

The Road to Financial Stability: Capital Regulation, Liquidity Regulation, and Resolution*

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Prior to the 2007–9 financial crisis, regulations addressing risk taking in the financial system were woefully inadequate. In this essay, I summarize the regulatory changes implemented over the past five years and come to three conclusions. First, as a result of the new Basel III standards, the global financial system is now substantially safer than it was, but probably not yet safe enough. Second, the costs of increasing capital requirements have been much smaller than we originally thought. And third, we are best advised to shy away from time-varying discretionary regulatory policies.

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1. Introduction

We can think of the financial system as having two distinct, but related, parts: institutions that do screening and monitoring, and have balance sheets; and markets where prices are determined and resources are allocated through trading. Both are essential for the smooth and efficient operation of the system. And, for the system to remain stable and support strong, stable, and balanced growth, we need resilient institutions and resilient markets. That is, both must be designed to withstand substantial stress and continue to operate. I will leave the discussion of market resilience for another day. Here,

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I will take the lead from the papers in this issue and discuss what it is that we need to ensure resilience of institutions.

As is always the case with any economic analysis of regulation, the first step is to identify the externality that the regulation is designed to address. In the case of financial institutions, this is relatively straightforward. As a consequence of limited liability and government guarantees (both explicit and implicit), banks engage in too much credit transformation, too much liquidity transformation, and too much maturity transformation. That is, they hold assets that are too risky, too illiquid, and too long term relative to what would be socially optimal. And the reason is that when banks are under stress, and especially when they fail and even when they are illiquid, it damages other parts of the financial system.

Banking regulation is designed to control this risk taking, reducing the spillovers that come from the failure of an individual institution. Capital requirements are designed to address the externality associated with the incentive to engage in too much credit and maturity transformation. The bulk of my comments will be about this aspect of financial regulation—the level of capital requirements, the possibility of making them time varying, and the transitional macroeconomic impact of increases. But first, a few words about liquidity requirements and resolution.

2. Liquidity Requirements

Their ability to tap the central bank as a source of liquidity, as a lender of first resort when the system is under stress, leads commercial banks to issue too many short-term, liquid liabilities to fund long-term, illiquid assets. The liquidity requirements embodied in Basel III are designed to constrain both of these. The first, the liquidity coverage ratio (LCR), is intended to limit liquidity transformation, while the second, the net stable funding ratio (NSFR), is aimed at controlling the level of maturity transformation. I will briefly describe each of these.

To help understand the LCR, it is useful to quote from the agreed international standard itself:¹

¹See Basel Committee on Banking Supervision (2013).

The objective of the LCR is to promote the short-term resilience of the liquidity risk profile of banks. It does this by ensuring that banks have an adequate stock of unencumbered² high-quality liquid assets (HQLA) that can be converted easily and immediately in private markets into cash to meet their liquidity needs for a 30 calendar day liquidity stress scenario. The LCR will improve the banking sector's ability to absorb shocks arising from financial and economic stress, whatever the source, thus reducing the risk of spillover from the financial sector to the real economy.

Reading this, we can see that the idea behind the LCR is to compel banks to hold an amount of liquid assets (like U.S. Treasury securities) that can be easily sold to meet deposit outflows and the takedown of loan commitments that might occur during a crisis. The goal is to ensure that banks can meet their obligations without relying on fire sales of their assets—something that has a negative impact on everyone else—or on borrowing from the central bank.

It would take too long (and be too tedious) to describe the details of the implementation of the LCR. Suffice it to say that the definition of what constitutes a high-quality liquid asset is complex, as is the computation of “liquidity needs for a 30 calendar day liquidity stress scenario.” But in the end, the idea is to constrain the degree to which banks can use liquid liabilities to finance illiquid assets.³

Turning to the NSFR, again I quote from the rules text:⁴

The NSFR will require banks to maintain a stable funding profile in relation to the composition of their assets and off-balance sheet activities. A sustainable funding structure is intended to reduce the likelihood that disruptions to a bank's regular sources of funding will erode its liquidity position in a way that would increase the risk of its failure and potentially lead to broader systemic stress. The NSFR limits overreliance on short-term wholesale funding, encourages better assessment of

²The term “unencumbered” means that the assets have not been pledged as collateral for a loan.

³For a discussion of the economics of liquidity regulation, especially its relationship to central bank lending, see Stein (2013).

⁴See Basel Committee on Banking Supervision (2014).

funding risk across all on- and off-balance sheet items, and promotes funding stability.

The purpose of the NSFR is to limit the extent of this maturity mismatch, requiring banks with long-term assets to have long-term liabilities, and only allowing those with short-term assets to issue short-term liabilities. Again, the details of the computation are complex, but the idea is fairly simple: banks should not do what they did prior to the crisis, which was to rely on short-term interbank or repo funding to support large volumes of long-maturity securities.

3. Resolution⁵

In a market-based financial system, the right to succeed is the right to fail. The orderly entry and exit of firms, combined with an appropriate relationship between risk and return, means that risk takers that stand to profit also stand to lose. And what's true for restaurants or technology companies must be true for banks. None can threaten the entire economic or financial system if they go out of business.

We remain a long way from achieving a sound global cross-border resolution regime. However, a number of jurisdictions are implementing national reforms that enhance their resolution powers. This process has been facilitated by the Financial Stability Board's (2011) release of the *Key Attributes of Effective Resolution Regimes for Financial Institutions*, which sets out new international standards for the resolution of distressed financial institutions. These measures are complementary to, not substitutes for, higher loss absorption capacity.

In the end, I believe that the solution to the very real problem posed by our inability to resolve large global financial institutions can only be met with plans for automatic (or rules-driven administrator-assisted) recapitalization in bad times—what Kim Schoenholtz and I have called a *phoenix plan*. In such an arrangement, the capital structure of a bank's long-term liabilities must be clearly stated and strictly honored. That is, think of the bank as having a hierarchy of long-term debt ranging from the most senior

⁵This section is based in part on Cecchetti and Schoenholtz (2014b).

(call it tranche A) to the most subordinated (tranche Z for zombie!). Whenever a bank's capital position is deficient—defined in an objective, widely observable fashion (say, on the basis of market equity prices)—the resolution authority automatically converts debt into equity, starting with the Z tranche and then climbing up the alphabet until there is sufficient capital to return the bank to the regulatory minimum. Provided that there is sufficient long-term debt to absorb the losses, the concern remains a going one. [The resolution authority also would be required to replace management and shut down risky activities in an effort to prevent a serial failure.]

Safeguarding the financial system will still require rules and enforcement. Above all, each systemic intermediary must issue an adequate supply of long-term debt in good times to absorb its potential losses in bad times. Were it instead to issue short-term debt, the intermediary would be vulnerable to a run. In addition, rules must prevent other leveraged intermediaries from owning this systemically risky long-term debt, which is a close substitute for equity capital. Otherwise, losses incurred by the holders of the converted debt can transmit one intermediary's insolvency to the broader financial system.

4. Capital Regulation

Turning to capital regulation, I organize the remainder of my discussion around three questions:

- (i) What is the right steady-state level of capital?
- (ii) How should we think about the move to implement discretionary, time-varying capital requirements?
- (iii) Once we decide on a level of required capital, how should it be implemented?

4.1 *The Level of Capital*

Starting with the basics, capital requirements are stated as a minimum ratio of capital to risk-weighted assets. Changes to these can influence the numerator (the definition of capital), the denominator (the computation of risk-weighted assets), or the ratio itself. Basel III made three changes: it changes the computation of the

Table 1. Comparing Basel III and Basel II Capital Requirements (Share of Risk-Weighted Assets) for the Largest Systemic Banks: Impact of Basel III Capital Definition

Basel III Range	8% to 10%
Basel II Baseline	4%
Adjustment for Hybrid Capital	-2%
Adjustment for Goodwill, Intangibles, Deferred Tax Assets, etc.	-1%
Adjustment for Changes in Risk Weights	$-\frac{1}{4}\%$
Effective Basel II Converted to a Basel III Basis	$< -\frac{3}{4}\%$
Source: Basel Committee on Banking Supervision (2010b) and authors' calculations.	

numerator in an effort to ensure that capital includes only what is truly loss absorbing; it changes the computation of the denominator, including all of a bank's activities as well as providing a more realistic assessment of relative risk; and it changes the required ratio, increasing it from 4 percent to 7 percent. Large, systemically important institutions are subject to surcharges over and above this 7 percent.⁶

But because of changes in the definition of capital and the computation of risk-weighted assets, the Basel II and Basel III required ratios are not directly comparable. This leads to the following important question: If we use the Basel III definition of capital and risk weights, what is the effective increase in capital requirements? The answer is in table 1.

Here is a rough accounting. First, under Basel II, capital was not just common equity, but included items that had the attributes of both debt and equity. Since debt has a tax shield, it is cheaper than

⁶Beyond simply requiring additional capital, authorities have also moved to restrict the activities that banks can undertake. For example, the Vickers Report in the United Kingdom proposes ring-fencing traditional retail banking business activities. The Volcker rule in the United States includes restrictions on proprietary trading by banks and limits on owning and investing in hedge funds. And the Liikanen Report for the European Union looks to ring-fence risky activities in a bank's subsidiaries.

equity, but it also is less reliable than equity as a loss absorber. This alone cut the equity requirement virtually in half.

Next comes a change in what counted as an asset. Under Basel II, banks could count things like goodwill, intangible assets, and deferred tax assets in their computation of capital. The last of these arises from the fact that a bank that is losing money can carry the loss forward to reduce future tax payments. But this is something that is only valuable if the bank becomes profitable! These cut the requirement virtually in half again.

Finally, there is the change in the risk weights. The Basel Committee on Banking Supervision (BCBS) estimates that this reduced assets by roughly a quarter of 1 percentage point.

Putting this all together, we find that if we were to use the Basel III capital and asset definitions, the Basel II requirement of 4 percent would in fact be something between $\frac{1}{2}$ percent and $\frac{3}{4}$ percent. As the authorities were fond of saying, Basel III increased capital requirements by a factor of 10. (For systemically important banks, the increase is even bigger.) Is this enough? Almost surely not.⁷

So, what is the correct answer? At one extreme, narrow banking advocates call for depository institutions to finance anything but riskless assets with 100 percent equity capital. Admati and Hellwig (2013) argue that banks should have equity capital of 20 percent to 30 percent of their total assets, unadjusted for risk.

Needless to say, the BCBS required an answer to this question. Balancing the benefits of reduced frequency and severity of financial crises against the increased costs of financial intermediation, the BCBS (2010a) concluded that risk-weighted capital requirements should be in the range of 10 percent to 12 percent. By contrast, using a calibrated dynamic general equilibrium model, Clerc et al. (this issue), suggest that capital should be in the range of 10 percent on an unweighted basis—that is, just one-half of the Admati and Hellwig lower bound. To understand how wide the implied range is, I note that the ratio of risk-weighted assets to total assets ranges from 30 percent for continental European banks to 60 percent for

⁷It is worth noting that the Basel III calibration was done with the understanding that there would be a liquidity requirements. As Pierret (this issue) notes, the two interact. The implication is that capital requirements can be lower in the presence of liquidity requirements.

U.S. banks, with UK and Japanese banks somewhere in between.⁸ So, converting everything to the risk-weighted measures, this means the range is from the Basel Committee's 7 percent to Admati and Hellwig's 100 percent.

That is obviously too big a spread to be practical. And it explains why we are having such a hard time engaging the various parties in a productive dialogue. What can we do? I will make several points. First, the right level of capital is not 0 percent and it is not 100 percent (unweighted). Furthermore, to avoid having banks load up on risky assets, it is important to retain a measure of risk sensitivity.⁹

One way out of this impasse is to adopt an approach similar to that advocated by Orphanides and Williams (2002) for monetary policy. Noting the substantial uncertainties over the level of the equilibrium real interest rate and the size of the output gap, they proposed the use of monetary policy rules based on *changes* in economic activity, rather than on its *level*. The analog, where we lack knowledge about the relative costs and benefits of higher capital requirements, is for regulators to ratchet up the level until the trade-off between banking efficiency and financial safety shifts appreciably in favor of the latter. Importantly, as capital levels rise, we will be able to measure the costs, in terms of increased lending spreads, reduced loan volumes, and shifts of activity to less-regulated shadow banks.¹⁰ Over time, these responses will give us the information we need to determine the desirable level of capital requirements. And, during this transition, the safety of the financial system will be on the rise.

4.2 *Time-Varying Capital Requirements*

Next I turn to my second question. Under the rubric of "macroprudential policy," Clerc et al. (this issue) consider the efficacy of discretionary time-varying capital requirements. This raises a number of very difficult policy issues, some theoretical and some practice.

⁸See Bank for International Settlements (2013, chart V.2, p. 55).

⁹For a discussion of the problems with narrow banks, see Cecchetti and Schoenholtz (2014d). On the need for risk-sensitive measures, see Cecchetti and Schoenholtz (2014a). On the desirable level of capital requirements, see Cecchetti and Schoenholtz (2014c).

¹⁰See Pozsar et al. (2010) for a discussion of shadow banking.

As a matter of theory, the mechanisms through which time-varying capital requirements influence real economic activity are nearly identical to what we normally think of as the monetary policy transmission mechanism.¹¹ They influence financial conditions, changing loan supply, borrower net worth, and asset prices. Put differently, capital requirements influence banks' cost of doing business in a way that is nearly indistinguishable from interest rates. So, in considering macroprudential regulations, we have to start by asking to what extent macroprudential policy aimed at reducing the reinforcing feedback between the financial system and the real economy (procyclicality) short-circuits the monetary policy transmission mechanism.

On a more practical level, discretionary macroprudential policy raises all of the issues associated with the debate of rules versus discretion and more. There are information and recognition lags. How will authorities be able to tell when the financial system is vulnerable so action is needed? There are response and decision lags. Will policymakers be able to make timely decisions and take quick enough action? And there will be implementation and transmission lags. How long will it take to increase capital requirements and then have an impact on lending, asset prices, and the like?

These are the traditional problems with discretion. In the case of macroprudential policy, there are also issues of governance and political resistance. Who has the authority to raise capital requirements from one day to the next? In some jurisdictions, like the United Kingdom, this is clear. But in the United States, where there are numerous regulatory agencies with overlapping responsibilities, it is far more difficult.¹² As for the politics, where is the constituency in favor of higher capital requirements?

How can we overcome these challenges? One answer is to make the financial system sufficiently robust so that it can weather occasional booms and busts. This suggests a combination at all times (good and bad) of high capital requirements and effective stress tests implemented in a rules-based framework.¹³

¹¹Cecchetti and Kohler (2014) discuss the correspondence between time-varying capital requirements and traditional interest rate policy in a simple macroeconomic model.

¹²See Cecchetti and Schoenholtz (2014f).

¹³See Cecchetti and Schoenholtz (2014e).

4.3 *Implementation*

During the financial regulatory reform process that followed the 2007–9 financial crisis, there was a very legitimate worry that higher capital standards would reduce bank lending at a time when economies were just starting to recover. The ultimate response to this was a slow phasing in of the new higher standards, a decision that was informed by a macroeconomic assessment.¹⁴ That exercise, performed by the Macroeconomic Assessment Group (MAG), was a meta-analysis of the results collected from modelers in eighteen jurisdictions plus the International Monetary Fund. The MAG concluded that a 1-percentage-point increase in required capital implemented over a $4\frac{1}{2}$ -year horizon would reduce economy-wide lending volumes by roughly 1.4 percentage points.

The paper by Mésonnier and Monks (this issue) addresses this same question by examining the impact on lending volumes of the unannounced 2011–12 European Banking Authority (EBA) capital exercise. Using bank-level data, they are able to estimate the behavior of the banks that were capital constrained and compare it with the behavior of those that were not. The authors conclude “that banks in a banking group that had to increase its capital by 1 percent of risk-weighted assets tended to have annualized loan growth (over the nine-month period of the exercise) that was 1.2 percentage points lower than that of banks in groups that did not have to increase their capital ratio.”

At first glance, this result appears quite consistent with those of the MAG. It is not. In fact, what Mésonnier and Monks find is a substantially weaker effect. This is for three reasons. First, the EBA exercise was completely unexpected. Second, banks had nine months to meet the new requirements. And third, the Mésonnier and Monks result is for banks that were constrained. The implication is that a well-planned phase-in of higher capital requirements over a period of several years should have only a minor impact on lending that can easily be offset by slightly more accommodative monetary policy.

¹⁴See Macroeconomic Assessment Group (2010).

5. Conclusion

A safe, stable financial system requires resilient markets and resilient institutions. Institutional resilience, in turn, requires strong capital and liquidity requirements, combined with an effective resolution regime. The papers in this conference further our understanding of how to formulate and implement a financial stability policy framework that can provide the foundation for strong, stable, and balanced growth.

As I consider the challenges for financial and monetary policymakers raised in the work presented here, I draw three main conclusions. First, to promote a robust financial system, we need significantly higher capital requirements than those currently in place. Basel III may have been a tenfold improvement over Basel II, but that is because the latter was so woefully deficient. But we remain uncertain about the share of equity capital in bank finance that balances social costs and benefits. A pragmatic solution to address this lack of knowledge, a way for authorities to limit the risk of going too far, is to raise substantially, but gradually, the required level of capital, monitoring the system as we go.

My second conclusion is that the costs of the transition to higher capital requirements in terms of bank lending likely will be quite small, smaller than we originally thought.

And finally, I conclude that we are best advised to shy away from time-varying discretionary regulatory policies. This is true for two reasons: first, since we don't know the welfare implications of raising and lowering capital requirements from the desirable steady state, and second, since the transitional cost of increasing bank equity appears to be small (aside from the key risk of spurring shadow banking), the elasticity of aggregate activity with respect to capital also must be small. This implies that the benefits of time-varying discretion must be small as well.

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