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## Leverage, System Risk and Financial System Health: How Do We Develop a Healthy Financial System?

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### 2.1 Introduction

The subprime crisis of 2007–2009 was the most devastating financial crisis since the Great Depression, cost the US economy trillions of dollars (see Atkinson, Luttrell and Rosenblum, 2013) and caused significant economic stress worldwide.<sup>1</sup> In response, new financial-market regulations were adopted in many countries, including the Dodd-Frank Act in the US, which is a massively complex piece of legislation that touches most financial intermediaries in significant ways and imposes a host of new proscriptions and requirements on all sorts of intermediaries. Moreover, the crisis also required unprecedented government intervention in the financial market and the real economy, with the issuance of *ex post* guarantees against failure to a multitude of *a priori* uninsured investors and institutions, in order to stave off a complete collapse of the financial system. While there is much debate over whether the regulatory interventions were the appropriate ones (see Thakor (2013c) for a detailed discussion), these interventions raise concerns about potential moral hazard insofar as expectations of future bailouts may influence present behaviour, and greater political involvement in the functioning of credit markets (see Song and Thakor, 2012).

Now that the dust has settled, it is time to reflect on two important questions: (1) what caused this crisis? And (2) what does a healthy financial system – one not prone to periodic bouts of systemic crises – look like?



In this chapter, I briefly discuss my views on these two issues. Since a large number of papers and books have been written on this crisis, my response to the first question will be somewhat brief, and I will refer the reader to some review papers on the subject. On the second question, my thoughts are somewhat preliminary and are intended to provide stimulus for future research.

The rest is organized as follows. Section 2.2 addresses the question of what caused this crisis. Section 2.3 proposes some simple steps that could be taken to build a healthy financial system. Section 2.4 concludes.

## 2.2 What caused this crisis?

The standard view is that this crisis, like many before it, was caused by misaligned incentives at many levels. Financial intermediaries took excessive risks due to *de jure* and *de facto* safety nets (e.g., Bebchuk and Fried, 2010; Farhi and Tirole, 2012), regulators were lax and permitted this due to incentive misalignment with taxpayers (e.g., Barth, Caprio and Levine, 2012; Kane, 1990), and politicians blocked ‘sensible’ regulation (e.g., Stiglitz, 2010). The US government *Financial Crisis Inquiry Commission* (FCIC) report also noted that, similarly, regulators saw warning signs but chose to ignore them, and that the Federal Reserve was ‘too supportive’ of banking industry growth.

However, many doubt the validity of this viewpoint. In his excellent review of 21 books written on the crisis, Lo (2012:173) writes:

There are several observations to be made from the number and variety of narratives that the authors in this review have proffered. The most obvious is that there is still significant disagreement as to what the underlying causes of the crisis were, and even less agreement as to what to do about it. But what may be more disconcerting for most economists is the fact that we can’t even agree on all the facts. Did CEOs take too much risk, or were they acting as they were incentivized to act? Was there too much leverage in the system? Did regulators do their jobs or was forbearance a significant factor? Was the Fed’s low interest-rate policy responsible for the housing bubble, or did other factors cause housing prices to skyrocket? Was liquidity the issue with respect to the run on the repo market, or was it more of a solvency issue among a handful of ‘problem’ banks?

In a recent paper (Thakor, 2013a), I argue that, while there is quite a bit of empirical evidence that misaligned incentives had a role to

play (see, e.g., Keys et al., 2010; Purnanandam, 2011), that cannot be the whole story. My point is that this crisis had at least as much to do with distorted *beliefs* as it did with distorted incentives. The basic argument is as follows: imagine a world in which there is *a priori* uncertainty about the abilities of bankers to manage risks and there is also ‘model uncertainty’ in the sense that economic agents believe that loan performance and the pay-offs of banks are either (largely) dependent on the skills of bankers or may be driven solely by exogenous factors. In such a world, rational Bayesian learning dictates that the longer things go well, the higher the confidence that all economic agents (creditors, bankers, regulators, etc.) develop in the ability of bankers to manage risks. This encourages banks to invest in riskier, more profitable assets, and makes risk appear to be ‘underpriced’. As long as all economic agents attach a sufficiently high probability to the view that outcomes are determined by the skills of bankers, learning-based posterior beliefs about the skills of bankers continue to rise as long as banks continue to keep performing well. As these posterior beliefs about bankers’ skills rise, so does the level of risk that investors are willing to let banks take, while they continue to provide (uninsured) financing to these banks.

Relatively unforeseeable economic shocks – such as unexpectedly large defaults on securities backed by subprime mortgages – can cause beliefs about the economic model of outcome determination to shift. In particular, economic agents may assign a much higher probability to the likelihood that outcomes are determined by luck, rather than the skills of bankers, than they did before. In this case, the previous level of risk-taking is no longer considered prudent by investors, and funding may dry up altogether for banks. This can precipitate a crisis. It is a crisis that looks like a liquidity crisis, but it is in fact a solvency crisis, in that it is investors’ belief about the lack of solvency on the asset side of banks’ balance sheets that causes funding to evaporate.

What can cause such a dramatic shift in beliefs about the economic model of outcome determination? One possibility is that there is a behavioural bias that causes economic agents to assign a much higher (than rational) probability to events that they have personally experienced and lower (than rational) probabilities to events that exist only as statistically probable outcomes experienced by others, but not personally by the agents in question. As Benjamin Franklin once said:

Experience keeps a dear school, but fools will learn in no other. For you can give advice, but you cannot give conduct.

Whether it is due to incentive misalignment or due to a discontinuous shift in beliefs about the skills of bankers in managing risks, or some combination of the two, one thing that is beginning to become clear is that high leverage among financial institutions – combined with high consumer leverage – was a significant contributor to the financial crisis. A number of papers have made this point in different ways. Goel, Song and Thakor (2013) develop a theory of correlated leverage, in which high consumer leverage and high bank leverage become correlated, increasing the fragility of the financial system, even in response to small shocks. The reason for this is that high consumer leverage increases the odds of these consumers defaulting on bank loans, even when hit by relatively small shocks, and high bank leverage makes banks incapable of absorbing the consequent credit losses. Farhi and Tirole (2012) present a model in which all banks become highly leveraged together and make investments with correlated prospects, given the possibility of en masse regulatory bailouts due to the regulator's inability to distinguish between illiquidity and insolvency. Acharya and Thakor (2013) present a theory in which the failure of one institution increases 'creditor pressure' – an increase in the cost of rollover funding or the cutting off of rollover funding – on other institutions because of (rational) inferences by the creditors of the other institutions. They show that this effect becomes stronger as these institutions become more highly levered, so an increase in leverage contributes to an endogenous increase in systemic risk.

These contributions highlight the fact that while institutions like the Financial Stability Oversight Council (FSOC) can help to improve the tracking of systemic risk, high bank leverage can elevate systemic risk in subtle ways that do not show up in the data until it is too late.

High bank leverage is not a new phenomenon, but capital ratios in banking have been declining since the adoption of deposit insurance (see Figure 2.1).

Interestingly, the frequency of financial crises has also gone up during this time (Reinhart and Rogoff, 2008). So any discussion of what constitutes a healthy financial system will need to incorporate an examination of bank capital and the regulations that can facilitate appropriately high levels of capital in banking.

I do not mean to suggest that excessive leverage in financial institutions was the only factor that led to the crisis, which began in the shadow banking system in the US. There were many factors that interacted with each other to create the perfect storm. These are discussed in depth in Thakor (2013c), where I provide a review of the extensive literature on this financial crisis.<sup>2</sup> My focus in this chapter is more on

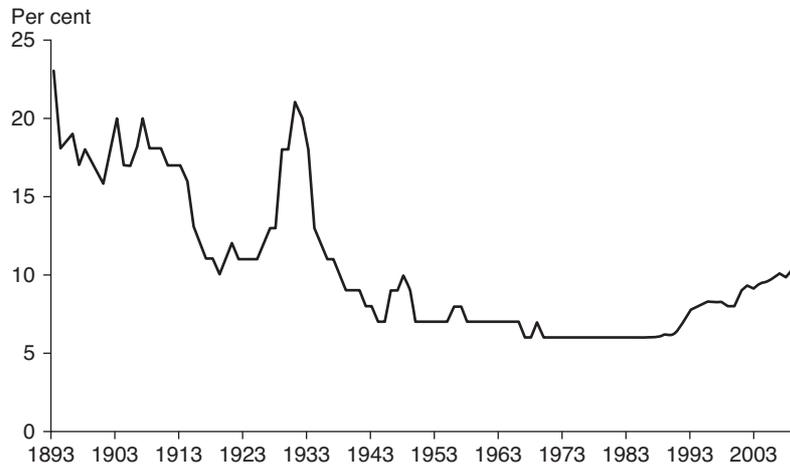


Figure 2.1 Mean book equity ratios for US banks, 1893–2010

Source: Data through 2001 are from Flannery and Rangan (2008); data since 2001 are from the Federal Reserve's Y-9C reports. Note: data since 2001 are average quarterly capital ratios for the 100 largest bank holding companies.

how we begin to think about financial system *health*, rather than what makes it sick at times.

### 2.3 What makes a healthy financial system and how to develop one?

A healthy financial system is *not* one that is never susceptible to a crisis. That would entail a level of risk-taking by financial institutions which would, in all likelihood, be inefficiently low. So, the idea is to have a financial system that is associated with a sufficiently low (but not zero) level of systemic risk. Indeed, I would suggest that a healthy financial system should be characterized by occasional failures of financial institutions – not systemic failures of large subsets of the financial system, but idiosyncratic failures of some banks. One reason why occasional bank failures are not only acceptable, but even desirable, for a healthy financial system is that beliefs and actions are heavily influenced by experiences, and if no failures are observed for a while, all economic agents – regulators, rating agencies, banks managers and investors – become somewhat sanguine about risk-taking, a phenomenon that can lead to high correlated risk-taking and high leverage by financial institutions (see Thakor, 2013a). The analogy here is to the human immune

system. Minor bouts of illness can help an individual develop immunity against more serious infections. Similarly, occasional failures of financial institutions are experience-based reminders of the hazards of risk-taking, and can also expose weaknesses in the financial system that can be identified and expunged before they mushroom into systemic structural flaws that make the system susceptible to debilitating crises. Thus, regulators should be circumspect when it comes to bailing out failing institutions, as the absence of failures can in itself weaken the financial system, both by precluding Darwinian extinctions of weak institutions and by shutting off the natural warning signs that can dampen the risk-taking of otherwise healthy institutions.

Another attribute of a healthy financial system is sufficiently high levels of capital in institutions – both in the commercial banking system and in the shadow banking system. There are some who argue that this may not be wise because high leverage is what makes banks valuable/special. However, as Miller (1995) noted:

An essential message of the M&M propositions as applied to banking, in sum, is that you cannot hope to lever up a sow's ear into a silk purse. You may think you can during good times; but you'll give it all back and more when the bad times roll around.

As discussed in Thakor (2013b), there now seems to be widespread agreement that higher capital in banking will enhance bank stability, reduce the pursuit of tail risks, diminish the likelihood of crises, and lower the need for taxpayer bailouts that may trigger sovereign debt crises. But there is often resistance to higher capital requirements, some of which is based on fallacious reasoning.

One such argument is that capital is money that banks have to set aside and is therefore unavailable for lending, so an increase in capital requirements will reduce bank lending. This confuses capital requirements with cash asset reserve requirements. Banks can invest their equity capital in any asset permitted by their charters, so there is no mechanical hardwiring that leads to higher capital requirements causing a drop in bank lending. Various other objections that crop up in arguments against higher capital requirements are discussed and debunked in Mehran and Thakor (2011). These include: banks must have necessarily high leverage because deposits are a factor of production in banking<sup>3</sup>; deposits cost less than equity, so higher capital will decrease the value of the bank by forcing it to rely on more expensive funding; and increasing equity capital in banking will reduce the values of banks. The theory as well as

the empirical evidence in Mehran and Thakor (2011) militates against these assertions.

A third attribute of a healthy financial system is active corporate governance by the bank's shareholders. One argument in favour of high bank leverage is that leverage disciplines banks (e.g., Calomiris and Kahn, 1991). However, that is because equity governance in banking has been largely overlooked in the theories of bank capital structure,<sup>4</sup> and has, in practical terms, not been as strong as in non-financial firms (due to regulatory restrictions on who can own banks). Strengthening equity governance in banking can make equity capital a less expensive and more attractive source of financing.

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Finally, a healthy banking system would go beyond 'regulation by labels' and focus on 'regulation by economic function'. An important reason why credit default swaps (CDS) were largely unregulated before the crisis is that they were called CDS, not insurance. Regulating by economic function will reduce the attractiveness/feasibility of institutions opting for financial contracts and institutional forms with new labels, so as to escape regulatory requirements (i.e., it will reduce 'regulatory arbitrage').

So, how do we develop a healthy financial system? Based on the preceding discussion, the following steps seem worthy of serious consideration.

1. Create a better business model by creating a bankruptcy code for banks (Chapter 11) similar to that for non-financials. In the US, we have liquidation as the only failure option for a bank, if it is not bailed out. Once orderly bankruptcy is possible, regulators should feel less constrained in permitting some banks to go bankrupt (i.e., not bailing them out). Having some banks fail at times is essential for a healthy banking system.
2. Have higher capital in banking. In addition to higher risk-weighted capital ratios, regulators should use much higher ratios of equity capital as a percentage of total assets, including off-balance sheet items. Acharya et al. (2013) discuss a novel approach that relies on two types of equity capital requirements which are designed to ensure that the governance discipline of both bank debt and equity can be preserved while higher capital requirements are implemented.
3. Make capital requirements countercyclical by increasing them through phased-in dividend restrictions (hence building capital through retained earnings) during good times, as discussed in Acharya et al. (2013).
4. Impose higher capital requirements in the shadow banking system (repos, money market funds, investment banks, insurance companies,

etc.), regulate *products* by their *economic functions*, *not* by their labels (e.g., CDS), and regulate institutions by their activities rather than by what they call themselves.

5. Permit broader ownership of banks in order to allow equity-based governance to work more effectively.
6. Consider some variant of the Belgian experiment of ‘levelling the tax playing field’ between debt and equity by allowing tax deductibility either of dividends or of a notional return on the book value of equity. This may encourage a lesser reliance on leverage by banks. There is some empirical evidence in support of this. For example, Schepens (2013) documents an increase in bank capital ratios in Belgium after the tax code was changed (inclusive of banks) to subtract from pre-tax income a hypothetical return on book equity capital.

## 2.4 Conclusion

In this chapter, I have discussed the 2007–2009 subprime crisis and identified four essential attributes of a healthy financial system. These are:

- The system experiences periodic idiosyncratic failures of a few financial institutions that are *not* bailed out by the government, but has a very low probability of experiencing large systemic crises.
- Depository institutions, as well as institutions in the shadow banking system, are well-capitalized.
- Corporate governance by bank shareholders is active and effective.
- Regulation of financial institutions is by economic function, not by the labels attached to contracts and institutions.

With the above attributes as a basis, I have outlined the regulatory changes that are needed. In a nutshell, these include: creating a bankruptcy code for depository institutions in which banks are allowed to go bankrupt; having higher and countercyclical capital requirements in both the commercial and shadow banking sectors; permitting broader ownership of banks; and changing the tax code to diminish the tax disadvantage of equity relative to debt.

I would like to emphasize two points in closing. First, we will never have a perfect regulatory system in which all ‘regulatory arbitrage’ can be eliminated. There will always be innovations made by institutions to enable them to lighten their regulatory burden, no matter what the system of regulations we put in place. But that should not be used as a ‘deal breaker’ when considering regulatory reform. After all, people

often drive faster than the speed limit in their cars, and sometimes evade income taxes. We do not use these to argue that speed limits ought to be abandoned and the tax code should be abolished. So, in contemplating regulations that call for higher capital requirements, while it is useful to consider ways in which regulatory arbitrage – involving activities shifting to the shadow banking system where capital requirements may be non-existent or lighter – can be minimized, it is not plausible to suggest that we should avoid higher capital requirements simply because institutions will evade them anyway by shifting more activities to the shadow banking sector. Second, an important goal of regulatory reform in a healthy financial system should be simplicity and ease of implementation. As Thakor (2013c) points out, more and more complex regulations engender more and more unpredictable responses from the regulated institutions, setting in motion a chain of events that ultimately increase uncertainty and diminish regulatory effectiveness. Regulations like the Dodd–Frank Act in the US have far too much complexity to permit an accurate assessment of their eventual effectiveness.

## Notes

1. This chapter is based on my keynote address (with the title: ‘Leverage, Systemic Risk and Financial System Health’) at the Wolpertinger Conference in Gothenburg, Sweden, August 2013. Kupiec and Ramirez (2013) provide broader evidence on the costs of financial crises to the real sector.
2. See also Lo (2012).
3. The argument is that just as steel is a factor of production in a car, deposits are a factor of production in banking. So, just as a car has a lot of steel, a bank has a lot of leverage. But, as Acharya et al. (2012) point out, there is no reason why the bank could not acquire all the deposits it needs and then acquire as much equity on top of it, as needed, for prudential regulation. Thakor (2013b) discusses this in greater depth. DeAngelo and Stulz (2013) propose that increasing equity capital like this may be socially costly when deposits provide liquidity services and the bank’s assets are riskless, arguing therefore that banks may need to be highly levered.
4. As pointed out by Acharya et al. (2013): the paper develops a theory of bank capital structure in which both bank debt and equity have governance roles to play.

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