

The Evolving Complexity of Capital Regulation

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Introduction

Excessively complex capital regulation can impose heavy deadweight economic costs on financial institutions that ultimately fall mainly on the users of financial services and, in some instances, taxpayers. Moreover, the difficulty of monitoring and enforcing opaque regulations tends to undermine their efficacy in enhancing the safety and soundness of the banking system. Nonetheless, the problem has gone virtually unnoticed in the wave of regulatory reform that has swept around the world in the wake of the financial crisis of 2007-2009. Indeed, many of the reforms have increased regulatory complexity.

Andrew Haldane (2011) summed up the problem well observing, “Regulatory capital ratios may have become too complex to verify, too error-prone to be reliably robust and too leaden-footed to enable prompt corrective action.” This article provides an overview of how this happened. The emphasis is on capital regulations applying to Global Systemically Important Banks (G-SIBs) with examples drawn from decisions made by the Basel Committee on Banking Supervision (Basel Committee) and regulatory reforms in the United States. It concludes with a modest proposal for how regulatory capital ratios could be simplified in the United States within the *current* framework and some speculative

¹ I am grateful to Sheila Bair, Robert Eisenbeis, Gillian Garcia, Joe Hughes, Edward Kane, Jack Reidhill, Paul Tucker, and an anonymous referee for helpful comments.

observations about why the regulatory process tends to produce such complex capital regulations.

The Original Capital Accord

Capital regulation has not always been so complex. The modern era in the quantitative regulation of bank capital can be traced to the decision by US regulators to set minimum capital requirements for US banks. Prior to 1981, the federal banking regulators had focused instead on making sure that the capital ratios of individual banks were in line with the peer group. Over time, however, the capital levels of the peer group drifted downward even as risks to the banking system increased. Wall (2014, p. 14) observed “[S]upervisors decided that if this trend were to be reversed, banks needed to be given specific targets for capital adequacy.” The approach taken was to set a target based on the ratio of a specially defined concept of regulatory capital relative to total assets. With the notable exceptions of France, which had nationalized its major banks in 1982, and Japan, which was riding the expansion of a real estate and stock market bubble that lasted to the end of the decade, the regulatory authorities in most major financial centers took broadly parallel actions.² These attempts to strengthen the resilience of their banks were offset to some extent by two factors. First, the emphasis on total assets as a measure of risk led many banks to substitute riskier assets for lower-yielding safe assets on their balance sheets and to restructure on-balance-sheet business as off-balance-sheet activities that would escape capital regulation (but without a commensurate reduction in risk). Second,

² See IMF (1989, p. 56) for estimates of trends in capital-asset ratios in several industrial countries from 1982 to 1987. The ratios could not be meaningfully compared across countries because the definitions of capital and accounting conventions differed markedly across countries, but the trend within each country is more significant. In each country apart from France and Japan the ratios rise over the period.

many of the leading international banks in these countries complained they were being underpriced in global markets and losing market share to Japanese banks, which were subject to lower minimum capital requirements. The regulators of these banks concluded that if they were to be effective in reducing systemic risk in the global banking system, their efforts to raise capital requirements must be harmonized across the leading financial centers, including Japan.

The shared sense that globally active banks had greatly increased their exposures to risk relative to their capacities to absorb loss motivated the negotiation of the Original Basel Accord (Basel Committee, 1988), the first attempt to harmonize capital requirements on an international basis. The Basel Committee, which had been organized in the wake of the Herstatt crisis to coordinate supervision of international banks, took on a new role in formulating and coordinating capital regulation.³

Negotiation of the Accord proved to be a difficult project. Although all major countries regulated capital ratios, the details differed markedly. They varied with regard to how to define and measure the regulatory capital numerator and what belonged in the denominator against which regulatory capital should be compared.⁴ After reaching agreement that the denominator should be risk-weighted assets (RWA), negotiators focused on three questions: (1) What should count as regulatory capital? (2) How should assets be risk-weighted? (3) What should be the minimum acceptable requirement – the ratio of regulatory capital to RWA -- for internationally active banks? The most contentious question, which took years to resolve, was what should be counted as regulatory capital.

³ See Goodhart (2011) for an authoritative account of the early years of the Basel Committee.

⁴ It should also be noted that these concepts were measured using different accounting standards, a problem that remains.

Germany and France took dramatically different positions. The German regulators insisted the rigor of German bank regulation would be undermined if the definition of regulatory capital included anything other than equity.⁵ At the other extreme, France, which had nationalized most of its internationally active banks earlier in the decade, argued for the inclusion of generous amounts of long-term debt, at least in part because of the awkwardness of issuing new equity in nationalized banks.⁶

These tensions were resolved by defining two kinds of regulatory capital: Tier 1 and Tier 2 capital. Tier 1 capital was largely equity plus some other instruments such as non-cumulative perpetual preferred debt that had “patient money” characteristics like equity. The definition of Tier 2 capital included a wide variety of instruments that enabled the members of the Basel Committee to reach agreement. For example, substantial amounts of debt were included to satisfy the French. The Japanese gained recognition of 45% of unrealized gains on holdings of common stock and the US won permission to count a substantial amount of loan loss reserves as part of regulatory capital.

The issue of risk weights proved less contentious. The Basel Committee decided not to attempt precise distinctions regarding the relative riskiness of various assets to avoid any allegation that they were using risk weights to micromanage the allocation of credit.

⁵ Ironically, the German position regarding the role of equity in regulatory capital has shifted 180 degrees since the negotiations surrounding the Original Accord. In the most recent negotiations, the German authorities have strongly resisted increases in the equity component of regulatory capital.

⁶ The definition of regulatory capital the US authorities adopted in 1981 was closer to the French than the German end of the spectrum. It included two kinds of capital: “(1) primary capital consisting of common stock, perpetual preferred stock, capital surplus, undivided profits, reserves for contingencies and other capital reserves, mandatory convertible instruments, and an allowance for possible loan losses; and (2) total capital, which is primary capital plus limited-life preferred stock and qualifying subordinated notes and debentures of bank subsidiaries” (Wall, 1989, p.19). Although the Basel definitions of capital differed from the US concept, the precedent of setting two minimum ratios was adopted.

Instead they opted for a very simple system in which all bank assets would be allocated into four different risk buckets corresponding to risk weights of 0%, 20%, 50% and 100%.⁷ The 0% bucket was designed to encourage banks to hold higher quality, liquid assets on their balance sheet by exempting such assets from regulatory capital requirements. The 20% bucket was intended to favor interbank lending which was believed to be critical to maintaining the resilience of international financial markets. The 50% bucket favored home mortgages with loan-to-value ratios no higher than 80% and was the only instance in which collateral was recognized as a risk mitigant. The 100% bucket was the residual, which contained any asset that did not qualify for inclusion in one of the more lightly weighted buckets.

The Basel Accord also attempted to capture the credit risk of off-balance-sheet commitments. Regulators were increasingly concerned about the risks inherent in the growth of financing techniques such as Note Issuance Facilities in which banks facilitated the access of their customers to capital markets and stood by to lend or buy up notes that could not be sold at the promised price. In effect, such techniques transferred loans off bank balance sheets and thus beyond the reach of capital regulation. Regulators feared if an underwriting failed, these kinds of exposures would emerge on banks' balance sheets and rapidly become troubled assets.

The solution for capturing off-balance-sheet commitments in the new risk weighting system involved posing two questions. First, how much like an on-balance sheet loan is the commitment? The answer provides a conversion factor that transforms the notional

⁷ The Accord (Basel Committee 1988) provided for an additional 10% category that could be applied at national discretion to securities issued by OECD central governments to account for investment risk. This option was not widely adopted.

amount into a loan-equivalent amount. Second, the loan-equivalent amount is then bucketed according to the identity of the counterparty or entity on whose behalf the bank has made a guarantee.⁸ This approach enabled the regulators to compute a risk-weighted asset total that included both on-balance-sheet and off-balance-sheet exposures to credit risk.

Once the numerator and denominator were defined, all that remained was to specify the minimum required ratios. This proved surprisingly uncontroversial, perhaps because the ratios were set at levels that would not inconvenience any of the major international bank. The minimum acceptable ratio of Tier 1 capital to RWA was 4% and the minimum acceptable ratio of Total Capital (Tier 1 plus Tier 2) was 8%. Oddly, the Basel Committee never provided a rationale for the minimum levels they specified. Nonetheless, these minimums prevailed for two decades

Peter Cooke, the longest-serving Chairman of the Basel Committee, took pride in the simplicity and transparency of the system. Indeed, the main features of the requirements could be written on the back of a postcard and any numerate clerk could easily compute a bank's capital requirement. The complete proposal (including annexes) was a mere 28 pages. The simplicity and transparency of this approach facilitated monitoring the evolution of an individual bank's capital strength over time and enabled comparisons of capital strength across banks and across countries at any particular time, with the important proviso that accounting conventions and the implementation of the Accord varied across countries.

⁸ An exception was made for bi-lateral contracts such as swaps. The Committee took the view that since most counterparties tended to be "first-class names," a 50% weight would be applied to counterparties that would otherwise have been subject to a 100% risk weight (Basel Committee, 1988, p.27).

The Original Accord was amended in 1996 (Basel Committee, 1996) to encompass market risk, which had been entirely neglected in Basel I. Regulators observed that some of the largest banks had expanded trading activities relative to lending and were serving many of their largest customers through their dealing rooms rather than in their banking books. They wanted to ensure that banks maintained sufficient capital to safeguard against risk arising from the volatility in the general level of market rates.

After a considerable amount of debate, the Basel Committee introduced a new paradigm in bank supervision, aligning the regulation of market risk with banks' own internal models of risk. This supervised use of internal models was a bold departure from the traditional approach and appeared to improve the efficiency and reduce compliance costs of capital regulation. Of course, the use of internal models was subject to several conditions: a bank's risk management system must be deemed sound and implemented with integrity, the bank needed to employ sufficient staff with skills to use sophisticated statistical models, the models needed to have a proven track record and perform well under regular stress tests. Moreover, the regulators insisted that banks achieve a level of safety, based on the underlying statistical model, that should ensure that regulatory capital backing market risk would be sufficient to weather a 22σ event. If the underlying statistical models based on the normal distribution were correct, this would occur only

once in a period substantially longer than the life of the universe (Dowd, et al, 2008).⁹

Initially, this shift in regulatory approach was viewed as a considerable success.¹⁰

Degradation of the Tier 1 Capital Numerator

Over time, in response to many financial innovations, the Basel Committee took decisions that weakened the quality of capital in the numerator of the Tier 1 capital ratio. Banks generally perceived Tier 1 capital, originally defined to include shareholders' equity and claims such as non-cumulative perpetual preferred stock that would absorb loss while permitting the bank to continue operations, as the binding constraint.

The tax codes of most countries treat debt more favorably than equity. Interest payments to creditors can generally be deducted from revenues in the computation of taxable income, but dividend payments to shareholders cannot. To some extent this tax incentive for increasing leverage is countered by the rising cost of debt as creditors attempt to protect themselves against the rising expected cost of financial distress. But G-SIBs are generally perceived to benefit from an implicit guarantee on their debt that weakens this market constraint on the substitution of debt for equity. As a consequence, banks often believe regulatory requirements rather than market forces are the main constraint on their ability to increase leverage. This stimulated a proliferation of innovations to produce

⁹ As Dowd et al note, a mere 8 sigma event should occur less than once in the entire history of the universe. A 22-sigma event has an astonishingly lower probability of occurrence. The regulators arrived at this standard by (1) assuming positions could not be liquidated in fewer than ten days (assuming a 10-day σ is 3.16 times the 1-day σ); (2) Insisting on a 99% level of confidence ($2.32*\sigma$); and (3) requiring a multiplication factor of at least 3 to compensate for possible model error. This yields a standard that is $3.16*2.32*3*\sigma$ or approximately $22*\sigma$.

¹⁰ Subsequently concerns have been raised about the extent of the variation in internal-models based measures of RWA of market risk across banks that cannot be explained by variations in actual risks taken or in business models (Basel Committee, 2013a). This has led to a fundamental review of the trading book and a revised market risk framework (Basel Committee, 2013c).

instruments sufficiently like debt so that the tax authorities would permit the deduction of interest payments, yet enough like equity so the regulatory authorities would deem them eligible for inclusion as Tier 1 capital. One such innovation, Trust Preferred Shares (TruPS)¹¹, became particularly popular in the US. The decision to permit TruPS and other similar instruments to count as Tier 1 capital betrayed a troubling confusion about the role of capital requirements in safeguarding the safety and soundness of the financial system.

Even though these instruments did not increase a bank's ability to remain a going concern while absorbing loss, the Basel Committee permitted them to qualify as Tier 1 capital -- subject to the limitation that they not exceed 50% of total Tier 1 capital. In effect, the regulatory authorities had authorized a massive increase in bank leverage. Once they permitted the equity portion of Tier 1 capital to fall to 50%, the regulators implicitly permitted banks to fund \$100 of RWA with only \$2 of equity, a 50:1 ratio. But even this comparison understates the permissible expansion of leverage. Usually leverage is measured based on total assets not RWAs. As a rough approximation RWAs are approximately 50% of total assets.¹² Thus, the regulators implicitly authorized an expansion of leverage, as conventionally measured, to 100:1, an astonishingly reckless

¹¹ TruPS are hybrid securities that combined features of both debt and equity. In 1996, the Federal Reserve Board ruled that TruPS satisfying specified conditions could meet a portion of bank holding companies' (BHCs') Tier 1 capital requirements. TruPS are a financing structure in which a BHC creates a wholly owned special purpose entity (SPE) that issues cumulative preferred stock to investors. The BHC then borrows the proceeds from the SPE using a long-term subordinated note. Looking through the SPE, in effect the BHC issues term subordinated debt into the market place and this subordinated debt was being permitted as Tier 1 capital. For additional details see French et al (2010).

¹² This is a conservative estimate. The ratio of RWA to total assets varies widely across G-SIBs. At yearend 2014 the ratio for 19 G-SIBs based in Europe and the US varied from 22.93% to 73.66%, with the median at 36.49% (Verma, 2015).

capital structure for any kind of firm. Fortunately, most banks were sufficiently prudent to refrain taking full advantage of this laxity in capital regulation.¹³

Presumably the regulators did not intend to authorize an increase in leverage of this magnitude. Instead, this decision may be an example of one of the dangers of complicated capital regulations negotiated under conditions of limited transparency. Lobbying by highly-paid bankers with clear profit incentives can often succeed in reducing the effectiveness of regulations. Proposed changes are often framed as relatively minor, technical adjustments, even though they could have major, *unperceived* implications for safety and soundness if adopted. Regulators may have been unwitting victims of the complicated regulatory structure and strong incentives for lobbying and financial innovations that the regulations had created.

This pattern fits the dynamic described in Kane's classic framework of the regulatory dialectic (1977, 1981), which describes the cyclical interaction between political and economic pressures in regulated markets in which political processes of regulation interact over time with economic incentives for regulatee avoidance to alter the effectiveness of regulatory restrictions. The Basel Accord threatened to constrain the scope for large banks to exploit perceptions among their creditors that they would be protected from loss by the safety net. The Tier 1 capital ratio limited the opportunity for banks to profit from this implicit subsidy by taking more risk and by reducing their tax liabilities. This fueled the search for innovative hybrid instruments and for intensive lobbying to enable these instruments to be recognized as Tier 1 capital. Seemingly

¹³ It should be noted that US banks remained subject to a leverage constraint that limited this kind of behavior to some extent, but many other countries did not regulate bank leverage directly.

technical decisions by the Basel Committee enabled banks to comply with capital regulations, while fundamentally undermining their effectiveness.

Of course, Kane's regulatory dialectic envisions continuing stages of regulatory avoidance (or "loophole mining") and re-regulation. The puzzling feature of this particular example of regulatory avoidance, is that the reregulation response took so long to occur. The Basel II reform focused exclusively on the denominator of the risk-weighted asset ratio without any consideration of weaknesses in the definition of Tier 1 capital. The Basel Committee reconsidered the definition of Tier 1 capital only after the Great Financial Crisis (GFC) revealed its inadequacy in constraining bank risk taking. As a result, the Basel III reforms placed a heavy emphasis on enhancing the quality and increasing the quantity of Tier 1 capital.

Basel II

The apparent success of the Market Risk Amendment led some banks and regulators to consider whether the approach could be extended to credit risk, the focus of the original Basel Accord.¹⁴ Moreover, regulators began to view the simplicity of the original Basel Accord as a fundamental weakness. Concerns about regulatory arbitrage arose almost immediately. A bank intent on increasing its exposure to risk (and presumably anticipated profits) without raising its required capital had several obvious options. For example, a bank could shift its lending from AAA-rated corporations to sub-prime borrowers within the 100% bucket. Banks also found it relatively easy to reduce the regulatory capital requirement for a given exposure by restructuring the loan. Instead of making a loan to the

¹⁴ Cynics might argue that bank lobbyists were continuing their efforts to weaken the force of the Basel Accord by reducing the risk weights in the denominator of the regulatory risk-weighted capital requirement.

government of an emerging market country, which would be allocated to the 100% risk-weight bucket, the bank could make a short-term loan to a state-owned bank in that country, which would be allocated to the 20% bucket. Or the bank could take advantage of discrepancies in risk weights between off-balance and on-balance-sheet exposures by selling a portfolio of loans to a trust and enhancing the credit quality of claims on the trust by purchasing the first-loss, bottom tranche representing, say, 20% of the total portfolio. The bank would have effectively the same credit risk as if it had retained the credit risk of the entire loan portfolio, but the exposure against which a capital charge would be required would be only 20% as large.¹⁵

Basel II (Basel Committee, 2006)¹⁶ attempted to eliminate these opportunities for regulatory arbitrage by aligning regulatory risk weights with the actual risks perceived by banks. The Original Accord evaluated credit risk based on the identity of the borrower (or counterparty), which was then allocated to one of four risk buckets that determined the risk weight. In contrast, Basel II increased the number of possible risk weights, and, more importantly based credit risk evaluations on ratings by independent credit rating agencies (in the case of the simplest, Standardized Approach) or the bank's own internal models (in the case of the more complex internal ratings based (IRB) approaches). Although both

¹⁵ See Jones (2000) for an analysis of several different regulatory arbitrage techniques. He notes that cosmetic improvements in reported regulatory capital ratios may be obtained through two means: (1) overstating the numerator, which generally makes use of accounting flexibility through gains trading or underprovisioning for loan loss reserves or (2) understating the risk-weighted asset denominator through restructuring loans to achieve a lower risk weight without a commensurate decline in exposure to risk. The avoidance of regulatory capital requirements through regulatory capital arbitrage erodes *effective* capital standards. Acharya, Schnabl, and Suarez (2013) show that the use of liquidity-guaranteed conduits was "highly suggestive" of regulatory arbitrage allowing banks to increase their exposures to insolvency risk while maintaining stable regulatory capital ratios.

¹⁶ Although agreement on the Basel II framework was not reached until 2004, the general outlines of the new approach were apparent as early as 1999.

approaches promised a substantial advance over the previous simplistic reliance on the identity of the borrower, each proved to have serious flaws. Credit rating agency ratings grossly underestimated the risks inherent in tranches of Collateralized Debt Offerings, which led to serious underestimates of credit risks in some bank portfolios. And internal ratings proved to be vulnerable to “strategic” risk-modeling choices by banks that wished to understate their exposures to risk to avoid higher capital requirements.¹⁷

It should be noted that even if regulatory risk weights had been perfectly aligned with the risk perceptions of individual banks, they would not have been sufficient to ensure financial stability. Such weights would not capture the negative externalities that would be imposed on the broader economy when a bank approached insolvency. Indeed, the architects of Basel II exacerbated this problem by rigging the risk weights so that large banks that adopted the Advanced IRB approach would have lower capital requirements than smaller banks, precisely the opposite of what regulators should have done if they intended for banks to internalize the costs of failure

In their efforts to increase the risk-sensitivity of regulatory capital requirements the authorities gave up their earlier objective of simplicity and their aversion to the appearance of micro-managing of credit decisions. This approach had many other weaknesses (Herring 2002, 2005, 2007) in addition to geometrically increasing the complexity of capital regulation. A superficial illustration of this increase in complexity can be seen in a comparison of the length of the Original Basel Accord (28 pages) with the length of Basel II (333 pages). More meaningfully, while a bank could compute its required capital under Basel I on the back of a postcard, the computation of required capital for a

¹⁷ The Economist (2012) derided this approach as “Do it yourself capital requirements”.

large bank under Basel II might require 200,000 or more risk buckets and over 200 million calculations (Haldane, 2011). Moreover, these calculations varied from bank to bank because each large bank relied on its own unique internal models for some of the inputs in the calculation. In addition, these calculations might vary over time for an individual bank because of changes in its internal models.

The opacity of this system for determining regulatory capital requirements defied effective oversight by bank supervisors and obscured the flow of information to the market. Because of the idiosyncratic nature of the computation of regulatory capital requirements it became impossible to assess the evolution of a bank's capital strength over time, much less make comparisons across banks. Basel II eliminated an important degree of transparency achieved by Basel I.

This increased risk-sensitivity of capital requirements also failed to end opportunities for arbitraging differences in capital requirements across instruments within and across institutions. But it did shift regulatory avoidance to other, more obscure strategies such as manipulation of the models used in estimating probabilities of default and financial innovations to transfer credit risk from the banking book to the trading book, where the primary regulatory focus was market risk, not credit risk. Basel II also stimulated innovations by other financial institutions to facilitate regulatory avoidance by banks. For example, AIG (2007, p. 122), an insurance company, developed a substantial line of business writing credit default swaps for banks, primarily in Europe, to provide them with regulatory capital relief.¹⁸

¹⁸ These credit default swaps were intended to be a temporary means for banks to reduce RWA until the banks could obtain authorization to base their capital requirements on their own models, which would

The extent to which the Basel II reforms can be implicated in the GFC is subject to considerable uncertainty. First is the problem of determining the time at which the reforms began to influence bank behavior. The implementation of the reforms varied *across* countries depending on when the implementing legislation was passed, the phase in period and, *within* countries, from bank to bank depending on when individual banks were able to obtain authorization to use the IRB Approaches. The European Parliament adopted the implementing legislation in 2006, with some European banks moving to Basel II advanced approaches by 2008 (European Parliament 2011, p. 8). The Securities Exchange Commission implemented a voluntary Consolidated Supervised Entity program for the five largest US investment banks that included capital requirements that mirrored the Basel II reforms.¹⁹ But official implementation by US banks lagged markedly. Although the US had committed to adopt Basel II, passage of the implementing legislation (Herring 2007) was delayed by objections from smaller banks that viewed the change as reducing the relative regulatory burden on larger, internationally active banks and by tensions between the FDIC and the other Federal regulators over the importance of maintaining a leverage ratio constraint. Final rules were not issued until November 2007, when the GFC was already underway. Consequently, US implementation was delayed still longer.²⁰

reduce RWA substantially below the previous, official measure. Masera (2012) has observed that the disparity in the regulatory treatment of credit risk between regulations of the banking book and the trading book fueled the growth in credit default swaps.

¹⁹ These investments banks joined this voluntary regime because the EU threatened to impose a consolidated regime on their European activities if they could not show that they were regulated on consolidated basis by a competent supervisory authority. The SEC managed to convince the EU that it could play such a role.

²⁰ Large, internationally-active US banks could have started the three-year parallel run required before the AIRB approach could be authorized as early as April 1, 2008. But by 2009, only one bank had entered the parallel run and others did not follow until 2010. The US had established stringent standards for banks to qualify for the parallel run and implementation of AIRB and several banks were reluctant to commit the necessary resources until the GFC was winding down.

Of course, the Basel II reforms are likely to have influenced bank behavior long before the date at which banks received authorization to compute their capital requirements based on internal ratings. The general outline of Basel II reforms was clear as early as 1999 even though the revised Accord was not formally adopted until 2004. Preparation for the Basel II reforms required massive, multi-year investments in data and modeling and so banks probably adjusted their portfolios and business strategies in anticipation of the new regulations.

In addition, identification of the influence of the Basel II reform is made difficult because a broad range of factors not directly related to Basel II contributed to the outbreak and severity of the crisis. For example, a recent survey of a distinguished panel of US and European economists (IGF Forum, 2017) rated seven factors as especially important in the GFC: flawed financial sector regulation and supervision; underestimation of the risk in the products of financial engineering; fraud and distorted incentives in the issuance and securitization of mortgages; illiquid financial structures for funding long-term, illiquid assets; and ratings agency failures. Other factors that were rated as somewhat less important include unrealistic expectations of increases in housing prices; elevated levels of household debt in the US; expectations of Too-Big-To Fail support; government involvement in subsidizing mortgages and homeownership; imbalances between global savings and channels for investing those savings; and excessively loose monetary policy in the US and in several other countries around the world.

Inadequate accounting standards are also implicated by enabling banks to overstate income and mask the deterioration in bank capital adequacy and increasing vulnerability to a crisis. Banks exploited scope for exercising accounting discretion to overstate the value

of distressed assets and, consequently, their regulatory capital (the computation of which is based mainly on the prevailing accounting standards). Real estate-related assets tended to be overstated relative to the market values of these assets and banks with large exposures to such assets used their discretion to set aside lower provisions against these assets and avoid classifying them as long as possible. Huizinga and Laeven (2012, p. 614) observe that “when bank distress is widespread regulatory forbearance is often applied to avoid disruption from bank failures to the real economy and the financial system. As a consequence, discretion over accounting rules combined with regulatory forbearance leads banks to understate balance sheet stresses and to overstate regulatory capital.”²¹ Citigroup provided a vivid illustration of the extent to which accounting values could diverge from market perceptions. Citigroup reported a Tier 1 capital ratio of 11.8%,²² well above the regulatory minimum, even though its market capitalization was approximate 1% of the book value of its assets.

Nonetheless, it is clear that Basel II contributed to increasing leverage among large banks. Northern Rock, one of the first banks to collapse in the crisis, illustrates the point. Just weeks before its collapse, Northern Rock received authorization from its regulator, the Financial Services Authority, to adopt the Basel II Advanced Internal Ratings Based Approach (AIRB) for computation of its capital requirements for mortgages.

Implementation of AIRB reduced Northern Rock’s regulatory capital requirement and the

²¹ Although accounting reforms are outside the scope of this paper, it should be noted that both the Financial Accounting Standards Board and the International Financial Reporting Standards Board have implemented measures to sharply limit the extent to which banks can use accounting discretion to overstate asset values. In addition, Wall (2013) argues that the use of supervisory stress tests to evaluate capital adequacy obliges banks to consider how asset values may deteriorate in under adverse economic and financial conditions and further counters the tendency for banks to understate the deterioration in asset values.

²² Of course, some of this difference may also be attributable to understated risk weights.

bank promptly announced a 30 percent increase in its dividend to shareholders. More generally, Mariathasan and Merrouche (2014) have shown when banks receive regulatory approval to apply the IRB approaches to their credit portfolios, the reported riskiness of their portfolios declines. This impact is particularly pronounced among weakly capitalized banks and in countries where supervisors are overseeing many IRB banks. After showing that this decline cannot be explained by portfolio shifts to safer assets or improved risk-measurement, they conclude “part of the decline in reported riskiness under IRB results from banks’ strategic risk-modeling.”

Average risk-weighted assets of some of the largest banks exhibited a consistent decline from the introduction of the Basel Accord in 1994 through 1998 with a notable acceleration of the decline in 2007-2008 as some banks shifted to Basel II. (See Figure 1.) A naïve observer might conclude from this pattern of declining average risk-weight assets to average total assets that banks had markedly decreased their exposure to credit risk over the 14-year period. The outbreak of the GFC suggests that a more plausible interpretation is that banks became increasingly skillful at regulation arbitrage, increasing their exposures to credit risk even as the regulatory measure of credit risk declined.

[Insert Figure 1 here]

Even though risk in the banking system had increased to crisis levels by 2008, the regulatory measures of capital adequacy failed to warn that a financial disaster of unprecedented dimensions was imminent. Moreover, during the crisis, several banks that were insolvent or nearly insolvent continued to report risk-weighted capital ratios that exceeded regulatory minimums. Overall regulatory measures of risk remained remarkably steady. A truly risk-sensitive measure of capital adequacy would have shown a marked

increase in (properly-measured) risk weighted assets and a decline in the ability of banks to absorb loss without entering a resolution procedure. Even after the outbreak of the crisis, large banks failed to increase retained earnings or issue a meaningful amount of new equity capital. Indeed, in several egregious cases, they paid dividends that exceeded their earnings. Truly risk-sensitive measures of capital adequacy should have revealed a marked deterioration because of the increased risk and the diminished capacity of banks to absorb loss.

The disparity between direct evidence of the deterioration in the soundness of the banking system and the official measures led market participants to simply disregard regulatory capital adequacy ratios –both the numerator and the denominator -- and focus instead on leverage, an uncomplicated measure that made no pretense of measuring the riskiness of assets. The crisis cast doubt on the risk weights and the underlying models that produced them. Even in the domain of market risk, where modeling techniques were most advanced, some of the most sophisticated firms with large trading operations, reported substantial losses on several consecutive days that one CFO described as 25-standard deviation moves in rates.²³

In summary, the growing opacity of regulatory structure created several problems that exacerbated the vulnerability of the financial system to a crisis. The lack of transparency made it difficult to verify compliance with prudential regulations and impeded effective market surveillance and discipline. Moreover, regulatory complexity

²³ Paraphrasing Oscar Wilde, Dowd et al (2008) commented “to experience a single 25-sigma event might be regarded as a misfortune, but to experience more than one does look like carelessness.” More fundamentally, these results suggested that the underlying distribution had shifted markedly or, more likely, that the assumed distribution was wrong.

facilitated sophisticated lobbying efforts and the introduction of financial innovations designed to undermine regulatory constraints. The highly technical nature of these complex regulations meant that changes largely escaped public scrutiny that might otherwise have served as a counterforce to self-serving lobbying efforts by regulated firms. In effect, complexity may have facilitated a degree of regulatory capture.

Without doubt, increased complexity raised the costs of implementing, monitoring and complying with regulations. Moreover, it is difficult to argue these expenditures on regulatory and compliance functions did much to enhance the safety and soundness of the financial system. Sharply increased costs that do not lead to commensurate increases in benefits raise troubling questions about the misallocation of resources caused by the adoption of a more complex regulatory system. Simplification could reduce costs for regulators, banks and the consumers of financial services.

How has regulatory reform addressed the problem of complexity?

In brief, it has not. The problem of complexity was completely ignored. Indeed, most reforms have layered still more complexity on an already complex system.

Reform in the structure of regulation

In the wake of the financial crisis, virtually every major country introduced sweeping financial reforms. Many of these new regulations focused on the G-SIBs, which were widely perceived as the main systemic threat. A superficial, but nonetheless instructive, indication of the increase in complexity of regulations can be seen in a comparison of the major reform legislation introduced in the wake of the US Great Depression, the Glass-Steagall Act (1933), with the major reform legislation in the wake of

the Great Recession, the Dodd-Frank Act (2010): The Glass-Steagall Act was 37 pages while the Dodd-Frank Act was 848 pages. Even this simple indicator understates the magnitude of the difference because the Dodd-Frank Act has already been accompanied by tens of thousands of pages of new rulemakings and guidance even though implementation is not yet complete.

Reform of Capital Regulation

A closer look at capital regulation illustrates the problem. The failure of capital regulation to prevent or even reflect the increasing risk in the financial system led to efforts to sharpen the definition of regulatory capital. Tier 1 capital was recast as “Going Concern Capital” and was purged of innovative instruments that had enabled some institutions to greatly expand their leverage. While this was a welcome reconceptualization of the role and purpose of Tier 1 capital, the measure still relies heavily on accounting values that differ across countries and are known to lag economic values badly in an economic downturn.²⁴ Although the authorities refined the definition of Tier 1 capital they introduced an awkward distinction between Common Equity Tier 1 Capital (CET1) and Additional Tier 1 (Non-Common Equity Tier 1) capital, which introduces additional complexity to regulatory capital ratios without enhancing safety and soundness.

Tier 2 Capital has been recast as “Gone Concern Capital,” which is certainly a conceptual advance over the original, murky notion. Its importance has been implicitly downgraded, but it is still retained in regulatory capital ratios.²⁵

²⁴ The regulators did succeed in eliminating some of the more dubious account entries such as deferred tax losses from the computation of regulatory capital.

²⁵ As noted below, the adoption of Total Loss Absorbing Capital Requirements makes the Tier 2 distinction seem entirely redundant.

In addition to refinements in the definition of regulatory capital, regulators have recalibrated and increased the number of risk-based capital ratios that G-SIBs must meet. Tier 1 capital must now be 6% of RWA. Of the 6%, 4.5% must be CET1. Tier 2 Capital must be at least 2% of RWA. Large US banks face an additional complexity as a result of the Collins Amendment to the Dodd-Frank Act, which sets a floor on the minimum leverage capital and risk-based capital requirements. The Collins Amendment states that these requirements can be no lower than the risk-based capital requirement and the ratio of Tier 1 capital to average total assets that applied when the Dodd-Frank legislation was enacted. Since no US banks had been authorized to use internal ratings based capital weights, this placed a floor on the extent to which banks could reduce their RWA once they received authorization. A large bank (defined in the Dodd-Frank Act as a BHC with consolidated assets \geq \$50 billion) must thus compute its capital requirements using the Advanced Approach that relies on the supervised use of its own internal models to some extent and the Standardized Approach that relies on risk weights set by the regulators. The two different approaches will most likely lead to two different minimum required capital ratios. The large bank will be required to meet whichever capital requirement is higher.

Over and above the minimum capital ratio, large banks must have an additional 2.5% of CET1 in good times that could be drawn down in times of stress. In addition, under certain, carefully specified conditions individual countries may impose an additional requirement of 0-2.5% of RWA as a counter-cyclical buffer to discourage excessive lending.

In recognition of the concern that G-SIBs pose a greater threat to the financial system than other smaller and/or less complicated banks, CET1 add-ons have been established to ensure additional loss-absorbing capacity. These surcharges are imposed on

banks that the Financial Stability Board has identified as G-SIBs and vary in magnitude depending on the risk bucket in which an institution has been placed. The Federal Reserve Board (FRB, 2015a) has taken a more complicated approach to calibrating the surcharges. It has adopted two different methods for gauging the extent to which a BHC poses a systemic threat. Method 1 uses proxies for the five broad categories identified by the FSB – size, interconnectedness, cross-jurisdictional activity, substitutability, and complexity. A BHC determines its score in each category based on its firm-specific systemic indicators within each category relative to aggregate global indicator amounts across large global banks. If a BHC’s Method 1 score exceeds a defined threshold it is identified as a G-SIB.

If a BHC is identified as a G-SIB, it is also required to compute its G-SIB surcharge under Method 2, which replaces a measure of the firm’s use of short-term wholesale funding for the substitutability indicator employed in Method 1. A BHC’s G-SIB surcharge will be the higher of the two computations.

The Basel Committee also took note of the uncomfortable fact that simple leverage ratios have been much more effective than the complex risk-weighted ratios in identifying problem banks (Blundell-Wignall and Roulet, 2013; Demirguc-Kunt et al, 2010; Haldane and Madouros, 2012; Mariathan and Merrouche, 2012)²⁶. Thus, they have decided to add a leverage ratio requirement in which the denominator is total on-balance-sheet assets and off-balance sheet items to the existing ratios based on RWA in the denominator. The US has long imposed a limit on leverage that has been maintained while the more complicated

²⁶ Mariathan and Merrouche (2012) report that the leverage ratio is a more reliable predictor of bank failure when the risk of a crisis is high, while the Basel II risk-weights prove superior when the risk of a crisis is low. In other words, the Basel II risk weights are least reliable when they are most needed to monitor the capital adequacy of individual banks.

Basel ratio was being introduced. The Standard Leverage Ratio in the US requires that all banks maintain Tier 1 capital equal to at least 4% of average consolidated on-balance-sheet assets. In addition, the US regulators have decided to impose a Supplementary Leverage Ratio calibrated against a bank's on balance-sheet assets and off-balance sheet exposures (defined to include derivatives exposures, securities transactions financing exposures and other off-balance-sheet commitments). All US banks with \$250 billion or more in assets or foreign exposures in excess of \$10 billion must maintain Tier 1 capital equal to at least 3% of this broader denominator.

G-SIBs are subject to yet another leverage requirement based on total on-balance-sheet assets and off-balance-sheet items ("Leverage exposure"). Holding companies of G-SIBs must maintain Tier 1 capital equal to at least 5% of Leverage Exposure. Insured depository institutions within the holding company must maintain Tier 1 capital equal to at least 6% of total exposures.

Bankers often contend that the most restrictive capital requirements are not the established regulatory minimums, but rather the consequence of a new, more forward-looking approach to supervision. This supervisory technique was developed by the Federal Reserve Board during the crisis in an attempt to restore confidence in the solvency of major US banks. During the crisis the capital markets lost confidence in both banks and the regulators because the regulatory capital adequacy ratios failed to reflect the increasing vulnerability of the banking system before the crisis and did not reflect the severity of the crisis once it erupted.²⁷

²⁷ Wall (2013) makes the additional important point that part of the failure of the Basel standards was attributable to overstated asset values. As noted above, both the FASB and IFASB are implementing

The FRB (2009) required the 19 largest US Bank Holding Companies, which accounted for two-thirds of the total assets of the US banking system, to participate in the Supervisory Capital Assessment Program (SCAP). These banks were obliged to show they could remain in compliance with capital standards under a nine-quarter, severely adverse stress scenario specified by the Fed. SCAP was designed to provide a credible assessment of the capital strength of these institutions. Any institution that failed to show it would remain in compliance with capital adequacy standards was obliged to raise additional capital to fill the gap. If the institution could not convince investors to provide sufficient additional capital, the Treasury's Capital Assistance Program (CAP) stood ready to fill the gap. This backstop was crucial to the success of the effort since 10 of the 19 banks failed the test and were required to raise additional capital. In the end none of these banks needed to draw on CAP, the availability of this backstop sustained confidence the solvency of these banks as they raised capital.²⁸

The success of SCAP led Congress to include a supervisory stress test in the Dodd-Frank Act, the Dodd Frank Asset Stress Tests (DFAST).²⁹ The supervisory stress test is

accounting reforms to mitigate this problem. Wall (2013, p.12) notes the implementation of supervisory stress tests will also curb the tendency from banks to overstate the value of their assets: "Although the stress tests as currently implemented also rely on accounting measures of capital, the longer time horizon of the stress tests can force a bank to eventually recognize its losses."

²⁸ Even though none of the banks drew on CAP, the presence of the backstop was critical. It enabled the Fed to disclose that 10 banks had failed without fear of setting off a destabilizing run on these institutions. Moreover, the fact that a significant number of institutions failed enhanced confidence in the rigor of the exercise. The European Union tried to emulate the SCAP program, but without a credible backstop. The market lost confidence in the rigor of the EU stress test when only a few months after the results of the test were announced the Irish banking system collapsed. In the absence of a credible way to provide a capital backstop, the EU officials may have been reluctant to apply rigorous standards.

²⁹ Section 165(i)(2) of the Dodd-Frank Act requires banks with total consolidated assets of more than \$10 billion to conduct annual stress tests. Early in each year (no later than February 15), the supervisory authorities specify three scenarios: a base-line, adverse and severely adverse scenario. Each scenario includes economic variables such as macroeconomic activity, unemployment, exchange rates, price, incomes

intended to complement minimum capital ratios, which in principle reflect a bank's current condition, with a projection of how the capital adequacy of the bank will develop over a 9-quarter period under conditions of economic and financial stress. Banks must demonstrate to regulators that they will be able to remain in compliance with four specified minimum capital ratios at the end of a 9-quarter, severely-adverse stress scenario.³⁰ In order to comply with this new approach, banks must model the evolution of their income statement and balance sheets under the specified stress conditions.

In addition, the Fed requires large banks in the US to conduct a Comprehensive Capital Analysis and Review (CCAR) in which both the bank and the regulators model the impact of the stress scenarios on the banks income statement and balance sheet. These stress tests are designed to assess the potential impact of various hypothetical economic scenarios on the consolidated earnings, losses and regulatory capital of each US Bank Holding Company (BHC) with \$50 billion or more in total consolidated assets.

Large BHCs are required to conduct two company-run DFASTs each year. The CCAR exercise is once a year. Both DFAST and CCAR incorporate the same projections of pre-tax net income. The primary difference between the two exercises concerns assumptions regarding capital actions. In the CCAR stress tests a bank's planned dividend payments and stock buy-backs are combined with the projections of net income to estimate the BHC's baseline and post-stress capital ratios. In contrast, the DFAST projections rely on a

and interest rates. The adverse and severely adverse scenarios are not intended to be forecasts. Instead they are hypothetical scenarios designed to test the strength and resilience of financial institutions.

³⁰ They must also be able to show that they will remain in compliance under the base line, severe and severely adverse regulatory stress scenarios. Banks that can meet the severely adverse scenario generally have no trouble demonstrating that they will remain in compliance with capital requirements under these scenarios even though the severe adverse stress scenario may involve shocks that differ in kind from the severely adverse scenario.

standardized assumption that common stock dividends will continue at the current level. Thus, the post-stress capital ratios projected for DFAST will differ significantly from the CCAR post-stress analysis if the BHC is planning to increase dividends or stock buy-backs.

If a BHC is not able to demonstrate it will be able to meet its capital requirements under the specified stress conditions given its planned capital actions (or if the regulators are not satisfied with the robustness of the bank's underlying data, models and capital planning process), the regulators may constrain the bank's dividend distributions or share repurchases. In practice, this means US-based G-SIBs must maintain additional regulatory capital considerably above current required minimums and the amount will vary depending on harshness of the severely adverse stress scenario specified by the regulators and with the parameters estimated for the Fed's model of the bank.³¹

The most recent addition to the regulatory capital tool kit is a requirement that banks meet a minimum ratio for Total Loss Absorbing Capital (TLAC) relative to RWA and Total Leverage Exposure (FRBb, 2015b). The new rule is intended to strengthen the ability of large banks to be resolved without extraordinary government support or taxpayer assistance. The TLAC rule includes a minimum External Long-Term Debt (LTD) requirement that could be used to recapitalize a firm's critical operations upon failure. The overall TLAC requirement can be met with both regulatory capital and LTD. The regulators believe that this will increase the loss-absorbing capacity by 60% or more (FRBb, 2015, p1).

³¹ To some extent banks have always felt obliged to maintain capital above regulatory minimums to meet supervisory expectations, such as the additional capital required to be deemed "well-capitalized". Moreover, the consequences of falling short of the regulatory minimum incentivize banks to maintain higher regulatory capital ratios as a precaution against unanticipated losses.

Although the preceding paragraphs have attempted to provide a simplified overview of capital requirements, they are nonetheless quite complicated. The extent of this complexity can be seen in Table 1, which displays each of these required capital ratios organized by the relevant numerator (identified in the left column) and the relevant denominator (identified on the top row). The table identifies five different denominators and five different numerators that underlie thirty-nine different regulatory capital requirements.³² In contrast recall that under the Basel I regime US banks were required to meet two risk-based capital requirements – a 4% Tier 1 ratio and an 8% Total Capital ratio – and a simple leverage requirement. Simplicity and comparability have clearly not been important objectives in regulatory reform.

[Insert Table 1 here]

Conceptually, it is as if the regulators have required that banks solve a large, complex linear programming problem in which banks must attempt to maximize profits subject to thirty-nine plus constraints.³³ Compliance is clearly more costly than under the Basel I regime which imposed only two constraints on capital ratios. These costs, in the first instance, fall on banks that must understand these requirements and devise and install information technology systems that will capture the appropriate data and monitor the ratios to ensure compliance. Of course, many of these costs will be passed on to users of financial services. Supervisors also face a heavier burden in oversight and verification and,

³² Table 2 assumes that all capital requirements have been fully implemented. The table would have been even more complex if transitional arrangements had been considered.

³³ Of course, banks must deal with many other regulatory requirements and constraints in addition to these required capital ratios.

to some extent, these costs fall on taxpayers. The multitude of regulatory ratios increases the difficulty for outside stakeholders to evaluate capital adequacy and may contribute to an uncertainty premium on banks equity in capital markets. Moreover, when presented with a wide array of ratios, market participants will understandably want to know which of the ratios is most important.

The sheer complexity of these ratios increases the difficulty facing policy makers in understanding how banks will react to changes in macroeconomic conditions. Different banks are likely to find some ratios more binding than others, but this will depend on the business model each bank pursues as well as market conditions. Do the regulatory authorities have a clear understanding of what activities they are implicitly encouraging or discouraging with this welter of capital ratios? To some extent the CCAR process provides information that will enable supervisors to understand the impact of a variety of shocks on four different capital ratios: leverage, Tier 1 risk-based, CET1 risk-based and Total risk-based (FRB, 2016). But if the CCAR process identifies four ratios as the most important, why are the other 35 necessary?

Simply arraying the current requirements in this format suggests several possibilities for simplification. For example, if the authorities impose an External TLAC requirement accompanied by an LTD requirement, why is it necessary to define and monitor Tier 2 capital? If Tier2 capital can be removed, then all ratios in which Total Capital is the numerator could be removed. This means rows 13-18 could be deleted from the system without any loss of rigor. Similarly, Tier 1 Common and General Approach RWA are outmoded measures that are superseded by CET1 and the RWA Standardized Floor and

so column E and rows 19 and 20 could be removed without undermining strength of the system in any way.

Other simplifications could be made, although the case may be less obvious. It seems pointless to continue Tier 1 as a definition of regulatory capital when CET1 is unquestionably the highest quality capital and what really matters in the market place. It is hard to imagine an argument for continuing a special regulatory category for “Additional Tier 1 Capital” that would justify the additional complexity. The criteria for “Additional Tier 1 Capital” are sufficiently complex that they provide an obvious incentive for lobbying to weaken the standard – as, indeed, happened in the late 1990s. It seems doubtful that if the original architects of the Basel system had defined Tier 1 as CET1 from the start, as advocated by the German negotiators, regulators would have added an additional category of Tier 1 to accommodate instruments that are not common equity. If Tier 1 were eliminated then rows 6 through 10 could be deleted from the regulatory matrix. Only the leverage ratios would need to be restated as ratios of CET1 to total assets.³⁴

Another good prospect for simplification would be the elimination of DFAST for G-SIBs. CCAR provides more information than DFAST by including intended capital actions that are crucial to a regulatory determination of whether a bank can meet its expected minimum nine quarters into a period of stress. It’s unclear that DFAST provides any additional information of supervisory importance. If DFAST were eliminated then rows 5, 12, 18 and 20 could be eliminated.³⁵

³⁴ Alternatively, if CET1 and additional Tier 1 are deemed equivalent in their ability to sustain the bank as a going concern, it is not necessary to set requirements about CET1.

³⁵ Since the Dodd-Frank Act requires the DFAST stress tests, Congressional action may be required to exempt banks subject to CCAR stress test from the DFAST filings.

Moreover, since the CCAR (and DFAST) focus solely on risk-weighted capital ratios that use the Standardized Floor, the rationale for continuing to require the G-SIBs meet a standard based on Advanced Approaches as well is unclear. In making the decision to use only the Standardized Floor in these crucial stress tests that have become the centerpiece of regulatory and supervisory policy, the authorities have implicitly admitted misgivings about the reliability of ratios based on the AIRB. If a strong defense cannot be made of continuing to require that banks meet the AIRB ratios, column A could be eliminated as well.

The recent distinction between Method 1 and Method 2 approaches for determining a G-SIB's risk bucket seems puzzling although it may have been thought necessary to assure foreign regulators that US GSIBs are being held to a standard at least as high as those imposed on banks headquartered abroad, which will be evaluated under Method 1 only. In time, if Method 2 proves to be a more reliable (and more rigorous) indicator of the systemic footprint of a G-SIB, it would seem logical to drop Method 1.

Finally, the case for maintaining a Standard Leverage Ratio is unclear when a more sophisticated measure of Average On-Balance-Sheet Assets and Off-Balance-Sheet Items is available. It should be a good candidate for elimination in the near future.

These very simple proposals could reduce the complexity of capital regulation by 75%. Although these proposals are quite straightforward, implementation would require coordinated action by the regulatory authorities and Congress.³⁶ Quite possibly regulators

³⁶ The Collins amendment expressed Congressional skepticism that the regulators would maintain rigorous capital standards by specifying a floor for the leverage ratio and the RWA ratio. The behavior of the regulatory authorities over the last eight years may have reduced concerns that the regulators would permit capital adequacy standards to erode.

might argue that one or more of these deleted ratios makes an important incremental contribution to the safety and soundness of the system and is therefore worth the additional complexity. This would be a debate worth having, but unfortunately, it is unlikely to take place in a public forum. Regulators are seldom enthusiastic about debating such issues in public and the system has become so complex that non-self-interested parties are unlikely to make the necessary investment to be able to pose well-reasoned arguments. Most importantly, we do not have effective sunset laws in place that would oblige the authorities to look back at the welter of regulatory requirements and ask whether the benefits truly outweigh the costs.

The preceding suggestions have focused on how capital regulation could be simplified within the *current* framework but are not intended as an endorsement of the current framework. It is troubling that despite the number of required capital ratios, no measures based on market value measures of capital rather than accounting measures have been included. Such measures could be observed and verified in real time. Moreover, they gave timely warnings of the impending crisis during 2007 and 2008 (Calomiris and Herring, 2010). It could be argued that not only have the regulators produced a superfluity of regulatory ratios, but also, they have focused on the wrong ratios. This important point is beyond the scope of this paper.

Why does regulatory reform usually lead to more complexity?

Regulatory reform is inevitably path dependent. As Haldane (2013) has noted, “History locks in idiosyncrasies and complexities of the past, generating a steadily rising tide of red tape.” In essence, we may have a more complicated regulatory system now

because the system was already quite complicated before the reforms. Kane's concept of the regulatory dialectic illuminates how much of this complexity evolved. Basel I was an attempt by regulators to curb avoidance behavior by banks subject to the earlier leverage ratio. But this round of reregulation was followed by yet another round of loophole-seeking behavior as banks found ways to exploit inconsistencies between the Basel I risk weights and the perceived riskiness of assets. It also spawned a wave of financial innovations to shift risk-taking off-balance sheets and beyond the reach of capital requirements. Basel II attempted to close these loopholes by refining risk weights so that they would be better aligned with market estimates. This represented a quantum shift in the complexity of regulations, failed to eliminate loophole exploitation by banks and enabled some Basel-II compliant banks to reduce their risk-weighted assets and increase their leverage still more. Basel III is yet another round of reregulation that focuses on the quantity and quality of capital and constrains leverage. Undoubtedly yet another round of loop-hole exploitation is underway.

In the context of increasingly complex regulations the otherwise laudatory procedure of issuing proposed rules for public comment may contribute to a dysfunctional outcome. When a very complex set of proposed rules is posted for comment, the only entities likely to respond are profoundly self-interested. Of course, regulators should understand the views of the industry, but these views are generally not counterbalanced by comments from experts who do not have a financial stake in the outcome. The costs for an independent expert to learn enough about a complicated proposal to make a well-reasoned comment rise with the complexity of the regulatory structure. When the comment period ends, regulators conscientiously review the comments, but they are generally looking only

at the views of industry, which have a predictable bias. In good faith, the regulators often make modifications to the proposed rules to meet the objections raised in the comments. Frequently, these changes involve adding still more complexity to take account of special cases raised in the comments. And, almost always, the final rules are more permissive than those originally proposed.

Few would deny that regulation has become increasingly complex, but some would argue that increasingly complex regulation is a necessary response to an increasingly complicated banking system. While this assertion seems plausible, the interaction between a complicated banking system and complex rule-making undoubtedly goes in both direction. To some extent, the complexity of the banking system is endogenous. Complex rules create incentives for banks to develop still more complicated financial instruments and financial structures that will enable them to comply with the letter of the regulations while evading their intended constraints. Moreover, Haldane (2011, p.2) has argued, based on the literature on complex systems, simple rules are more appropriate for a complex, adaptive system like finance. "Faced with complexity, the temptation is to seek complex control devices. In fact, complex systems typically call for simple control rules. To do otherwise simply compounds system complexity with control complexity. Uncertainty would not then divide, it would multiply."

Moreover, more complicated rules are inevitably more difficult for both supervisors and regulatees to understand making compliance much costlier. The very opacity of current capital regulations makes it difficult for external market observers to understand regulatory measures of capital adequacy. If market participants find it difficult to monitor the evolution of an individual bank's capital adequacy over time or to compare one bank's

capital adequacy with that of other banks, the market cannot be an effective force for consistent discipline. Rather the market will likely respond in a panicky way when events make clear that the regulatory measures have been misleading.³⁷

Despite these arguments in favor of greater simplicity in regulations, the idea meets with considerable skepticism from several important participants in reforming and implementing financial regulation. Bankers have much to gain from identifying and exploiting opaque loopholes, which are less likely to be monitored in a complicated regulatory system and so they are unlikely to support simplification measures that do not liberalize constraints on bank behavior. Legislators seldom have enthusiasm for simplifying the regulatory structure at least in part because they are often reliant on flows of funds from lobbyists representing regulated firms to finance reelection campaigns. Finally, regulators, lawyers, accountants and industry consultants have invested large amounts of their human capital in understanding (and often contributing to) complexity and may see no clear personal advantage in simplification.

Yet the costs of maintaining and enforcing a complex system of regulation mount even though we make no systematic attempt to measure them. A rough indicator may be found in the growing numbers of regulators and compliance personnel employed to operate the system. Citigroup now employs a larger compliance staff than the entire number of employees (about 25,000) at Lehman Brothers when it collapsed (Kay, 2016). These talented individuals could be employed producing goods and services that

³⁷ In this respect, the innovation of publicly-disclosed supervisory stress tests is a major advance. The CCAR tests show how the same stress scenario will affect comparable banks in ways that are readily understood by market participants. Although banks are required to comply with four different regulatory ratios, the results are described in terms of the evolution of income statements and balance sheets over a nine-quarter period. This provides much higher quality information than the capital ratios reveal, which at best showed the current condition of the bank, but did so in a way that made comparisons across banks difficult.

consumers value rather than simply adding to the costs of producing financial services. Some regulatory and compliance costs are undoubtedly necessary, but it seems unlikely that anyone could make a persuasive argument that the current system produces the desired degree of safety and soundness efficiently.

What might be done? The Basel Committee (2013b) addressed the issue in a discussion paper, “The regulatory framework: balancing risk sensitivity, simplicity and comparability.” Potential ideas included: (a) explicitly recognizing simplicity as an additional objective of regulatory policy; (b) enhancing disclosure; (c) utilizing added floors and benchmarks to mitigate the consequences of complexity; (d) reconsidering the linkage between internal and regulatory models of risk; (e) limiting national regulatory discretion; (f) improving the consistency of supervision across countries. These ideas seem far from bold, but there is scant evidence to date that they have had any impact. Indeed, since the publication of this discussion paper, the Basel Committee has proposed hundreds of pages of new regulations and supervisory practices, none of which are aimed at simplifying the regulatory system.

The US seems especially resistant to proposals for regulatory simplification. Nonetheless, there has been no shortage of plans issued over the past sixty years. Some of the most prominent included the Hoover Commission Proposal (1949), the Hunt Commission Report (1971), the Treasury Department Proposal (1982), the Federal Reserve and Treasury Department Proposal (1994), the Treasury Blueprint for a Modernized Financial Regulatory Structure (2008) and the Volcker Alliance Recommendations (2015). Despite these considerable efforts, no progress has been made. Indeed, the system has become markedly more complex. This is especially puzzling

because several countries with much older regulatory traditions have achieved considerable success in simplifying their regulatory structures (Herring and Carmassi, 2008).

Why has it been so difficult in the United States? Calomiris and Haber (2014) argue in their book *Fragile by Design* that regulatory systems are motivated less by the aim of sustaining financial stability than by the objective of controlling the distribution of benefits that arise from bank charters. Combining political analysis with cross-country historical examination of banking crises, the authors develop the concept of the Great Game of Bank Bargains in which coalitions form among payers to determine the distribution of benefits from bank charters. Calomiris and Haber (2014) argue that “The group in control of the government always receives a share of those benefits, and the coalition that forges a partnership with the government splits the remainder.” The Game of Bank Bargains thus is driven by the logic of politics, not the logic of economics and it constrains the possible scope for enacting effective bank reforms. In a democracy persistent popular support is necessary, but the authors argue that “self-interested” groups will have strong vested interests in forming powerful coalitions to oppose the idea and distract and misinform the voting public.

Reform efforts are further hampered by the fact that bank regulation is generally regarded as complicated and esoteric. And, the consequences of bad policies may not emerge for many years. The dominant political coalition with a stake in the existing system may add further complexities to make it difficult for most voters to understand what is happening. This kind of opacity (whether purposeful or not) undoubtedly impedes reform efforts.

A recent contribution to the theory of regulatory reform (Barth, Caprio et al, 2013) emphasizes that sustainable reforms need to be robust to withstand the political pressures. They emphasize the sustainable reforms should rely on simple rules that enhance the ability of everyone to understand them and the ability of regulators to verify compliance. In addition, rules should be automatically and transparently enforceable to minimize politically-motivated discretion and any government subsidies should be transparent to facilitate accountability. These are clearly not the precepts that guided the most recent round of reforms in the US

The problem of how to reverse the trend toward increasing complexity remains perplexing. Andrew Lo (2011) has observed that “In physical and natural sciences, complexity is often a fact of life and exogenous, but [in financial systems] it is usually a demon of our own design.” What would it take to exorcise this demon from the US financial regulatory system?

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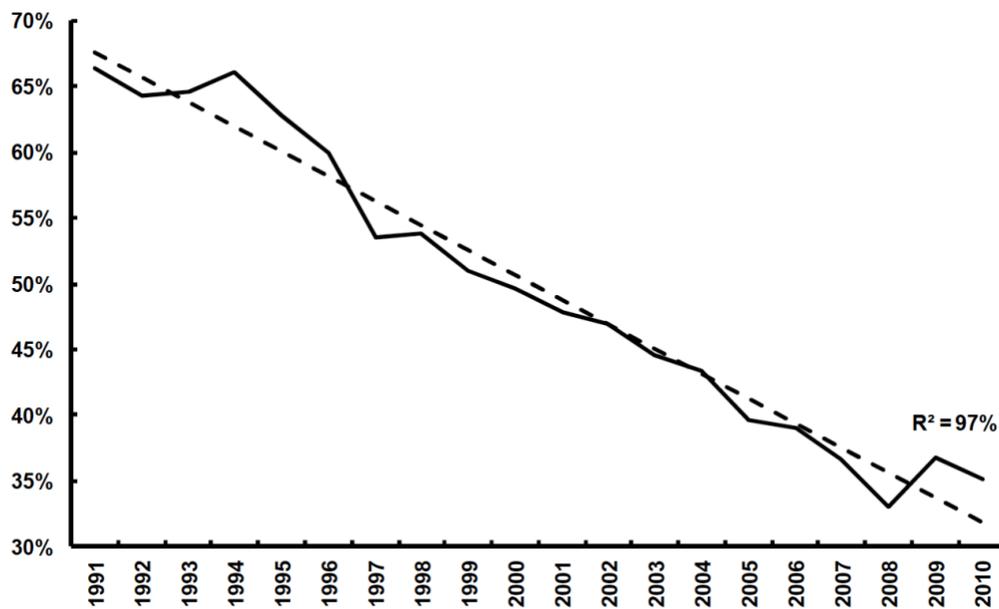
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Figure 1. The Decline in Average Risk Weights (RWA/TA) for Leading Banks



Source: Slovik (2011). The solid line represents the decline in risk-weighted assets (RWA) relative to total assets (TA). Slovik's calculations are based on the Banker Database. The data is a weighted average for 15 of the largest systemically important banks in the US and the euro area, the UK and Switzerland. They include UBS, Barclays, BNP Paribas, Citigroup, HSBC, Credit Agricole, RBS, Deutsche Bank, Bank of America, ABN AMRO, Societe Generale, ING Bank, Banco Santander, UniCredit and Credit Suisse.

Table 1. Regulatory Capital Requirements for US G-SIBs

| Numerator | Denominator | | Average On-Balance Sheet Assets ^c | Average On-Balance-Sheet Assets + Off-Balance Sheet Items |
|---------------------------------|-------------------------|---|---|--|
| | A | B | | |
| | RWA Advanced Approaches | RWA Standardized Floor ^f | | |
| CET1 | 1 | Minimum Common Equity Tier 1 Ratio (CET1) = 4.5% ^a | Minimum CET1 = 4.5% | |
| | 2 | CET1 Capital Conservation Buffer 2.5% above Minimum CET1 Ratio ^d | CET1 Capital Conservation Buffer 2.5% above Minimum CET1 Ratio | |
| | 3 | CET1 Counter-Cyclical Buffer, 0-2.5% above Capital Conservation Buffer | CET1 Counter-Cyclical Buffer, 0-2.5% above Capital Conservation Buffer | |
| | 4 | G-SIB Minimum CET1 (method 1)= 7% + Method 1 G-SIB Surcharge ^f | CCAR Post-Stress Test CET1 Ratio ≥ 4.5% | |
| | 5 | G-SIB Minimum CET1(method 2) = 7% + Method 2 G-SIB Surcharge | DFAST Post-Stress Test CET1 Ratio ≥ 4.5% | |
| Tier 1 | 6 | Minimum Tier 1 Ratio = 6% ^a | Minimum Tier 1 Ratio= 6% | Standard Leverage Ratio ≥4% minimum ^a |
| | 7 | Tier 1 Capital Conservation Buffer 2.5% above Minimum Tier 1 Ratio | Tier 1 Capital Conservation Buffer 2.5% above Minimum Tier 1 Ratio | Supplementary Leverage Ratio ^b for Advanced Approaches Bank ^a ≥3% |
| | 8 | G-SIB Minimum Tier 1 Ratio (method 1) = 8.5% + Method 1 G-SIB Surcharge | | Enhanced Supplemental Leverage Ratio for G-SIB holding companies ≥ 5% |
| | 9 | G-SIB Minimum Tier 1 Ratio (method 2) = 8.5% + Method 1 G-SIB Surcharge | | Enhanced Supplemental Leverage Ratio for Insured Depository Institutions within G-SIB holding companies ≥ 6% |
| | 10 | | | CCAR Post-Stress Test Minimum Leverage Ratio ≥ 4% |
| | 11 | | CCAR Post-Stress Test Tier 1 Minimum Ratio ≥ 6% | DFAST Post-Stress Test Minimum Leverage Ratio ≥ 4% |
| | 12 | | DFAST Post-Stress Test Tier 1 Minimum Ratio ≥ 6% | |
| Total Capital = Tier 1 + Tier 2 | 13 | Minimum Total Capital Ratio = 8% ^a | Minimum Total Capital Ratio = 8% | |
| | 14 | Total Capital Conservation Buffer, Total Capital 2.5% above Minimum Total Ratio | Total Capital Conservation Buffer, 2.5% above Minimum Total Ratio | |
| | 15 | G-SIB Minimum Total Capital Ratio (method 1) = 10.5% + Method 1 G-SIB surcharge | | |
| | 16 | G-SIB Minimum Total Capital Ratio (method 2) = 10.5% + Method 1 G-SIB surcharge | | |
| | 17 | | CCAR Post-Stress Test Total Capital Minimum Ratio ≥ 8% | |
| | 18 | | DFAST Post-Stress Test Total Capital Minimum Ratio ≥ 8% | |
| External TLAC | 20 | Minimum External TLAC Ratio ≥ 18% | Minimum External TLAC Ratio ≥ 18% | Minimum External TLAC Ratio ≥ 9.5% |
| | 21 | External TLAC Buffer ≥ 2.5% + Method 1 G-SIB surcharge + Countercyclical Buffer | External TLAC Buffer ≥ 2.5% + Method 1 G-SIB surcharge + Countercyclical Buffer | |
| External Long-Term Debt (LTD) | 22 | Minimum LTD Ratio ≥ 6% + Method 2 G-SIB surcharge | | Minimum External LTD Ratio ≥4.5% |

Footnotes

^aFederal Register (2013), p. 62029

^bFederal Register (2013), p.62031

^cAverage total consolidated assets, minus amounts deducted from Tier 1 capital (Federal Register, 2013, p.62030)

^dFederal Register, 2013, p. 62033

^eFederal Register, 2013, p. 62038

^fFederal Register, 2013, p. 62021

^gFederal Register, 2015, p. 49094 for all G-SIB adjustments