



Center for Development Economics,  
WILLIAMS COLLEGE

CDE Working Paper Series

Title:

**Financial Regulation in a Changing World:  
Lessons from the Recent Crisis**

Authors:

**Gerard Caprio, Jr.**

Date:

September 2009

Abstract:

The current crisis is leading many to re-think the role of finance and how it should be regulated. Yet many features of this crisis are decidedly not new. This paper reviews what was regarded as the conventional wisdom on financial regulation prior to the 2007 onset of the crisis, briefly recounts some of the main factors behind the events of the 2007-09 years, and then turns to lessons for regulatory reform. At some point in the 1990s, the financial systems of high-income countries seemed to be functioning well and withstood some significant shocks, yet by 2007 much had changed. However, the regulatory structure did not change in response, and in fact eased in such a way as to exacerbate the instability that was subsequently experienced. A key theme is that financial regulation needs to be more dynamic, taking account of financial innovations and how they affect the sector. No such approach to regulation seems possible without greater accountability for regulators and attention to the incentives for those in the sector and for those who regulate it.

# Financial Regulation in a Changing World:

## Lessons from the Recent Crisis

Gerard Caprio, Jr.

Williams College

September, 2009

**Abstract:** The current crisis is leading many to re-think the role of finance and how it should be regulated. Yet many features of this crisis are decidedly not new. This paper reviews what was regarded as the conventional wisdom on financial regulation prior to the 2007 onset of the crisis, briefly recounts some of the main factors behind the events of the 2007-09 years, and then turns to lessons for regulatory reform. At some point in the 1990s, the financial systems of high-income countries seemed to be functioning well and withstood some significant shocks, yet by 2007 much had changed. However, the regulatory structure did not change in response, and in fact eased in such a way as to exacerbate the instability that was subsequently experienced. A key theme is that financial regulation needs to be more dynamic, taking account of financial innovations and how they affect the sector. No such approach to regulation seems possible without greater accountability for regulators and attention to the incentives for those in the sector and for those who regulate it.

**Keywords:** Financial crisis, Securitization, Regulation and Supervision, Safety Nets

**JEL Classification Codes:** G21, G28, G32

Paper prepared for the VII Colloquium on “*Financial Collapse: How are the Biggest Nations and Organizations Managing the Crisis?*”, Jointly organized by the Associazione Luiss-Guido Carli and Fondazione Cesifin “Alberto Predieri” in collaboration with the editors of the *Journal of Financial Stability*, October 2, 2009 – Ravenna. Comments from James Barth and Ross Levine are gratefully acknowledged, though responsibility for the views espoused here remains with the author.

## I. Introduction

Money ... is a machine for doing quickly and commodiously what would be done, though less quickly and commodiously, without it; and like many other kinds of machinery, it exerts a distinct and independent influence of its own only when it gets out of order.

John Stuart Mill, *Principles of Political Economy*, Book 3.7, 1848

The financial crisis that has engulfed most industrial and many emerging markets since mid-2007 has been dubbed the most serious financial crisis since the Great Depression and has led many to observe that thinking about finance, and even the field of economics, or at least modern macroeconomics, needs to be reconsidered. Unfortunately, this reaction is hardly a surprise. The view that finance, in particular in normal times, is not very important, dates back to at least the time of John Stuart Mill (above). Consequently, it was natural, as economists moved to working with mathematical models and desperately sought simplifying assumptions, that one of the earliest favorites was to assume away the need to include the existence of money (and of course the financial sector). In an Arrow-Debreu world of complete markets, the return to financial intermediation was zero, so no intermediaries existed. Notwithstanding the contributions of economists such as Raymond Goldsmith, Gurley and Shaw, Kindleberger, and Minsky, finance and most notably the study of financial crises has remained a relatively fringe activity in economics. Even models that included money and even debt often ignored the financial intermediation process. Attention to finance and its regulation picks up in the aftermath of financial crises, but many economists in recent years have quickly returned to the safety of their dynamic stochastic general equilibrium models and assumptions of efficient markets. Similar to financial market participants, policy makers seemed to accept the market efficiency view, and also took comfort in the benign messages coming from standard microprudential assessments of risk.

As became painfully evident, and as Avinash Persaud (2000) pointed out so far in advance, the herd of risk takers might have been quite happy but they were in the process of riding off the cliff together. A number of financial innovations and changes in the shape of the financial sector had occurred, noted below in section III, which conspired to make old approaches to regulation as useful as was the Maginot line in protecting France in 1939. Together these developments dramatically altered the incentives in the financial sector and led to taking a high-risk position by many financial intermediaries. The Canadian case to the contrary notwithstanding, there was not much divergence in the success, or lack thereof, among regulatory systems. In addition to well-publicized failures in Iceland, Ireland, the United Kingdom, and the United States, many continental European systems are in grave distress; while some might have been slower to originate many of the bad loans and securities, financial intermediaries there were major purchasers of securitized paper. Curiously the U.S. system has been vilified for supplying much of this paper, yet foreign systems have received less attention for their role on the demand side.

With the maturing of the empirical finance literature, there is now excellent evidence, based on aggregate cross-country, industry-level, and firm-level studies, as well as in individual historical case studies, that finance plays a critical role in economic growth (see Levine, 1997 and 2004). And there also is strong support for the role of finance in ameliorating poverty (Demirguc-Kunt and Levine, 2009) and reducing income inequality (Levine, Levkov, and Rubenstein, 2008). Since finance is an important force for good, it is important to change the approach to regulation in order to maximize these benefits as well as to protect societies from the ‘dark side’ of this force. Moreover, the present crisis has demonstrated effectively what was known previously from developing country experience with rapid credit growth, namely that all financial deepening is not necessarily good. Ensuring healthy financial sector development should be the critical objective of the regulatory regimes that countries choose.

Section II of this paper will review the conventional wisdom regarding financial regulation prior to the onset of this crisis, including the critiques of this position. Section III then will provide a short review of the key factors in the crisis; those who know these issues well should feel free to skip this section, but ensuring that author and reader have the same diagnosis will reduce the disagreements as to the cures. The key problem in a nutshell: the sector changed, regulation did not, at least not in the right direction. In the mid-1990s, financial systems in industrial countries were relatively robust, withstanding shocks from crises in Mexico, East Asia, and the Russian/LTCM episode of 1998. To be sure, there were some weaknesses, as those very crises revealed, but a record setting financial crises was not inevitable at that time. However, a decade later, the landscape had changed fundamentally, and this section argues that the key factors were the rise of opacity and the skewing of incentives in favor of risktaking, while the regulatory approach had failed to adapt and even reinforced rather than mitigated these changes. In sum, financial systems experienced much innovation without a suitable adaptation of regulation. Section IV therefore argues in favor of moving to a more dynamic system of regulation, and takes some lessons from previous attempts to put rules rather than bright lines into regulations.

While a shift to greater attention on macroprudential regulation is desirable – and ensuring financial stability after all was the key reason why the Federal Reserve System was established -- before all of the checklists of variables to be monitored inevitably are rolled out, regulators need to be compelled to focus on the quality and availability of information and on the incentives in the sector. It is difficult to envisage a regulatory system that will adapt dynamically unless regulators are provided with financial incentives for the effective conduct of their responsibilities, an idea that is not yet receiving serious consideration in regulatory circles. Instead, debates on the number of regulators, or where regulatory responsibilities are housed have become popular, even though both unified (U.K.) and balkanized (U.S.) regulatory models failed miserably in this crisis. This paper argues that it is

time instead to focus on the key factors behind the crisis and the regulatory failures behind it. Rather than inserting fingers into dikes, a broader look at the issues is needed, if not to prevent but at least to mitigate the next crisis. Regulatory reformers need to abandon the quest for the ideal Maginot Line and instead focus on building an adaptable system that will adapt to a changing financial system.

## II. 'Known' Knowns? Pre-Crisis Views on Regulation

Prior to the beginning of the crisis in the summer of 2007, there seemed to be greater consensus on financial regulation in official policy making circles than had been seen in some decades, though not without academic and other critics. Industrial country authorities, joined by those in at least 80 emerging markets, on the eve of the crisis were in the process of moving at various speeds to Basel II, the revised Capital Accord of the Basel Committee on Bank Supervision to improve upon Basel I of 1988.<sup>1</sup> For sophisticated banks and countries, the first pillar of this Accord was to feature the use of internal ratings models of commercial banks, while for those lacking the data and skills for a model-based implementation of the accord, risk weights were to be set using the assessments of credit rating organizations (CROs). This move to rely more on models (of the banks and/or of the CROs) was part of what was described as a revolution in risk management in favor of greater quantification. Although some regulators and Basel Committee enthusiasts understandably took credit for helping along this process, as detailed by Tett (2009), it dated back to the efforts of the former Bankers Trust and JP Morgan in the early 1980s, thus predating the Basel Committee's foray in the area. Unfortunately, in implementing quantitative risk management models, many rushed to assume that risks were normally distributed even though the possibility of – and the historical evidence on – fat tails was

---

<sup>1</sup> See the website of the Basel Committee (<http://www.bis.org/bcbs/index.htm>) for descriptions of their membership, work program, etc. Barth, Caprio, and Levine (2006) offer a brief description of the multi-pillar system and a short history of the Basel effort.

recognized. How far back in time should or could one go to estimate probabilities of defaults, loss given default, and exposure at default during rare market events was largely ignored, a fact the Basel Committee seemed to sanction by allowing 5 years of data to be sufficient for estimated credit default probabilities and losses. In the go-go days of the U.S. credit bubble, this short estimation period meant that no period of high default rates was included, much less a period in which real estate prices were falling. Disaster myopia (Guttentag and Herring, 1986) is commonplace in all bubbles, and certainly in the runup to the current crisis; the author recalls being told in 2005 by those caught up in the bubble that U.S. real estate prices might slow, but *never* fall – notwithstanding the factual error of that statement and the absence of any logical reason as to why it might be hold. As Kahnemann and Tversky (1981) described, this type of ‘framing,’ in which people judge prospects by a selective look at evidence, might be advantageous in some aspects of human behavior but is dangerous in finance.

Basel II was envisaged as a supervisory-led system, not surprisingly as bank supervisors largely shaped it. The Basel Committee’s “Core Principles for Effective Banking Supervision” and supporting documents discuss all of the requirements for supervisors, including the information that banks need to make available to them, but are remarkably silent on the information that banks need to disclose to the public. The main document asserts that effective market discipline is a prerequisite for effective supervision, but says nothing about how the former can be expected to develop. It also lists ‘sound and sustainable macro policies as another precondition, notes that this area is not in the domain of bank supervision, but that supervisors must react if they see a macro issue.<sup>2</sup>

Overwhelmingly, supervision was focused at the microprudential level, concerned with the health of individual banks based on an analysis of individual institutions, neglecting systemic

---

<sup>2</sup> “Sound macroeconomic policies must be the foundation of a stable financial system. This is not within the competence of banking supervisors. Supervisors will, however, need to react if they perceive that existing policies are undermining the safety and soundness of the banking system,” Basel Committee, 2006, p. 6.

concerns.<sup>3</sup> This orientation made it plausible that as supervisors investigated individual banks that may have sold off some of their risky exposure, they were placated by its absence from the bank's balance sheet and did not address the issue of whether these risks could come back to the bank, much less its implications for the broader financial system.

This micro level approach permeated financial sector regulation. The history of the Bank-Fund Financial Sector Assessment Program (FSAP) sheds some light on the problem. In 1995-96, the World Bank was gradually ramping up its efforts to diagnose financial systems, having put together a diverse team of finance specialists (financial economists, bankers, bank supervisors, regulators – with market experience -- of capital markets, pension funds and insurance, accountants and lawyers) to discuss how this might best be achieved, and operationalized the approach with an investigation of an East Asian country. A hallmark of the approach taken was that the analysis of the banks, insurance companies, pension funds, etc. was not left to narrow specialists in each area, but rather was conducted and vetted by the broader group, with questioning on the implications of developments in one subsector for another and the entire system.

With the increase in developing country crises in 1997-98, the World Bank and IMF were encouraged to develop a formal assessment program. However, at the same time a variety of G-10 and other groups sponsored the creation of a wave of standards well beyond banking – from accounting and auditing to securities market regulation, payment systems, insurance and pension funds – all covering a dozen specialist areas, leading to a total of hundreds of standards.<sup>4</sup> Thus the FSAP program became an umbrella for each of these specialists, and on most of the exercises, the entire time that the various specialists worked on a country, they did so exclusively or virtually only in their particular sub-discipline. Although the overall assessment of the FSAP would attempt to synthesize results, much of

---

<sup>3</sup> See Persaud, 2009 for more on the importance of macroprudential regulation.

<sup>4</sup> One colleague quipped, with so many standards, one could instead inquire as to whether they had any!



the synergy to be gained from having specialists collaborate was lost. Attempting to harness the synergies of various specialists working together was one of the arguments in favor of the establishment of the U.K. Financial Services Authority (FSA), but also seems not to have worked out in practice. The various standards were promulgated by G-10 led groups operating under the assumption that their adoption by developing country authorities would render financial markets there developed and stable.

In banking, although Basel II was barely being implemented in advanced countries in the summer of 2007, still key features of the crisis (below) were the failure of models and the grossly overoptimistic ratings of the CROs, key components of pillar 1 of the new system. Interestingly, there have not been overt denials or halts in the movement to implement Basel II notwithstanding the failure of its key components. The official position of the Basel Committee (in remarks by the Karl Cordewener, the Deputy Secretary General of the Basel Committee, at the World Bank, May 2009), in addition to acknowledging these failures, seems to be to say that they must improve on the use of each, even though how these improvements will occur – or why if known corrective measures were not previously implemented -- is not clear.

Both in academia and in the financial sector, there was no shortage of Basel critics and the related standards and codes in other subsectors. Focusing just on Basel, one group of critics was the Shadow Financial Regulatory Committee,<sup>5</sup> first of the U.S. and later joined by those in Europe, Japan, and Latin America, composed mostly of financial economists, many with experience in policy advisory work or banking. Many of the members of the U.S. group (e.g., Kane, Calomiris, Herring, and Kaufman) had been involved analyzing and/or reforming bank regulation in the wake of the U.S. Savings and Loan (S&L) Crisis during the 1980s. Not surprisingly, the official regulatory community espoused the public interest view of regulation (Shleifer, 2005; Barth, Caprio, and Levine, 2006), which assumes the existence

---

<sup>5</sup> For the various statements and papers by the Shadow Group, see <http://www.aei.org/raProjectHome?rapId=15>

of market failures but posits that government has the incentive and ability to correct them. Explicitly or implicitly, the Shadow groups' analysis was based on the private interest view of regulation, which also assumes the existence of market failures but argues that regulators will respond not just to the public interest but to their own private interests as well. Thus this school of thought recognizes the possibility of regulatory or political capture, and therefore the need for incentives to induce regulators to comply. This view also clearly recognized the incentives that bankers would have to exploit the safety net (Calomiris, 1997).

In the regulatory reform following the S&L crisis, the 'incentive' for regulators to take appropriate and timely action was a series of requirements that they intervene with increasingly severe measures as banks' net worth declined, with the goal of closing them while net worth was still positive.<sup>6</sup> However, not only was this system weakened in its implementation, compared with its original design, but also it relies on an accurate estimate of bank net worth. As noted below, securitization and the creation of off-balance sheet vehicles impaired the ability of creditors, bank supervisors, and even bank CEOs to understand their true exposure.

Another strand of the critique was based on cross-country empirical evidence, combined with a line of research showing the importance of the institutional environment in development broadly and finance in particular. Barth, Caprio and Levine (BCL, 2006) assembled a database for the World Bank on bank regulation around the world, and proceeded to construct indices of capital regulation, supervisory powers, private monitoring, and other variables, examining the extent to which these helped explain the development of the banking sector, its efficiency, its stability, the integrity (or its opposite, the extent of corruption) in banking, and the governance of banks. While not an evaluation of Basel II, which was not yet in operation, their first three independent variables correspond to the three pillars of Basel II. BCL found no robust influence of capital regulation or supervision

---

<sup>6</sup> This legislation is referred to as the Federal Deposit Insurance Corporation Improvement Act, or FDICIA. See Kaufman and Litan, 1993.

on any of the dependent variables, except that supervision was linked with a less developed and more corrupt banking system – neither variable influenced stability. On the other hand, private monitoring was associated with a more developed, more efficient, less corrupt, and better-governed banking system. The only variables that influenced stability were moral hazard (or the generosity of deposit insurance) and activity restrictions, both of which were bad for stability, and diversification requirements (or loan concentration limits), which exerted a positive effect on stability. Similar findings in securities markets were established by La Porta, Lopez-de-Silanes, and Shleifer (2006).

BCL also found that political institutions matter greatly in determining the type of regulatory system that countries adopt. Closed, relatively uncontested political systems are strongly associated with uncompetitive financial systems, an argument advanced conceptually and anecdotally by Rajan and Zingales (2004). BCL also explore the impact of the legal system and other factors that affect the contracting environment, and find that these institutions very much influence the way in which the same set of rules can operate in different countries. In short, in financial regulation one size does not fit all.

Notwithstanding these critics, the Basel movement in banking and the ‘standards approach’ in other areas of finance were very much in the lead in official circles at the IFIs, the BIS, Financial Stability Forum, and many governments. Although some in the regulatory community, notably Bill White and Claudio Borio at the BIS, and Ned Gramlich even earlier at the Fed, were actively warning of a buildup of problems well in advance of the crisis, active intervention into the financial system was not seen. Worse still, once the crisis began regulatory officials repeated on numerous occasions that it was merely a liquidity problem. Although regulators can usually be suspected of making statements to calm markets, this view, and not the problem that many banks had leveraged themselves to extremely high levels, seemed genuinely to be believed and was reiterated in private. The conclusion thus is that they believe that the Basel approach largely was working to keep the financial system

safe. Certainly some of the gaps in their knowledge was due to activities in the less regulated parts of the financial sector, but it later became clear to all that excessive leverage and risk taking were a problem in the commercial banking sector, the part that responsible regulatory authorities believed was fine, even overcapitalized! In truth, this sector was ‘over-risked!’

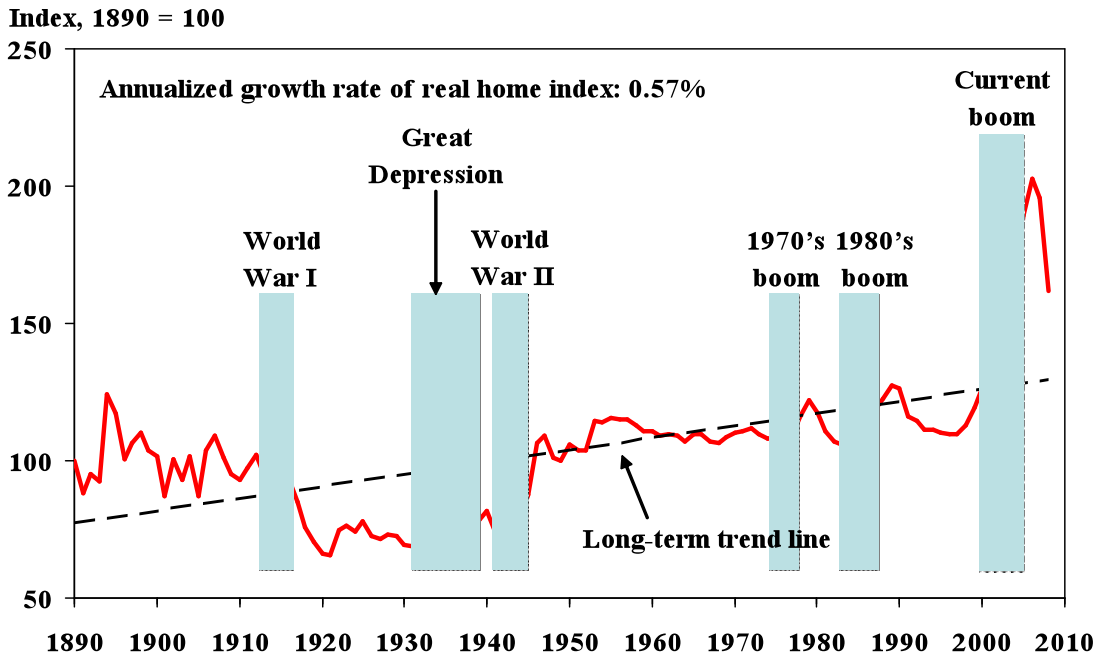
### **III. Key Features of the Crisis**

As a number of papers and books have examined the details behind the crisis that is officially dated as beginning in the summer of 2007, as well as some of the vulnerabilities that had been building up for several years, so this section will focus only briefly on the most important explanations, including some that have gotten short shrift.<sup>7</sup> First, consider the leading features behind the US crisis, beginning with the best known. As shown in Figure 1, housing prices had risen substantially relative to their long-term trend, as well as in comparison to incomes. This boom was accompanied by a large rise in the percent of mortgages that were securitized, as seen in the data for subprime mortgages (Figure 2), which was facilitated by an evisceration of down payment requirements – borrowers with no verifiable income and no assets could make a bet on the U.S. housing market with other people’s money and without recourse. In other words, ‘innovation’ allowed people to make a bet in which their downside loss was limited and much of which could be passed back to the banks and/or holders of securities. Overall, the percentage of U.S. mortgages that were securitized rose from zero in 1952 to 60% in 2008, according to Barth, et al. (2009), reflecting at least in some cases banks’ interest in getting high-risk loans off of their balance sheets.

---

<sup>7</sup> See in particular Barth, et al (2009); Brunnermeier (2009); Caprio, Demirguc-Kunt and Kane (2008); Gorton (2008, 2009), and Greenlaw, Hatzius, Kashyup, and Stein (2008).

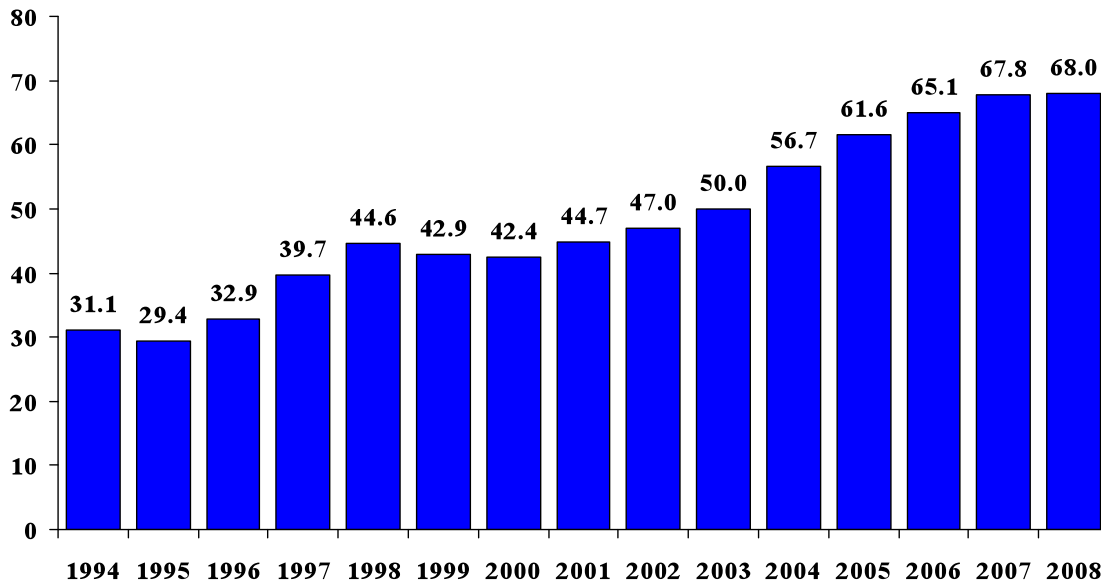
Figure 1: Housing Price Booms and Busts (1890–2008)



Sources: Barth, Li, Lu, Phumiwasana, and Yago (2009) and Shiller (2002). Note: The annualized growth rate is the geometric mean.

Figure 2: Mortgage Securitization, 1994– 2008

Percent of all subprime mortgages securitized since 1994



Sources: Barth, Li, Lu, Phumiwasana, and Yago (2009) and Inside Mortgage Finance. Note: Each bar represents the cumulative share of all subprime mortgage originations securitized starting in 1994 and continuing through the third quarter of 2008.

However, although it is common to speak of the current episode as a subprime or even a housing crisis, it is more accurate to say that it is an information and incentive crisis. Prior to the recent real estate boom, mortgage securities had been simpler instruments, and to the extent that they were held by banks, they were more likely to be held on balance sheet – especially before Basel I – as there was little use of risk weighting for capital ratios, and much less use of derivatives. Securitization was an important factor in the destruction or obscuring of information and the weakening of incentives in the banking sector; banks had less motivation to exert due diligence -- including even gathering information -- in the loan approval process to the extent that there was a higher probability that they would be selling loans almost immediately.<sup>8</sup> Indeed, no documentation loans, which are difficult to comprehend in the absence of securitization, represent a clear loss of information. Worse still, ‘NINJA loans’ or loans with no documentation of income, jobs, and assets promised that the banks would take the borrower’s word for any information that they recorded – yet these were soon dubbed ‘liar’ loans, and were associated with a purported growth in the 6-figure incomes of those with no apparent marketable skills. Also the use of loan brokers increased dramatically, and these institutions retained virtually none of the credit exposure and essentially were unregulated. Not surprisingly, many of the worst loans originated from such brokers, especially independent brokers with little reputational risk at stake. In short, there were a number of blatant warning signs that incentives had been perverted in favor of absurd risk-taking, yet few regulators were noticing, much less acting on these developments.

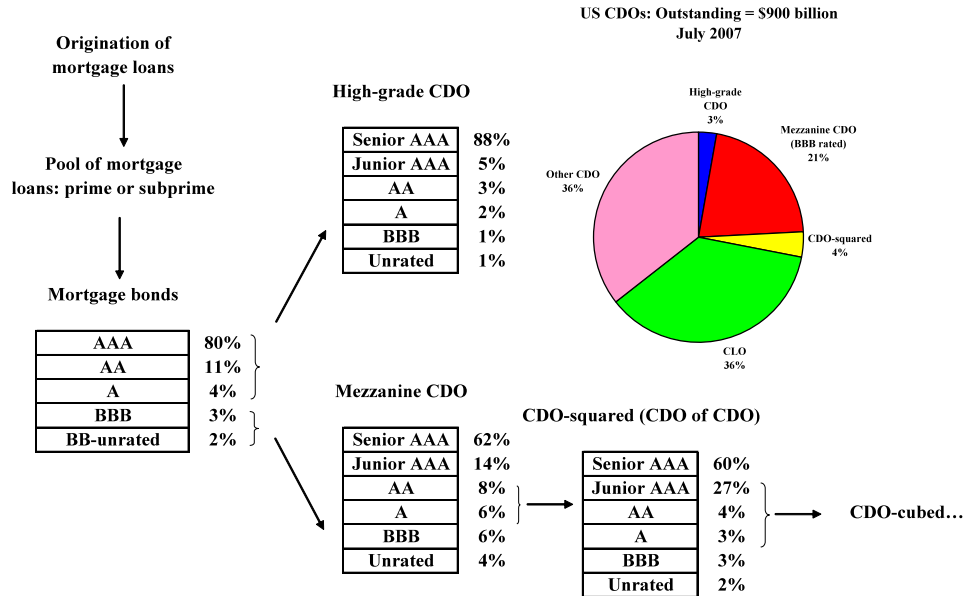
The complex nature of securitization, combined with the growth of off-balance sheet Structured Investment Vehicles (SIVs), which were invented to evade regulatory requirements), then contributed to a serious deterioration in the quality of information that was available. Mortgages and other securities were pooled together and then sliced and diced into various tranches in complex Collateralized Debt Obligations (CDOs), best

---

<sup>8</sup> It is important to note that securitization had been in existence literally for millennia – with evidence in Goetzmann (2009) that loans were bought and sold as early as around 2000 B.C.

summarized here in Figure 3 (from Barth, et al, 2009), in which even the presence of securities of dubious quality do not prevent a high rating. Indeed, the CROs were

**Figure 3: The Securitization Process**



*Note:* The equity tranche absorbs approximately the first 3 percent of credit losses in a portfolio. Losses then affect the mezzanine tranches; the first of these commonly covers the next 3 percent of losses up to 6 percent. Additional tranches can also be created to cover losses up to 12 percent, beyond which the losses begin to hit senior, AAA-rated tranches. Both first and second mortgages can be securitized in a similar fashion.

functioning as consultants in the packaging process, notwithstanding a clear conflict of interest. Conveniently (at the time), their models did not take account of the change in the population of borrowers – home ownership was expanding to a record high, and many had never owned a home previously. Nor did the CROs account for the fact that many of the underlying mortgages were adjustable rate instruments, that many had artificially low initial (or ‘teaser’) rates, and that with interest rates at or near record lows, the market risk born by borrowers would be converted into a highly correlated credit risk as and when interest rates rose. Yet for many borrowers, significant interest rate increases were guaranteed, and likely to be substantial, which explains the high rates of default among relative new loans (Greenlaw, et al 2008). Thus securitized packages of these new types of mortgages, rather than diversifying risk the way a diversified bundle of corporate securities would, instead they

manage to hide and concentrate systemic risk.<sup>9</sup> Some suggest that these were oversights or mistakes by the CROs. However, that they were being paid incredibly well for these mistakes, and that employees were told not to raise objections (Lowenstein 2008) suggests that it was incentives and not ignorance that is blameworthy.

Purchasers of these complex securities were mollified by their often-high ratings, and asked few questions about the underlying assets. The ebullient atmosphere pervading credit markets up until late 2006/early 2007, combined with the sanctioning of the CROs by the SEC (their status as Nationally Recognized Statistical Readings Organizations, or NRSROs), led many purchasers to acquire the securities without asking questions about their quality. As the quality of subprime, and later alt-A and even prime mortgages began to be doubted, it proved virtually impossible to sell the securities, or to determine their proper valuation. Even without delving into the complex nature of financial markets, replete with complicated securities and derivatives, the loss of information became painfully evident when the crisis broke out, as interbank markets essentially shut down. In past crises, including during the Great Depression, runs on banks for the most part were selective; except for the brief period in early 1933 when the run essentially was on the dollar, it was the riskiest banks that suffered from the runs (Calomiris and Mason, 2003). In recent decades, ‘plain-vanilla’ local banks generally were able to get access to the interbank market, as they were known overwhelmingly to be holding local mortgages and auto loans – so as long as the local market was not seeing a sharp rise in defaults, these institutions were expected to be in good condition. However with derivatives and securitization, in the current crisis, it was difficult for anyone to be sure exactly what their exposure was, much less how to value it, so when risk premia rose in 2007 and subsequently reached all-time high in September 2008 virtually all banks were cut off from their hitherto dependable sources of liquidity. Although banks

---

<sup>9</sup> See Coval, Jurek, and Stafford for an excellent overview of structured finance and in particular their discussion as to how even slight imprecision in the estimates of the properties of AAA-rated CDOs can lead to a greater than expected likelihood of default.



used to hold liquid assets on their balance sheets, competition for funds and for shareholder returns had long since led to a much greater dependence for liquidity on market sources.

The informational collapse guaranteed a retrenchment of lending and a severe crisis, yet as the standard macro models did not model well this process, not surprisingly they missed the turning point and the depth of the recession.

Dramatic changes in compensation in financial services, which were evident in the large percentage increase in financial services in GDP, contributed as well to the boom in securitization on the supply and demand sides (Table 1). As noted at a number of the elite colleges and universities, some of the best students of the last 10-15 years increasingly were taking jobs in finance as a result of the generous compensation packages. Not included in these data are the legions of real estate brokers earning 6- and even 7-figure incomes by pushing sophisticated financial products on relatively unsophisticated borrowers. Nor does it include the significant sums of money accruing to the CROs. Moreover, Philipon and Reshef (2009) show that looking over the 1909-2006 period, U.S. financial services went from a high wage, high skilled sector in 1909-1933 to an average wage sector from the latter date until 1980 and then moved back to its earlier standing. They even argue that the regulatory failures of the 1930s and the current crisis could not have been helped,

**Table 1. Value-Added, Finance and Insurance  
(% of GDP)**

	1981	1985	2001	2006
<b>Finance and Insurance</b>	4.9	5.4	7.7	8.1

Source: U.S. Department of Commerce Bureau of Economic Analysis

in that the financial services industry opened up a significant skill gap compared with the regulatory community. Goldin and Katz (2008) support the anecdotal evidence that

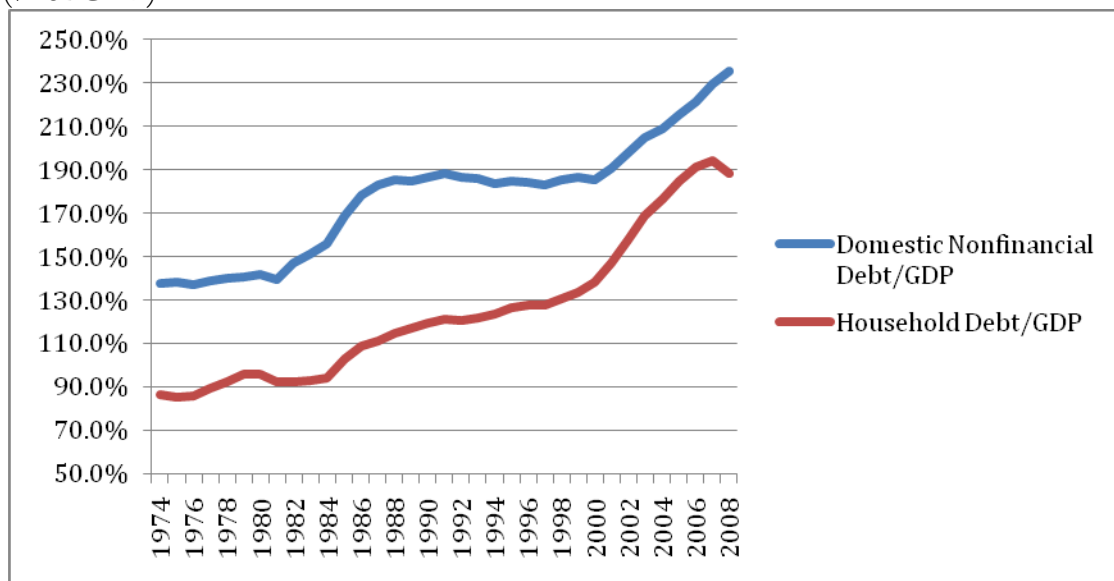
increasing numbers of talented undergraduates at elite universities were responding to increasing wages by moving to the financial sector with a more formal study. Indeed, one can tell a story in which an increase in financial innovation led to a shift of more talented and skilled people to the financial services industry, increasing the skill gap compared with the regulators, and that eventually innovation went from a net positive, improving resource allocation and growth, to a negative form. Michalopoulos, Laeven, and Levine (2009) have a nice model of financial innovation that lends itself to such a view, as financial innovation in their framework occurs with a monopoly on information by the innovators. Protecting information about their products also can facilitate risk-taking, so if 'bad' financial innovation is better compensated than 'good' innovation, more of the former will be produced.

In commercial and investment banks, as well as insurers like AIG, compensation in some units was tilted heavily in favor of current returns, with less attention paid to risk. As Rajan (2005) presciently argued, managers increasingly were being paid for 'alpha,' a return that they were supposedly earning over the risk-free rate of interest, but in fact they were really taking on more market risk that they disguised as alpha. To be sure, Fahlenbrach and Stulz (2009) find that bank CEO incentives cannot be blamed for the credit crisis, as their incentives seemed to be aligned with the interests of their shareholders. However, this research, and the widely noted example that the CEO of Lehman suffered a \$1 billion loss when that firm failed, only consider the incentives of CEOs, and fail to examine those of the many people who were authorized to take risks on behalf of the various intermediaries. A similar example is the case of Enron: although the former CEO, Kenneth Lay, suffered substantial financial losses when that firm failed, he had been overseeing a system of compensation that was systematically rewarding short-term risk-taking. Although many employees ultimately suffered, a handful made absolutely phenomenal sums of money, passing the risks onto others. The former head of the financial products group at AIG

appears to have done the same in the current crisis. Theory suggests that officers of firms with declining or negative net worth will cut back on their effort, which was consistent with the behavior of the CEO of Bear Stearns, who apparently spent the week before that firms' closure at a bridge tournament. Loan brokers and securitizers were earning high fees for generating and packaging mortgages without regard to risk, and fund managers in institutions around the world, thanks to pay packages that rewarded them on the basis of the return on their portfolios, were eager to buy them. The fact that rates of return on CDOs were above those on similarly rated securities should have been a red light, indicating that the securities entailed higher risks, but decidedly few were paying attention.

Higher consumption was popular, even among those without the incomes to support it. Although it is common to describe this crisis in the United States with the label, 'subprime,' in fact it was a generalized bubble; subprime and alt-A mortgages only peaked at one-third of total originations. As seen in Figure 4, there was a general explosion of debt, as

**Figure 4. U.S. Household and Nonfinancial Debt**  
(% of GDP)



Source: Federal Reserve Flow of Funds Data

consumers increasingly use their supposed gains in housing wealth as collateral to finance a consumption boom. This was done both with home equity loans, and by refinancing at

seemingly attractive interest rates. Amazingly, former Fed Chairman Greenspan recommended adjustable rate mortgages when interest rates were at or near historical lows (“Federal Reserve Chairman Alan Greenspan said Monday that Americans' preference for long-term, fixed-rate mortgages means many are paying more than necessary for their homes and suggested consumers would benefit if lenders offered more alternatives.” USA Today, February 23, 2004). The slight downturn in household debt in 2008, which was more than offset by an expansion in government debt, is the beginning of a deleveraging process that likely will take years and will act as a drag on the U.S. economy.

Another aspect of the boom was the growth in leverage in the financial sector, with major commercial and investment banks attaining peak leverage ratios (total assets/shareholder equity) of 13 to 34 (according to Barth, et al, 2009). However, even these high figures do not include the significant ‘assets’ and slight amounts of equity that banks held in their SIVs, which likely would have most boosted the leverage ratios of the commercial banks. The latter’s on-balance sheet leverage ratio peaked at the low end of this range (13 to 19), as they faced differential risk weights, as a result of Basel I, that induced them to securitize and move off their balance sheet mortgages and other higher-risk weighted assets. From 1975-2003, investment banks were limited in their ability to leverage themselves (a debt to net capital limit of 12 to 1), but this was repealed by the SEC in 2004, allowing the top 5 investment banks to increase their leverage to 30 or 40 to 1.

This last issue reveals yet another key feature of U.S. regulation, namely its uneven features. For example, commercial and investment banks were competing against each other in certain business lines, but were regulated differently by different entities. Commercial banks could shop for a regulator of their choice, within some limits, they could be regulated by the state, by the Federal Reserve as a state bank or as a member of the Federal Reserve,

or by the Office of the Comptroller of the Currency.<sup>10</sup> The easier regulation of investment banks, moreover, allowed them to grow certain businesses faster in the boom economy, earn greater profits, and pay higher compensation, which in turn put pressure on compensation in commercial banks. And hedge funds, facing essentially no regulation, contributed to these pressures as well. Moreover, to some extent some financial firms were allowed to shop for their regulator, as in the case of AIG, which owned an S&L and thus at the federal level was only supervised by The Office Thrift Supervision – in effect, the supervisory agency with the least skill on complex financial products was supervising credit default swaps (CDS).<sup>11</sup>

Regulatory loopholes also could emerge as financial innovation proceeded while regulation remained static. Thus as banks began forming SIVs to hold securitized instruments, U.S. regulators apparently accepted that the banks did not stand behind their SIVs and regarded them as independent entities as long as they met certain tests (having small direct ownership links, independent corporate officers, etc), even though it was regarded as conventional wisdom in the markets that ‘the only securitization that a bank does not stand behind is its last.’ Interestingly, Canadian authorities did not give their banks capital relief for moving assets off their balance sheets in this form, which likely was an important factor in explaining the relative health of the Canadian system. Canadian borrowers also faced full recourse for the mortgage loans, meaning that they could not easily walk away from their housing debt, and down payments of less than 20-25% entailed taking out expensive mortgage insurance.<sup>12</sup>

---

<sup>10</sup> Thus Colonial Bank, expected to become the largest bank failure of 2009, deliberately expanded into rapidly growing areas, and by 2006 had 41% of its portfolio in construction, and 28% in commercial real estate, with much of both in Florida, among the worst hit states in the housing crisis. Colonial had moved from being a state-regulated entity in 2003 to the federal level, given the then prevailing deregulatory environment, only to switch back to the state level in 2008, presumably as federal regulators finally became concerned.

<sup>11</sup> The ‘plain vanilla’ insurance business of AIG was supervised at the state level.

<sup>12</sup> Some maintain that Canadian bankers, operating in a less competitive environment, as less innovative and/or more conservative. Also, Ratnovski and Huang (2009) show that Canadian banks enjoyed a greater reliance on funding with deposits (itself perhaps due to a less competitive financial services industry) and higher liquidity, which help them weather the crisis.

Government officials contributed to the crisis by encouraging subprime lending in a variety of ways. First, it was the policy of several administrations and Congress to encourage home ownership, via the tax deductibility of mortgage interest and the policies of Fannie Mae and Freddie Mac (both Government Sponsored Entities, or GSEs) in buying mortgages and mortgage securities. However, it is important to note that these institutions pulled back from lending in 2004 due to regulatory concerns about their accounting practices, and expansions in their holdings was restrained. Their retreat from this market and the interest by the large banks in stepping up their securitization activities (partly in preparation for Basel II), led them rapidly to expand their activities. Moreover, while the GSEs could not purchase subprime mortgages, they were allowed to purchase highly-rated mortgage-backed securities, a loophole that the banks exploited, and were themselves required to meet specific goals for funding housing in low and moderate income and underserved areas. Second, and perhaps most disturbingly, although it is understandable that elected officials were encouraging housing and easy lending standards, even the Federal Reserve System was on record, in an otherwise reasonable attempt to ensure equality across races and classes in access to credit, as suggesting that banks needed to be innovative in their support of housing. Consider these examples from one of their reports (Federal Reserve Bank of Boston, 1996, 2003):

- “Special consideration could be given to applicants with relatively high obligation ratios who have demonstrated an ability to cover high housing expenses in the past. Many lower-income households are accustomed to allocating a large percentage of their income toward rent. While it is important to ensure that the borrower is not assuming an unreasonable level of debt, it should be noted that the secondary market is willing to consider ratios above the standard 28/36.” (p. 13)
- “Policies regarding applicants with no credit history or problem credit history should be reviewed. Lack of credit history should not be seen as a negative factor. Certain cultures encourage people to “pay as you go” and avoid debt.” (p. 14)
- “Management should be aware that Fannie Mae and Freddie Mac have issued statements to the effect that they understand urban areas require different appraisal methods. Accordingly, it may be advantageous to use the services of appraisers with experience in conducting appraisals in minority and lower-income neighborhoods. Management should consider having all appraisal reports that would cause an

application to be denied reviewed by another experienced appraiser.” (p. 22)

- “Management should be aware of any differences in standards used by private mortgage insurance companies. If a private mortgage insurance company refuses to issue insurance on a particular loan, the financial institution may wish to have another reputable company review the application. Lenders should question any differences that arise from the review process and consider the results when determining which private mortgage insurance companies they use. In addition, financial institutions may wish to work with private mortgage insurance companies that have demonstrated a commitment to minority and lower-income applicants.” (p. 22-23)

Coming from the regulator, these statements certainly could be interpreted as encouraging banks to be aggressive in their mortgage lending, a position that no regulator should take – and if taken, clearly should be abandoned when debt/income levels are setting records! Yet the document containing these statements remains available on the Federal Reserve Bank of Boston’s website.

In sum, the story of the U.S. crisis was of a regulatory system that was functioning well in the mid-1990s and surviving some significant shocks. By the early- to mid-2000s, significant financial innovation, record compensation, troubling debt levels and substantially higher housing prices were all part of a long boom that were interrupted only by a mild recession, supporting a belief that the central bank would not allow a significant downturn. Rather than an appropriate adaptation of regulation, the U.S saw a relaxation of regulation and its enforcement.

In addition to the aforementioned factors behind the boom and bust in the U.S., the current crisis was international in scope, not just as a result of foreign institutions buying up CDOs – and over half of U.S. mortgages were held abroad, as of 2007, so this effect was not insignificant – but also through reckless lending and housing and asset bubbles of their own. Interestingly, countries such as Iceland, Ireland, Spain, and a number of Eastern European countries, notably Latvia, Estonia, and Lithuania, did not see a boom in securitization, but they did experience significant asset bubbles and a fundamental change in incentives in the financial sector that rewarded risk taking. These diverse countries shared a generalized

bubble environment, in which liquidity was available for long periods of time and allowed the funding of a number of risky bets – from mortgages in foreign currency in some Eastern European countries to 100% or greater loan to value mortgages in Ireland, Iceland, and other places. As Hyman Minsky would have put it, the most important fact that these diverse countries shared is his theory that stability breeds instability – precisely by an explosion of new ways to take on risk. The lessons for regulation, to which we now turn, similarly should have much in common.

#### **IV. Towards more dynamic regulation**

"If you entrench yourself behind strong fortifications, you compel the enemy  
to seek a solution elsewhere." von Clausewitz

Good news always is refreshing after its opposite. So after the bad news of the last section, it is refreshing to be able to say that the fiscal cost of the crisis of 2007-2009 must be zero, at least in the United States. No, this is not an efficient markets hypothesis (EMH) argument that bubbles do not exist and therefore they cannot burst, ergo no cost. Rather it is an appeal to the fact that the U.S. already had a regulatory framework -- prompt, corrective action and structured early intervention -- embedded in the FDICIA legislation requiring that supervisors would have to intervene with increasing severity as banks' net capital position decline to below 10% of assets, and ultimately that banks would be closed when net capital dropped to 2%. Consequently, the US government must have intervened while banks' net worth was positive, and therefore the fiscal cost of the crisis must be zero as conventionally measured. In fact, thanks to FDICIA, apparently the last 2+ years were just a figment of our imagination!

The purpose of this argument is not to convince the reader that the author was using a controlled substance while writing the above paragraph, but rather to underline the



importance, in ANY discussion of regulatory reform, of asking the question: what happened to the FDICIA legislation? Why did it breakdown? If the reasons for its failure are not fully understood, then any reforms might be insufficient or even counterproductive. One early criticism of the system of structured, early intervention, at least for developing countries, was that it required a sufficiently strong information environment and sufficiently skilled, independent supervisors operating in a regulatory system characterized by a low degree of corruption, so that banks' net capital position could be observed in a timely fashion AND that supervisors would intervene while net worth was still positive (Caprio, 1997). What we apparently discovered in the most recent crisis is that the information and incentive system in U.S. regulation became as flawed as that in many developing countries during the 1980s and 1990s. The rationale for prompt, corrective action was to remove the discretion that supervisors used to delay confronting the U.S. Savings and Loan crisis. Yet it should be evident in this crisis that the forces for inaction are much stronger. The public does not know what regulators knew and when they knew it. For example, did Federal Reserve supervisors believe that the assets sitting in Citibank's SIVs genuinely were off-balance sheet, ignoring both outright guarantees and reputational risk? Did they not consider whether securitized assets could come back onto Citi's balance sheet? Why did supervisors ignore this off-balance sheet risk? Are Philipon and Reshef (2009) correct that the private sector had built up a skill advantage, so that regulators did not understand the risks – in effect that their skills were built for an earlier era and not suited to understanding complex securities? Or were they sounding alarms that were being ignored? It is clear from a number of examples (e.g., AIG, Colonial Bank)<sup>13</sup> that regulatory loopholes, including the ability of entities to choose their regulator, were one part of the crisis in the United States. However, it should be noted that the crisis was severe in countries such as Ireland and the United

---

<sup>13</sup> In the case of AIG, its most financial products group, which was actively writing credit default swaps, was regulated by the Office of Thrift Supervision, with its narrower insurance business under the authority of state regulators. See the above mention of the regulatory arbitrage practiced by Colonial Bank.

Kingdom, which did not suffer from the abundance of regulatory authorities seen in the U.S. Moreover, the history of regulation, beginning with prohibition of charging interest and the ensuing creation of bills of exchange (a clever way to pay interest, among other features), has been characterized by regulatory arbitrage, or the boundary problem (where regulated activities are constrained within a boundary, they tend to move outside that boundary, whether geographical or sectoral).

Consequently, regulatory reformers need to recognize that the financial system changed significantly since the mid-1990s and that the regulatory system, which had proved adequate to cope with the shocks of the 1990s, failed to adjust. As argued above, the quality of available information declined markedly and incentives change dramatically from that earlier time. Consequently, several elements of a regulatory reform program stand out. First, there needs to be a way to ensure that the regulatory system will be dynamic, that is, that it will respond to changes in the financial sector, as static regulation confronting a changing financial system is a recipe for periodic crises. Since it is too difficult in a democracy to get serious reconsideration of financial regulation (and legislative bodies and the public exhibit a low degree of financial literacy), rather than to rely on periodic reconsiderations of the legislative framework, there needs to be a way to ensure some adaptability of the regulatory system. Second, an overall focus of regulation should be on the information environment and incentives, both of market participants and regulators. The information that is available to the public, meaning both shareholders and current and potential creditors, is paramount. Supervision, at least in most countries with the exception of New Zealand, has been cast as the first line of defense against unsafe and unsound banking practices, and therefore has concentrated on the types of information that banks need to make available to supervisors. In many countries there are legal restrictions on the information that supervisors in turn can divulge to the public.

This orientation needs to be turned around completely for several reasons. First, information asymmetries between bank management and all other actors -- shareholders, depositors and other creditors, and supervisors – are severe, and bankers (and apparently supervisors as well) have every incentive to keep information as private as possible. Second, supervisors have had no financial incentives, or other effective inducements, to ensure that they would act in society's best interest. Even if supervisors are given better financial incentives, as recommended below, due to the severity of the information problem they still need as many allies as possible in the battle to see through to the risks that banks are taking. Third, there is little hope of holding supervisors accountable if adequate information about the banking system is unavailable; in short the public needs to know what supervisors know. It would be useful to debate whether any information should be withheld by the supervisor; it is difficult to see how accountability would operate if some information is restricted under exceptional circumstances, because exceptional circumstances can always be invoked.

Thus, rather than argue for the superiority of markets or official supervision, the current crisis demonstrates that both failed and society should want improvements in both areas, as the costs of failure are so large. BCL's recommendation was to emphasize the potential complementarities between official supervision and market discipline, with supervisors focusing on bank entry, information disclosure, and exit, and markets being given the information and incentives to monitor banks effectively. This approach is very different from that taken by the Basel Committee, which envisages giving supervisors more powers (pillar 1) and more discretion (pillar 2) to take the lead in banking system oversight. Yet most industrial countries have been on a path to the ever-increasing reach of supervisors for some time in the commercial banking system and still were hit by the worst crisis in decades. A change of strategy is in order, and certainly, given both the BCL finding on the lack of any positive impact of supervisory powers and performance in the crisis, a reconsideration of the knee-jerk reaction to increase supervisory powers is in order.

The most radical part of this change is the use of financial incentives for regulators. To be sure, experimentation with bureaucratic incentives and requirements might be useful notwithstanding the failure of FDICIA. However, financial incentives are the most straightforward way to align supervisory incentives with those of the public whose welfare is to be protected. More generous and better structured compensation would help avoid the occurrence of the skill gaps between regulators and regulatees, noted above. As was characteristic of the Suffolk Banking system in 19<sup>th</sup> century New England (Calomiris and Kahn, 1996), and as argued in the Becker-Stigler approach to compensating law enforcement officials, supervisors should receive a good basic pay package but an especially generous 'bonus,' or deferred compensation package, such as a pension, that would be paid after employment as a supervisor ceased and which could be reduced to the extent that supervisors did not adequately do their job. In this model, their job would be simpler than it is now, as just noted, so it would presumably be easier to see ex post if they were concealing information that should have been disclosed. Supervisors' lack of response to market signals (a rise in the cost of funding for banks taking on more risk) would be evident contemporaneously.

The difficulty with this solution is that, following unprecedented extensions of the government safety net supporting the financial system, market participants would need to be convinced that governments would not bail out creditors, including uninsured depositors. It may be that the burdensome levels of public sector debt being taken on in some countries will help make a change in policy more credible, but it will not be easy, for the usual time consistency reasons. Perhaps the most convincing way to implement a change would be to remove the greatest temptation to intervention, namely the too big to fail policy that has been apparent. An increasing tax on the size of financial intermediaries is one way to accomplish this, though extending this policy as intermediation activities spread to other sectors will be a challenge. A lengthier consideration of this idea is beyond the scope of this

paper, but as Feldman and Stern (2004) argue, forcing uninsured creditors to take losses when large banks fail has to be a significant part of the solution.

An alternative to these recommendations could be to scrap the financial safety net entirely and thereby strengthen market forces in the financial system (Hetzl, 2009). In addition to the usual arguments about the ability of the unsophisticated to protect themselves (an argument that will be made more strongly thanks to the losses sustained by small shareholders and pensioners in the current crisis), such a move seems entirely out of the realm of the possible in high-income countries today. However, continuing on the road to Basel, with commitments to do better coupled with more supervisory powers, surely is not the way to reform financial sector regulation. Military strategists, recognizing the wisdom of von Clausewitz's quote above, have abandoned fixed and 'impregnable' lines of defense for a more dynamic approach. Is it not time for financial sector reformers to do the same?

## References

- Basel Committee on Bank Supervision, 2006. "Core Principles for Effective Banking Supervision," Bank for International Settlements, <http://www.bis.org/publ/bcbs129.pdf?noframes=1>.
- \_\_\_\_\_, 2006a. "Core Principles Methodology," Bank for International Settlements, <http://www.bis.org/publ/bcbs130.pdf?noframes=1>.
- Barth, James R., with Tong Li, Wengling Li, Triphon Phumiwasana, and Glenn Yago, 2009. *The Rise and Fall of the US Mortgage and Credit Markets: A Comprehensive Analysis of the Market Meltdown*, New York: John Wiley and Sons.
- \_\_\_\_\_, Gerard Caprio, Jr., and Ross Levine. 2006. *Rethinking Bank Regulation: Till Angels Govern*. New York: Cambridge University Press.
- Becker, Gary S. and Stigler, George J., (1974) "Law Enforcement, Malfeasance, and Compensation of Enforcers," *Journal of Legal Studies* 3: 1 – 18.
- Brunnermeier, Markus, K, 2009. "Deciphering the Liquidity and Credit Crunch 2007-2008," *Journal of Economic Perspectives*, Winter, Vol. 23, Number 1.
- \_\_\_\_\_, Andrew Crockett, Charles Goodhart, Avinash Persaud, and Hyun Shin, 2009. "The Fundamental Principles of Financial Regulation," *Geneva Reports on the World Economy*, 11.
- Calomiris, Charles, 1997. *The Postmodern Bank Safety Net: Lessons from Developed and Developing Economies*, The AEI Press, Washington, D.C.
- \_\_\_\_\_, and Charles Kahn, 1996. "The Efficiency of Self-Regulated Payments Systems: Learning from the Suffolk System," *Journal of Money, Credit and Banking*, Blackwell Publishing, vol. 28(4), pages 766-97, November.
- Calomiris, Charles, and Joseph Mason, 2003. "Consequences of Bank Distress During the Great Depression," *American Economic Review*, 93:3, June, 937-947.
- Caprio, Gerard, 1997. "Safe and Sound Banking in Developing Countries: We're Not in Kansas Anymore," in George Kaufman, editor, *FDICIA: Bank Reform Five Years Later and Five Years Ahead*, Greenwich, Connecticut: JAI Press, December 1997.
- \_\_\_\_\_, 2009. "Safe and Sound Banking: A Role for Countercyclical Regulatory Requirements?" mimeo, Williams College.
- Caprio, Gerard, Asli Demirguc-Kunt, and Edward Kane, 2008. "The 2007 Meltdown in Structured Securitization: Searching for Lessons not Scapegoats," World Bank Policy Research Working Paper 4756, November.
- Demirguc-Kunt, Asli, and Ross Levine, 2009, "Finance and Inequality: Theory and Evidence," *Annual Review of Financial Economics* 1, Palo Alto, CA, forthcoming.
- Fahlenbrach, Rudiger, and Rene Stulz, 2009. "Bank CEO Incentives and the Credit Crisis," mimeo, <http://www.cob.ohio-state.edu/fin/faculty/stulz/>.

- Federal Reserve Bank of Boston, 1996, 2003. "Closing the Gap: A Guide to Equal Opportunity Lending,  
<http://www.bos.frb.org/commdev/commaff/closingt.pdf>.
- Feldman, Ronald, and Gary Stern, 2004. *Too Big to Fail: The Hazards of Bank Bailouts*, Washington, D.C.: The Brookings Institution.
- Goetzmann, William, 2009. "Financing Civilization," mimeo, Yale University,  
<http://viking.som.yale.edu/will/finciv/chapter1.htm>.
- Goldin, C., and L. F. Katz, 2008. "Transitions: Career and Family Lifecycles of the Educational Elite," AEA Papers and Proceedings.
- Gorton, Gary, 2009. "Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007," Paper prepared for the Federal Reserve Bank of Atlanta's 2009 Financial Markets Conference: Financial Innovation and Crisis, May 11-13, 2009, mimeo.
- \_\_\_\_\_, 2008. "The Panic of 2007," mimeo,
- Greenlaw, David, Jan Hatzius, Anil K Kashyap, Hyun Song Shin, 2008. "Leveraged Losses: Lessons from the Mortgage Market Meltdown," paper prepared for US Monetary Policy Forum Conference," February.
- Guttentag, J.M. and R.J. Herring. 1986. "Disaster Myopia in International Banking." *Princeton Essays in International Finance*, No. 164, September.
- Hetzl, Robert, 2009. "Should Increased Regulation of Bank Risk-taking Come from Regulators or from the Market?" Federal Reserve Bank of Richmond *Economic Quarterly*, Vol 95, Spring, 161-200.
- Kaufman, George, and Robert Litan, 1993. "Introduction and Summary," in Kaufman and Litan, eds., *Assessing Bank Reform: FDICIA One Year Later*, The Brookings Institution.
- LaPorta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2006. "What Works in Securities Laws?" *The Journal of Finance*, Vol. LXI, February.
- Levine, Ross. 1997. "Financial Development and Economic Growth: Views and Agenda." *Journal of Economic Literature*, 35, pp. 688–726.
- Levine, Ross. 2004. "Napoleon, Bourses, and Growth: with a Focus on Latin America," in *Market Augmenting Government: Essays in Honor of Mancur Olson*. Azfar Omar and Charles A. Cadwell, eds. Ann Arbor, MI: University of Michigan Press.
- \_\_\_\_\_, Alexey Levkov, and Yona Rubenstein, 2009. "Racial Discrimination and Competition," mimeo, Brown University, [http://www.econ.brown.edu/fac/Ross\\_Levine/Publications.htm](http://www.econ.brown.edu/fac/Ross_Levine/Publications.htm).
- Lowenstein, Roger, 2008. "Triple-A Failure. *New York Times*, April 27.
- Persaud, Avinash, 2000. "Sending the Herd off the Cliff Edge." *World Economics* 1(4): 15-26.
- \_\_\_\_\_, 2009. "The rise and apparent fall of macro-prudential regulation," VoxEU,

<http://www.voxeu.org/index.php?q=node/3694>.

Philippon, Thomas, and Ariel Reshef, 2009. “Wages and Human Capital in the U.S. Financial Industry, 1909-2006,” NBER Working Paper 14644, January.

Rajan, Raghuram, 2005. “Has Financial Development Made the World Riskier?,” Federal Reserve Bank of Kansas City, Proceedings of the Jackson Hole Conference, <http://www.kansascityfed.org/publicat/sympos/2005/sym05prg.htm>.

\_\_\_\_\_ and Luigi Zingales, 2004. *Saving Capitalism from the Capitalists: Unleashing the Power of Financial Markets To Create Wealth and Spread Opportunity*, Princeton: Princeton University Press.

Ratnovski, Lev, and Rocco Huang, 2009. “What Are Canadian Banks More Resilient?” IMF Working Paper WP/09/152.

Reinhart, Carmen, and Kenneth Rogoff, 2008. “This Time is Different: A Panoramic View of Eight Centuries of Financial Crises,” mimeo, [http://www.economics.harvard.edu/files/faculty/51\\_This\\_Time\\_Is\\_Different.pdf](http://www.economics.harvard.edu/files/faculty/51_This_Time_Is_Different.pdf)

Rogoff, Kenneth, 2009. “Why we need to regulate banks sooner, not later,” Op-ed, The Financial Times, August 18, [http://www.ft.com/cms/s/0/c2d523c0-8c21-11de-b14f-00144feabdc0,dwp\\_uuid=81377dd2-0733-11de-9294-000077b07658.html](http://www.ft.com/cms/s/0/c2d523c0-8c21-11de-b14f-00144feabdc0,dwp_uuid=81377dd2-0733-11de-9294-000077b07658.html).

Shleifer, Andrei, 2005. “Understanding Regulation,” *European Financial Management*, Vol 11., No. 4., 439-451.

Tett, Gillian, 2009. *Fool's Gold: How the Bold Dream of a Small Tribe at J.P. Morgan Was Corrupted by Wall Street Greed and Unleashed a Catastrophe*, New York: Simon and Schuster.

Tversky, Amos and Daniel Kahneman, 1981. “The Framing of Decisions and the Psychology of Choice,” *Science*, New Series, Vol. 211, No. 4481, pp. 453-458.