



Post-crisis regulatory reform in banking: Address insolvency risk, not illiquidity!

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ARTICLE INFO

Article history:

Received 3 March 2018

Received in revised form 9 March 2018

Accepted 14 March 2018

Available online 20 March 2018

JEL Classification:

G21

G28

Keywords:

Liquidity risk

Insolvency risk

Post-crisis regulatory reform

ABSTRACT

An extensive review of the evidence related to the 2007–09 crisis reveals that it was an insolvency risk crisis, not a liquidity crisis. The appropriate post-crisis regulatory reform should therefore focus on increasing capital requirements. The Basel III liquidity requirements do not serve a useful economic purpose in dealing with the root causes of the stresses that led to the 2007–09 crisis, and unnecessarily constrain the asset transformation and liquidity creation roles of banks to the detriment of economic growth.

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1. Introduction

There has been much discussion in recent years about the appropriate regulatory responses to the crisis of 2007–09 that would remove the structural defects most responsible for the crisis. While the entire spectrum of post-crisis regulation in Europe and the U.S. has been vast in scope,¹ there are two pillars of the prudential regulation component of the regulation that are noteworthy: liquidity and capital requirements. In the case of liquidity requirements, there are two liquidity ratios banks must maintain: (i) the liquidity coverage ratio (LCR), which stipulates that a bank's high-quality liquid assets (HQLA) must be at least as much as its total expected net liquidity outflows over 30 days, and (ii) the net stable funding ratio (NSFR), which requires that the available amount of stable funding must exceed the required amount of stable funding over a one-year period of extended stress. In the case of capital requirements, there are also two key ratios: (i) a risk-weighted capital ratio that requires common equity and tier-one capital to be at least 6% of risk-weighted assets, and (ii) a leverage ratio that requires the bank's tier-1 capital to be at least 3% of its average total consolidated assets (including off-balance sheet items).

Why have regulators focused on both liquidity and capital requirements, especially in light of the fact that reserve require-

ments for U.S. banks—the original liquidity requirement—had fallen out of favor as a risk-management tool and was secularly declining prior to the crisis? I believe the reason is the popular view that this crisis had two key features: ex ante misaligned incentives on the part of banks, and an ex post liquidity shock that caused liquidity to suddenly evaporate from the financial system, thereby exposing otherwise-healthy institutions to the risk of failure unless central banks opened up their liquidity spigots.² Capital requirements are thought to be appropriate in dealing with ex ante misaligned incentives,³ whereas liquidity requirements are meant to deal with banks having sufficient liquidity on hand to deal with the next system-wide liquidity evaporation.

This brings me to the central research question of this essay: is the post-crisis focus on both liquidity and capital requirements optimal, given the twin objectives of economic growth and financial stability? I emphasize these as the two key objectives because, as I have argued elsewhere (see Thakor, 2014), it is trivial to achieve financial stability if one does not care about growth. The essence of contemporary theories of financial intermediation is that banks facilitate economic growth by lowering the cost of finance for borrowing firms (e.g. Boot and Thakor, 2000; Ramakrishnan and Thakor, 1984; Coval and Thakor, 2005).

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¹ For an extensive description and analysis of the new regulatory structure, see Greenbaum et al. (2015).

² See, for example, the discussion in Thakor (2015).

³ See Thakor (2014).

My conclusion, based on an extensive review of the existing literature,⁴ is twofold. First, the purported tradeoff between financial stability and economic growth is overblown—it is possible to achieve financial stability as well as long-run economic growth. Second, the current emphasis on liquidity requirements is misplaced and stems from the erroneous belief that the 2007–09 financial crisis was a liquidity crisis. Rather, it was an insolvency risk crisis that caused liquidity to flee the system. Hence, the focus ought to be on strengthening capital requirements. Specifically, I recommend six ex ante measures and two ex post measures to achieve greater financial stability and enhanced economic growth.

Ex Ante Measures:

- (1) Increase capital requirements for depository institutions and shadow banks, and make them countercyclical.
- (2) Eliminate liquidity requirements.
- (3) Restrict consumer leverage and improve consumer literacy.
- (4) Create a better business model by creating a bankruptcy code (Chapter 11) for banks.
- (5) Design a more integrated regulatory structure.
- (6) Focus on bank governance and culture.

Ex Post Measures:

- (1) Resolve financial crises through (temporary) government capital support that dilutes current shareholders and by imposing dividend restrictions.
- (2) Have greater consequences for the executives of failing banks.

The rest of this essay is organized as follows. Section 2 discusses the first two ex ante recommendations, along with the empirical evidence underneath those recommendations. Section 3 discusses the third recommendation. Section 4 discusses recommendations four through six. Section 5 discusses ex post measures. Section 6 concludes.

2. Increase capital requirements and drop liquidity requirements

My discussion in this section is in three parts. In the first part, I briefly review the empirical evidence, which strongly indicates that this was an insolvency risk crisis, not a liquidity crisis. In the second part, I discuss the implications of increasing capital requirements, in the third part, I discuss the implications of eliminating liquidity requirements.

2.1. Was this an insolvency or illiquidity crisis?

An insolvency crisis is essentially a “counterparty risk” crisis. Investors refuse to extend financing to institutions because they view the credit risk of the institution as being excessive, given their asset portfolios and capital structures. A liquidity crisis is one in which, for some reason, liquidity evaporates, so that institutions reliant on short-term debt experience funding declines and may be compelled to engage in asset fire sales to raise funding. Typically, the liquidity evaporation is linked to a coordination failure of some sort.

An important difference between the two types of crises is that an insolvency risk crisis is bank specific in that it affects only banks that are viewed by investors as being excessively leveraged and/or excessively risky. By contrast, a liquidity crisis indiscriminately affects all banks, regardless of fundamental financial health.

⁴ For the relevant literature reviews, see Thakor (2014), Thakor (2015), and Greenbaum et al. (2015).

While the proponents of the view that this was a liquidity crisis acknowledge that there were insolvency-risk forces at work, they reason that the direction of causality was from illiquidity to insolvency. That is, the sequence of events was that liquidity first shrank in the system, which forced substantial reductions in demand for assets and also fire sales, which drove down asset prices, which then—due to assets being marked to market—reduced equity in institutions and elevated insolvency risk. So their view is that liquidity risk and insolvency risk are endogenously co-determined, and a policy recommendation emerging from this is that central banks must flood the market with liquidity, so that the spillover effect of liquidity risk on insolvency risk can be avoided.

The proponents of the insolvency risk viewpoint propose that asset prices decline due to a shock to fundamentals, and this causes the equity values of highly-leveraged institutions to fall, which then diminishes their short-term borrowing capacity. Liquidity dries up because investors are unwilling to finance institutions that have debt overhang problems or are insolvent.

Empirically distinguishing between these two viewpoints is important for two reasons: assessing appropriate policy interventions during the crisis, and determining the appropriate post-crisis regulation design.

The empirical evidence strongly indicates that this was an insolvency risk crisis, not a liquidity crisis. There are four strands of research that provide this evidence.

First, as I indicated earlier, if this was a liquidity crisis, it should have caused funding access to dry up for all institutions. The empirical evidence for the U.S., however, is that the majority of commercial and investment banks did not experience diminished funding during the crisis and did not engage in the fire sales predicted to accompany liquidity crises.⁵ This evidence also indicates that the institutions that did experience liquidity shortages during the crisis were those whose insolvency risk had risen due to a deterioration in asset values. In addition, using transaction-level data on short-term, unsecured certificates of deposit in the European market, Perignon, Thesmar and Vuilleme (forthcoming) document that there was no market-wide funding freeze for banks during 2008–14. During this time, banks with higher capital, higher profitability and fewer impaired loans actually increased their short-term (uninsured) funding, whereas the more highly-leveraged banks with lower-quality assets reduced their access to this funding. There was thus a reallocation of liquidity based on differences in insolvency risk. The authors point out that their evidence is inconsistent with any coordination-failure theory of bank runs, i.e., they rule out a liquidity crisis story.

Second, there is also empirical evidence that the massive withdrawals from money market mutual funds (MMFs) during 2008 were not precipitated by a market-wide liquidity crunch that just caused a run on those funds. Rather, as Kaeperczyk and Schnabl (2013) document, these withdrawals were due to asset risk and insolvency concerns. The disclosure that the Reserve Primary Fund had suffered significant losses due to its holding of Lehman Brothers commercial paper laid to rest the commonly-held belief that MMFs invested only in safe assets.

Third, in direct contradiction to the liquidity crisis hypothesis, there is substantial evidence that banks with higher capital ratios were less adversely affected by the crisis. Specifically, banks with higher capital ratios:

- were more likely to survive the crisis and gained market share during the crisis⁶;

⁵ See Boyson et al. (2014).

⁶ See Berger and Bouwman (2013).

- took less risk prior to the crisis⁷; and
- had smaller contractions in lending during the crisis.⁸

Fourth, additional evidence based on movements in market spreads is provided by [Taylor and Williams \(2009\)](#). They examined the LIBOR-OIS spread, which is the difference between the three-month LIBOR and the three-month Overnight Index Swap (OIS) rate. This spread reflects both liquidity and credit risks. [Taylor and Williams \(2009\)](#) document that the spread increased sharply in August 2007 and stayed high. The huge liquidity injections by the Federal Reserve during 2008 should have lowered the spread if this was a liquidity crisis. Instead, the spread increased further. It only began to come down when insolvency risk was directly addressed with the U.S. government infusing equity capital into banks. Further evidence that the LIBOR-OIS spread increase was primarily due to elevated insolvency risk is that it was found to be highly significantly positively correlated with the unsecured-secured spread, which is essentially a measure of credit risk.

The argument presented by [Taylor and Williams \(2009\)](#) is further buttressed by [Dong and Wen \(2017\)](#) who develop an incomplete-market model with heterogeneous agents and calibrate the model to match U.S aggregate output fluctuations and bond premia. Their analysis shows that a sharp reduction in the quality, and not the liquidity, of private assets was responsible for the 2007–09 financial crisis. That is, the crisis was caused by heightened concerns about the quality of subprime mortgages and the solvency of institutions holding those mortgages and the MBS associated with them, rather than a sudden evaporation of liquidity. In fact, the [Dong and Wen \(2017\)](#) analysis indicates that excessive injections of public liquidity during a crisis can be welfare reducing under either conventional or unconventional monetary policies.

2.2. Implications of higher capital requirements

It is often claimed by bankers that higher capital requirements in banking will diminish shareholder value in banks and make it more difficult for banks to attract capital. Some academics support this notion and will sometimes cite reduced bank lending in response to an unexpected increase in regulatory capital requirements as supporting evidence. Let me begin by saying that evidence of that sort says little about the costs and benefits of higher bank capital. Most banks increase capital primarily via retained earnings, so their immediate response to higher capital requirements is not surprisingly to cut back on lending. This just means that there ought to be a phase-in period for higher capital requirements, as was done with the FDICIA of 1991, for example.

Here is what the evidence says. More highly-capitalized banks:

- lend more and create more liquidity⁹;
- are safer and more likely to survive a financial crisis¹⁰;
- take less risk in normal times and screen loans with greater diligence¹¹;
- contract lending less during crises¹²;
- create more value for their shareholders¹³;

- maintain/increase access to short-term funding (liquidity) during periods of stress¹⁴;
- create less systemic risk,¹⁵ and
- deliver higher returns to their shareholders.¹⁶

On the last point above, there have recently been some papers that have examined the asset pricing implications of higher bank capital. They have documented that shareholders in banks with higher capital earn returns that are higher than can be justified based on priced risk associated with any asset pricing model.¹⁷ That is, shareholders in banks with higher capital earn higher “alphas”. This is an asset pricing anomaly. Some have interpreted this evidence to suggest that shareholders in banks with higher capital have higher expected returns—based on using realized returns over long time horizons as proxies for expected future returns—even though they are safer (have lower systematic risk). Based on this, they conclude that banks with higher capital have a higher equity cost of capital. This is problematic because the documented higher return is an anomaly to begin with, so it is hard to then conclude that it implies some sort of equilibrium higher expected return, with a cost of capital implication. I have an alternative interpretation of these findings, which is that higher capital benefits bank shareholders. The evidence suggests to me that regulators should ask banks to gradually increase their capital ratios by cutting back on dividends and retaining more earnings. Every dollar of retained earnings generates a positive alpha—a future return for shareholders that exceeds what they can obtain if they received the dollar as a dividend and invested it themselves in the market. That is, regulators can make the shareholders of banks better off by imposing dividend restrictions and increasing equity over time.

2.3. Implications of lower liquidity requirements

While higher bank capital has numerous documented benefits, the same cannot be said for higher liquidity in banks. A liquidity requirement stipulates that a certain amount of bank funds have to be invested in liquid “eligible” assets (like cash, Treasuries, and so on), essentially freezing loanable funds into immobility, and preventing the bank from lending the money to individuals and corporations. For example, in 2016, J.P. Morgan Chase held \$524 billion in “eligible” liquid securities against a deposit base of \$1.38 trillion. This is a staggering waste of the qualitative asset transformation capacity of the bank, and in the aggregate of the banking sector as a whole. Moreover, since liquidity regulation does not distinguish between globally systemically important banks (G-SIBs) and non-G-SIBs, this waste of qualitative transformation capacity is not limited only to the very large systemically important banks.¹⁸ If central banks were to follow the Bagehot rule and stand ready to provide liquidity to solvent (high capital) banks when there is a true liquidity shock, there would be a much lesser need to shackle our banking sector with such economic-growth-sapping liquidity requirements.¹⁹ A recent paper by [Barroso et al. \(2017\)](#) documents

⁷ See [Beltratti and Stulz \(2012\)](#).

⁸ See [Carlson et al. \(2013\)](#).

⁹ See [Berger and Bouwman \(2009\)](#), [Peek and Rosengren \(2000\)](#), and [Puri et al. \(2011\)](#).

¹⁰ See [Berger and Bouwman \(2013\)](#). In addition, the theory developed by [Merton and Thakor \(forthcoming\)](#) also indicates that such banks will create more value for their depository customers.

¹¹ See [Beltratti and Stulz \(2012\)](#), and [Purnanandam \(2011\)](#).

¹² See [Carlson et al. \(2013\)](#).

¹³ See [Mehran and Thakor \(2011\)](#).

¹⁴ See [Pérignon et al. \(forthcoming\)](#).

¹⁵ See [Laeven et al. \(2014\)](#).

¹⁶ See [Baker and Wurgler \(2015\)](#), and [Bouwman et al. \(2017\)](#).

¹⁷ [Baker and Wurgler \(2015\)](#) find this is true at all times, whereas [Bouwman et al. \(2017\)](#) find that the result is driven by returns during “bad” times and that the returns are similar during “normal” times.

¹⁸ As [Quarles \(2018\)](#) stated: “I believe it is time to take concrete steps toward calibrating liquidity requirements differently for large, non-G-SIBs than for G-SIBs.” Thus, as a first step, we can at least begin by jettisoning liquidity requirements for the non-G-SIBs.

¹⁹ I think the argument that this will lead to the moral hazard of banks holding inefficiently low levels of liquidity is a red herring. The central bank can always make the provision of liquidity conditional on the bank having adequate capital in order to ensure that access is provided only to solvent banks.

that higher reserve requirements on Brazilian banks reduced their credit supply.

In a nutshell, lowering/eliminating liquidity requirements while increasing capital requirements will reduce the set of states in which banks find market access to short-term funding drying up—thereby reducing their reliance on the central bank liquidity spigot—and free up more loanable funds for banks to invest and foster economic growth. It will also have the benefit of improving the efficiency, transparency, and simplicity of regulation.²⁰

3. Restrict consumer leverage and increase consumer literacy

A sharp increase in consumer leverage in the years before the crisis played an important role in putting in place the forces that contributed to the crisis, including the “demand channel” effect discussed by [Mian and Sufi \(2014\)](#), [Jagannathan et al. \(2013\)](#) document that per capita U.S. household consumption grew steadily at \$1994 per year during 1980–99, but then increased quite dramatically to \$2849 per year from 2001 to 2007.

This increase in household consumption was financed in two ways: a reduction in the savings rate of households, and an increase in borrowing. The borrowing grew even faster than house prices—home equity as a percentage of home values dropped from 58% in 1995 to 52% in 2007.

Perhaps one reason for this behavior on the part of consumers is that some of them did not understand the risks involved in being very highly leveraged or the specific consequences of contractual features in their mortgages, such as teaser interest rates that increased in subsequent years. Some indirect evidence of such lack of financial literacy appears in [Mian and Sufi \(2014\)](#) who point out that some of the highest growth in household consumption and leverage occurred in counties with the lowest growth in productivity and income. Improved financial literacy can go a long way in helping consumers make more prudent decisions about leverage.²¹

4. Better business model, more integrated regulatory structure, governance and culture

4.1. Better business model

There is a fundamental way in which the banking business model in the U.S. can be improved. Currently, liquidation is the only failure option for a bank if it is not bailed out by regulators or merged with another institution. Title II of the Dodd-Frank Act has improved things in terms of providing a well-specified process for orderly liquidation of a failing bank. This will make regulator less constrained to let a bank fail. Having some banks occasionally fail is essential to the proper functioning of the financial system. However, it would also be a good idea to develop something analogous to Chapter 11 bankruptcy for banks.

4.2. A more integrated regulatory structure

The 2007–09 crisis exposed serious weaknesses in the way the financial system is regulated. Insurance companies, commercial banks, investment banks, securities broker-dealers and other institutions are all highly interconnected, and yet they are regulated by distinct regulatory entities that did not communicate effectively and coordinate across regulatory silos. There is also conflicting reg-

²⁰ [Quarles \(2018\)](#) stated this as one of the Federal Reserve's goals in post-crisis regulatory reform.

²¹ There is a growing body of research on the economic importance of financial literacy. See, for example, [Lusardi and Mitchell \(2014\)](#).

ulation, which makes regulatory arbitrage easy. This means that even if risks are carefully monitored in one sector, they may migrate in an amplified fashion to a less-regulated sector.

The creation of the Financial Stability Oversight Council (FSOC) under the Dodd-Frank Act is intended to help regulators more effectively see the early warning signs and achieve better coordination across jurisdictions.

But Dodd-Frank does not do enough. More needs to be done to deal effectively with possible future occurrences of insolvency-driven stresses in the repo market, especially since this market can engender systemic risk. Moreover, the Volcker Rule—which is fraught with daunting implementation challenges when it comes to distinguishing between market-making and speculative “prop trading”—needs to be streamlined.

Finally, Dodd-Frank has introduced different regulatory burdens on banks depending on size. There is now evidence that this is affecting the behavior of banks just below the size thresholds.²² Regulators should look at this evidence to determine if this behavior is what they want to see, and if not, what can be done to change things.

4.3. Governance and culture

It is often argued that equity governance in banking is not as effective as it is in non-financials, at least not in the U.S. One reason is that bank ownership is restricted by law, with non-financials precluded from bank ownership. An investor with more than 10% ownership in a bank is considered a “controlling shareholder” and must thus become a bank holding company (BHC). A BHC cannot invest in non-bank activities. This means that firms that specialize in creating value through more effective governance—like private equity firms—cannot play a role in owning and governing banks.

Governance is also affected by bank culture. The culture of a bank is defined by the explicit and implicit contracts that influence employee behavior. Although regulators in both the U.S. and Europe have been discussing the importance of bank culture for some years now, not much tangible progress has been made in operationalizing the insights of research for regulatory purposes. This is not because the importance of culture is not appreciated. Rather, I suspect it is because regulators do not quite know how to take something as seemingly nebulous as culture and come up with policy tools to deal with it. They recognize that using culture to just preach ethics and good behavior is not enough. The approach has to be more nuanced.

The good news is that regulators can deal with culture in a practically sensible way. In [Thakor \(2016\)](#) and [Song and Thakor \(forthcoming\)](#), it is pointed out that traditional tools of micro-prudential regulation can be used to influence bank culture. If regulators want banks to focus more on developing “safety-focused” cultures, they can do so by:

- Increasing capital requirements;
- Limiting interbank competition; and
- Reducing the probability of bailouts;

[Song and Thakor \(forthcoming\)](#) model bank culture in an explicit and implicit contracting framework and show that these regulatory actions will create endogenous incentives for banks to focus more on safety in choosing their culture. Moreover, they also show that culture choice is contagious, which means that if regulators can influence a few large banks to adopt a safety-oriented culture, it will cause other banks to follow suit. These results imply that reg-

²² See [Bouwman et al. \(forthcoming\)](#).

ulators need not worry about how to “measure” culture in order to influence it, and they do not have to intrusively “monitor” culture at every bank. Culture measurement and monitoring are often daunting challenges that discourage regulators from making culture a part of their regulatory tool kit, so not having to worry about these issues should be welcome news. For further details on how regulators can deal with bank culture, see Thakor (2016).

5. Ex post measures

5.1. Resolve financial crises by capital support rather than intrusive interventions

If the two approaches typically used to resolve failing banks—charter revocation (and liquidation) and capital support through equity injections—the better approach is the latter, according to recent research.²³ There is also evidence that capital injections large enough to restore compliance with bank capital requirements lead to an increase in the supply of credit and higher investment.²⁴

Capital support by the government should be followed by dividend freezes at the banks in question to enable capital levels at these banks to be refurbished.

5.2. More consequences for executives of failing banks

Part of the process of strengthening prudential management incentives among bank executives should be to have personal consequences for these executives when the banks fail. One consequence is compensation clawbacks. Another is fines for ex post discoveries of reckless risk taking. However, regulators should be careful not to push this too far or else they risk inducing bank managers to be excessively risk averse, passing up even prudent risks. This can hurt economic growth by diminishing qualitative asset transformation by banks.

6. Conclusion

This paper, based on a review of a large theoretical and empirical literature, has proposed numerous steps regulators should take to achieve the twin goals of financial stability and growth. The two most important recommendations I have elaborated upon in this paper are to significantly strengthen capital requirements and to eliminate (or at least substantially relax) liquidity requirements which, in my opinion, were inspired by a misreading of the evidence on other crisis. The 2007–09 crisis was an insolvency risk crisis, not a liquidity crisis. The appropriate regulatory response should be to increase capital requirements in order to reduce solvency risk, not to freeze hundreds of billions of dollars into immobility by requiring banks to invest them in “high quality liquid assets”.

Acknowledgement

I thank Loretta Mester for helpful comments. I alone am responsible for the views expressed here and for any errors or infelicities.

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- ²⁴ See Giannetti and Simonov (2011).
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