as volatility measures rise can add fuel to the collapse of liquidity and prices when many institutions employ similar risk management strategies at the same time.

One major implication of this analysis is that macro-prudential regulation should offset the markets tendency to underprice risk in an upturn and to overprice it in a downturn. Counter-cyclical capital requirements are the commonly associated policy prescription. In addition, any individual institution with a marked maturity mismatch between assets and liabilities, should also face an incremental capital requirement.

A somewhat different high level approach is taken by Gary Gorton at Yale⁶. Gorton believes the cause of the recent crisis was the spread of “banking” outside of the banking sector. He argues that repos are the wholesale inter-institutional equivalent of cash deposits in the retail system. Before the crisis, the asset as well as the cash interchanged in a repo transaction had come to be viewed as informationally insensitive in the sense that MBS and CDO seemed to be protected by diversification from any shortcomings in the performance of the underlyings.⁷ The massive repo market provided liquidity to financial institutions in much the same way that deposits provide it for the real economy. However, in the absence of an equivalent of deposit insurance, when diversification failed and the strength of

⁴ See Taylor, John B. in *Getting Off Track: How Government Actions and Interventions Caused, Prolonged, and Worsened the Financial Crisis*. Pages xi-xii.

⁵ See Brunnermeier, Markus, Andrew Crocket, Charles Goodhart, et al. in *The Fundamental Principles of Financial Regulation*. Page xi.

⁶ See Gorton, Gary in “Slapped in the Face by the Invisible Hand: Banking and Panic of 2007.” Pages 32-38.

⁷ A misconception aided and abetted by the credit rating agencies.

counterparties and the quality of assets fell into question simultaneously, there was the equivalent of a 19th century bank run in the repo market.

Gorton suggests senior tranches of qualifying securitizations should be government insured. And the quid pro quo would be that the choices of asset class, portfolio and tranching should be subject to regulatory examination, just as depository institutions are examined today. Attractively, a rather general characterization of the problem leads to a rather specific cure. And Gorton's account explains why the Great Recession and the Great Depression were so much more serious than any other crisis over the past 100 years.

Another high level approach for analysis and policy action is to concentrate on institutions that are "Too-Big-To-Fail" -- institutions whose failure would threaten to trigger a cascade of failures across the financial system. Simon Johnson is one proponent of this approach. His historical analysis goes back to the founding fathers and emphasizes the pernicious effects of the concentration of economic and political power. President Jefferson, and later President Jackson, had a point⁸. Even when large banks do not act collusively and central banks relentlessly pursue the common good, this concentration of power is corrupting. Managing crises by selling failing banks to bigger banks has been an ill-begotten policy. Protecting the biggest banks from failure in any crisis may be an understandable disaster management practice but it fosters extraordinary moral hazard in the long run. These institutions influence the policymaking process directly through lobbying and indirectly through their substantial influence on how policymakers think about risk and finance. As a result, it tends to be the case that that they prosper in good times and in bad times the rest of us pay the bill.

Johnson's analysis leads to the conclusion that today's systemically important institutions need to be broken up; anything else would be unconvincing and ineffective.

Finally, in some of his work, Marcus Brunnermeier has also focused on systemically significant institutions. He and Tobias Adrian developed the concept of CoVaR to internalize systemic risks⁹. The idea is to estimate an incremental capital requirement related to certain risk factors such as size, interconnectedness, maturity mismatch, and leverage that predict the scale of the effect that the failure of the institution might have on the system as a whole. These capital charges would create an incentive for institutions to adopt business strategies that reduced the risks they posed to others – as though fire insurance premiums reflected not only the costs of your house burning down but the risk and the cost of your neighbor's house burning down too.

Although with any of these approaches there are plenty of empirical issues that need to be addressed in order to sharpen definitions and calibrate policy responses, the incremental informational demands for refining and operationalizing these macro-analyses are all relatively modest. The policy problem is

⁸ See Johnson, Simon and James Kwak in *13 Bankers*. Page 25.

⁹ See Adrian, Tobias and Markus Brunnermeier in "CoVaR."

reduced to detecting and deflating a bubble early on, dampening the natural oscillations of the system, and strengthening or discouraging (or breaking up) systemically significant institutions. Although some could do with improvement, indicators already exist to monitor most key economic aggregates – LTV ratios, rates of credit expansion, asset price increases and so on. Periodic studies would suffice interspersed with periodic data collection. In that sense, they represent an economical set of options for addressing systemic risk.

3. Institutional Analyses

Other analyses drill down a little below the macro-economic level and look at the interconnections between institutions and how they function as a network. Or they look a little deeper still at things as particular as the price discovery process in a given market, the clearing process for a specific class of instruments or the structure of a particular process that threads its way across the financial network.

In “Rethinking the Financial Network,” Andrew Haldane argues that the financial system is an adaptive network that, over the last decade, has become increasingly complex and homogeneous. The network structure became denser and more complex as securitization proliferated and lengthened linkages and OTC derivatives spawned a huge variety of conditional obligations. As large institutions individually sought to diversify their risks and their business lines, they came to resemble one another more and more. The market became both more robust when faced with normal shocks and peculiarly fragile in the face of greater stress. What had appeared to be a self-regulating and self-repairing system in the 1990s and early in the 2000s fell apart in 2008 crash.

Haldane’s policy prescription is that: more data and better communications about network dynamics would be useful to “map the global financial network and communicate to the public about its dynamics;” regulators should vaccinate the “super-spreaders” – that is, strengthen the large, most interconnected institutions that are most capable of spreading financial contagion; and regulators should restructure the network through more widespread use of central counterparties and intra-system netting arrangements, to reduce the financial system’s “dimensionality” to change the shape of the power law governing the size of financial collapses¹⁰.

In the just-released report of the Task Force on Tri-party Repo Infrastructure provides another example of institutional analysis. This, however, is far more detailed and confined to a single market. “First and foremost, the Task Force has focused on specific actions needed to fundamentally strengthen the operational arrangements at the heart of the tri-party repo market. These actions are necessary to reduce the markets reliance on intraday credit provided by the Clearing Banks and clarify the credit and liquidity risks borne by market participants¹¹.”

¹⁰ See Haldane, Andrew G. “Rethinking the Financial Network.” Page 4.

¹¹ See Task Force on Tri-Party Repo Infrastructure. Page 4.

In good times, the extension of intraday credit was merely an operational convenience. But in a sufficiently severe period of stress, these very large exposures became extraordinarily consequential and at the same time quite uncertain in an almost Knightian way, threatening to seize up liquidity in ABS, MBS and Treasuries. When one thinks of the dependence of the Federal Reserve on the tri-party repo market as a place in which to execute monetary policy, this operational convenience had serious systemic implications.

Another example of an analysis of an “institutional” analysis of systemic significance was a paper entitled “Understanding the Securitization of Subprime Mortgage Market Credit” by Adam Ashcraft and Til Schuermann¹². In this analysis Ashcraft and Schuermann provide a quite detailed overview of the subprime mortgage securitization process from origination through to distribution. They identify and document seven key points at which informational asymmetries and moral hazards arise where the separation of duty from interest led to the breakdown of the system. They discuss both predatory subprime borrowing and lending and also the process whereby the credit ratings assigned and monitored ratings for mortgage-backed securities.

All three of these analyses point to the fact that the network structure and its detailed organization can influence importantly the behavior of the financial system when it is under stress. As a general matter, there is not much assembled information on the connections between institutions, although individual institutions do often have a fair idea of their counterparty exposures day by day. More of a challenge would be to assemble the data needed to understand intra-day exposures and, at the other end of the spectrum, to monitor the evolution of the system so as to understand when a process, a product, a trading strategy or a new institutional arrangement might be emerging with the sorts of weaknesses that appeared at several places in the originate-to-distribute model. The informational requirements to conduct comprehensive institutional analysis of the financial system would be serious.

4. Granular Analyses

Granular analyses that look at individual behavior at the portfolio, trading strategy, instrument and trade level are the most atomistic of these styles of analysis, but may not necessarily be more detailed than institutional analyses so far as the particulars of processes and market mechanisms are concerned.

Agent based simulation has been used effectively to analyze how behavior at this level can be destabilizing. In their paper “Leverage Causes Fat Tails and Clustered Volatility” Stephan Thruner, Doyne Farmer and John Geanakoplos build a simple model of leveraged asset purchases with margin calls that depends on just one style of investment – value traders. Banks allow investors to increase leverage when times are good, but require them to reduce it when times turn bad. In the absence of leverage, analysis of simulations shows price movements are normally distributed. With leverage exacerbating

¹² See Ashcraft, Adam B. and Til Schuermann in “Understanding the Securitization of Subprime Mortgage Market Credit.”

selling pressure in a downturn and accommodating buying pressure in an upturn, they develop the fat tails observed in practice. There is no appeal to strategy-switching or irrational behavior to explain fat tails. For policy the implication is that something equivalent to a counter-cyclical loan loss reserve requirement for banks, applied to margin requirements might be worth investigating¹³.

Today, the absence of much granular data means that most granular analysis is likely to be based on simulations. It seems likely that the possibilities for understanding system dynamics better would be greater – and possibly much greater -- if more data at a granular level were available.

Certainly, in order to understand changes in exposure across the system in anything like real time, it would be very useful to have position, marks and even transaction data for most instruments and entities in the capital markets. It would be useful to be able to identify every entity uniquely – structured investment vehicles, special purpose vehicles, subsidiaries and so on – and to understand the conditional obligations, rights and triggers associated with individual instruments and contracts, in order to understand how liquidity might drain out of parts of the system and how relationships between entities might change in periods of financial distress. It would also be useful to have granular data from elsewhere in the financial system to be able to detect early signs of new processes emerging akin to the originate-to-distribute process, or changes in the composition of populations – such as the changes in home-owner populations and in the population of mortgages -- that might signal potential destabilization.

5. Conclusion

The problem of financial system stability is so complex that some reductionism is going to be necessary to understand many aspects of it. However, there should be room in any overall strategy of data, information and analysis for a wide variety of approaches that focus on different sets of issues and ideas. This should, more than likely, accommodate much more analysis of relatively far-flung issues such as appropriate accounting principles for financial institutions, the psychology of behavior under stress, the relationship between collective and individual panic, how to combat cycles of complacency and carelessness among regulators and industry participants alike, issues of legal dogma such as the arrangements for the bankruptcy of large complex internationally active financial institutions, and issues of corruption and fraud. To achieve anything like an adequate overall understanding of the stability characteristics of such a system will require careful thought about how one type of analysis should inform others -- as in the nesting of scientific models of complex natural systems.

Tommaso Padoa-Schioppa observed at the inaugural INET Conference at Kings College Cambridge earlier this year that he had the hardest time persuading academic economists to take the plans for the Euro seriously in its earliest stages of development because they were in the habit of taking national sovereignty as a given whereas he was operating from the premise that sovereignty could, and would,

¹³ See Thurner, Stefan, J. Doyne Farmer, and John Geanakoplos in "Leverage Causes Fat Tails and Clustered Volatility."

be given up. Here too there may be some resistance to breaking the mold of reductionist analysis. The tendency has been to make do with what's available for analytical purposes. In the future the challenge will be to ask what could be done were more data available and shaping thereby the data development strategy for the future¹⁴.

¹⁴ See Pado-Schioppa, Tommaso in "Closing remarks at the inaugural conference of the Institute for Economic Thinking." New

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