

Less Really Can be More: Why Simplicity & Comparability Should be Regulatory Objectives

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Abstract Regulatory complexity undermined efforts to strengthen financial stability before the crisis. Nonetheless, post-crisis reforms have greatly exacerbated regulatory complexity. Using the example of capital regulation, this paper shows how complexity has grown geometrically from the introduction of the Basel Accord on Capital Adequacy in 1988 to the introduction of Basel III and the total loss-absorbing capacity (TLAC) proposal in 2015. Analysis of the current welter of required capital ratios leads to a proposal to eliminate 75 % of them without jeopardizing the safety and soundness of the system. Quite possibly, regulators might argue that one or more of these deleted ratios does make an important incremental contribution to the safety and soundness of the system. But these important debates are not taking place in public, in part because we lack systematic measures of the costs of regulatory compliance and effective sunset laws that would require that regulations meet a rigorous cost-benefit test periodically. The concluding section poses the more speculative question of why, despite the evident advantages of a simpler, more transparent regulatory system, the authorities layer on ever more complexity.

Keywords Basel Accord · Basel II · Basel III · Capital regulation · Financial crisis · Safety and soundness · Prudential regulation and supervision

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Introduction

Regulatory complexity imposes heavy deadweight economic costs and undermines efforts to strengthen financial stability. Nonetheless, the problem has received virtually

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no attention in the wave of regulatory reform that swept around the world in the wake of the financial crisis of 2007–2009. Indeed, most of the reforms have increased regulatory complexity. This article attempts to sketch the broad outlines of the problem that I hope will receive much wider attention.

The first section illustrates how complexity undermined financial stability before the crisis. The example illustrates how complexity in financial instruments, complexity in financial regulation, complexity in financial institutions and complexity in bankruptcy and resolution procedures combined to exacerbate financial vulnerability. The second section argues that regulatory reform has generally exacerbated regulatory complexity, using the reform of capital regulation as the primary example. The final section is much more speculative and considers why regulatory simplification remains so elusive.

How Complexity Contributed to the Crisis

Complexity in Financial Instruments

The opportunity to arbitrage differences in capital requirements across instruments within institutions and across institutions encouraged the rapid development of a series of increasingly complicated innovations in financial instruments. Mortgage lending provided some of the most attractive opportunities. Across institutions, the government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, were permitted to finance 2.5 % of every \$100 of mortgages in their portfolio with regulatory capital. The remaining \$97.50 could be financed at very close to the risk-free rate because of an implicit government guarantee.¹ In contrast, banks were required to finance 4 % of every \$100 of mortgages in their portfolios with regulatory capital and the remainder with debt. In the case of the largest banks that benefitted from a too-big-to fail, implicit guarantee, the cost of funds was close to the risk-free rate, but generally above the rate on GSE debt.

This disparity in regulatory requirements created an obvious incentive for the GSEs to buy mortgages from banks because they could fund them at lower cost. Moreover, the GSEs could purchase mortgages, pool them and transform them into mortgage backed securities (MBSs) that could be placed in capital markets at just above the risk-free rate because the GSEs guaranteed them against default risk. In part because of the implicit guarantee, they could accomplish this transformation setting aside only 0.45 % of every \$100 dollars in mortgages as a buffer against default risk. The sale of MBSs permitted the GSEs to buy still more mortgages, which in turn enabled banks and thrifts to engage in still more mortgage lending. This was intended to expand the amount of mortgage finance available to encourage home ownership and in that it was successful.

But, it also contributed to a substantial increase in leverage in housing finance. Instead of the 4 % regulatory capital that regulators required banks to use to finance \$100 of mortgages, the bank could sell the mortgages to the GSEs, which would transform them into MBSs. Because bank regulations favored holdings of GSE guaranteed MBSs by

¹ Although the Treasury engaged in the ritual of denying that such guarantees existed, in the summer of 2008 it felt obliged to honor these implicit guarantees in the hope of stabilizing the financial system. Of course, this justified expectations that the guarantees would be honored despite the disavowals and further eroded confidence in official statements.

imposing a substantially lower capital requirement, banks could finance \$100 in MBS with only 1.6 % of regulatory capital. Thus if a bank sold \$100 in mortgages to a GSE, which pooled the mortgages and issued MBS that were purchased by the bank, the regulatory capital backing the \$100 of mortgages was only 2.05 % (1.6 % at the bank and 0.45 % at the GSE when the MBS was created). A given amount of regulatory capital could thus fund almost twice the volume of mortgage lending through this kind of securitization relative to conventional mortgage lending in which the loan was originated, financed and held by the bank to maturity.

This expansion of leverage was fairly obvious, but an additional round of innovations proved much more insidious. Without the GSE guarantee against default risk, mortgage pools needed to be valued on the basis of the quality of the individual instruments. Banks found that they could enhance the value of these mortgages by performing a similar transformation, but without the GSE guarantee. By pooling mortgages of different quality, they could issue tranches of very high quality (AAA-rated) MBSs supported by lower-rated tranches that had a subordinated claim on cash flows from the pool of mortgages. This process could be extended by repackaging MBSs with differing degrees of subordination from different pools of mortgages and combining them with other kinds of securitized debt to form collateralized debt obligations (CDOs). This facilitated the transformation of lower quality tranches of MBSs into higher-rated securities by pooling and diversifying the securities and issuing tranching CDOs against this pool of debt obligations. Indeed, the technique could be used to form a CDO², which was a CDO that contained lower-rated tranches of other CDOs as well as some other securitized debt obligations.² These were derivative securities in the sense that their value was derived from the value of the underlying claims. But the complexity of these transformations made it very difficult to value the securities. Haldane (2009) observes that each CDO might contain about 750,000 mortgages and the accompanying documentation might total 30,000 pages or more.

The issuance of CDOs, which when combined with MBSs amounted to nearly \$5 trillion by 2006 (IMF, 2009), represented a large expansion of debt based on the same underlying collateral. This increase in leverage appears to have defied market or supervisory scrutiny, but as always happens when leverage increases, the borrowers became more vulnerable to a shock. Moreover, because most of this debt was short term, borrowers increased their vulnerability to a liquidity shock as well. Illiquid mortgages were being financed by relatively short-term debt. The sustainability of the market depended on the willingness of the holders of CDOs to roll them over when they came due since the portfolio of assets could not be liquidated on short notice without causing fire-sale losses. In some cases this liquidity risk was addressed by backing the CDOs with 364-day lines of credit from banks. But this was yet another form of regulatory arbitrage. Standby lines of credit of less than one-year maturity were not subject to capital requirements. This proved especially troublesome because in several cases the commitments appear to have escaped the notice of the bank's own treasury division, which was unpleasantly surprised when the lines of credit had to be honored at precisely the same time the bank's own ability to borrow was under pressure.

² This abbreviated account omits several other important elements such as the reliance on flawed credit ratings and mortgage insurance that could not be honored in a crisis.

The complexity of CDOs led to their collapse. When the value of CDOs was questioned because of deteriorating economic conditions in the housing market, the market for CDOs seized up. Once credit ratings of CDOs were in doubt, market participants found they were unable to link the value of the complex CDOs to the value of the underlying collateral from which their value should have been derived.

Complexity in the Regulation of Capital

One factor that contributed to the development of opaque financial instruments like CDOs was regulatory capital arbitrage between banks and GSEs, and within banks, between higher risk weights for mortgages than for MBSs issued by GSEs. In fact, the incentives for expanding leverage in the financial system were even more extreme because of a seemingly innocuous technical change in the definition of regulatory capital that appears to have been taken without any thought of the implications for the riskiness of the banking system. The system of capital regulation had become so complex that the regulators appear not to have understood the consequences of what they must have believed was a minor tweak to the definition of regulatory capital.

Capital regulation has not always been so complex. The original Basel Accord, the first attempt to harmonize capital requirements on an international basis, relied on the classification of assets into four different buckets, each with a different risk weight. In addition, the Accord defined two different kinds of capital for regulatory capital – Tier 1 and Tier 2. The architects of the Accord realized that this classification of assets was only modestly risk sensitive, but they wanted to avoid any charge that they were attempting to micro-manage the allocation of credit. Moreover, they were quite proud of the fact that the system was transparent and that any clerk could compute a bank's capital requirement on the back of a postcard. The simplicity and transparency of this approach facilitated comparisons of a bank's capital strength over time and enabled comparisons of capital strength across banks and across countries at any particular time.

Concerns about arbitrage of the regulatory risk weights and financial innovations designed to take advantage of discrepancies in risk weights between off-balance and on-balance-sheet exposures led the regulatory authorities to replace Basel I with Basel II. The architects of Basel II were much less concerned with allegations of micro-management of the allocation of credit and more concerned with increasing the risk sensitivity of capital requirements. The hope was that if the official risk weights accurately reflected the actual risks of a bank's exposures, incentives for regulatory arbitrage would be eliminated.³ This approach had many weaknesses (Herring 2007; 2005, 2002), but the issue that deserves emphasis in this context is the geometric increase in the complexity of capital regulation. This can be illustrated superficially by a comparison of the length of Basel I (28 pages) with the length of Basel II (333 pages). Although a bank could compute its required capital under Basel I on the back of a postcard, the number of risk buckets for a large bank under Basel II expanded to over

³ This was naïve because even if the regulators succeeded in getting the risk weights “right” from the bank's perspective, the weights would not capture the externalities that might be imposed on the broader economy if 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 Measurement Approach would have lower capital requirements than smaller banks. This is precisely the opposite of what regulators should have done if they wanted banks to internalize the costs of failure.

200,000 (Haldane 2011) and the computation of required capital entailed over 200 million calculations. 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.

The opacity of this system for determining regulatory capital requirements defied effective monitoring by bank supervisors and obscured the flow of information to the market. Because of the complexity and idiosyncratic nature of the computation of regulatory capital 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 in capital strength achieved by Basel I.

Worse still, the additional complexity accomplished nothing in improving the risk-sensitivity of measures of capital adequacy. During the crisis, several banks that were insolvent or nearly insolvent continued to report full compliance with the Basel II capital requirements. Indeed, some of the most troubled banks reported the strongest risk-based capital ratios. Citicorp reported a Tier 1 risk-weighted capital ratio of 11.8 % at a time when its market capitalization was roughly 1 % of the book value of its assets. Risk in the banking system had increased to unprecedented levels during the financial crisis, yet the regulatory risk-weighted capital ratio for banks remained remarkably steady.⁴ (Fig. 1.) The disparity between direct evidence of deterioration in the soundness of the banking system and the official measures led market participants to simply disregard regulatory capital adequacy ratios and focus instead on leverage, an uncomplicated measure that made no pretense of measuring the riskiness of assets.

The risk-weighted denominator in the required capital ratio became increasingly misleading as banks learned how to game the system in various ways. The quality of capital in the numerator was degraded, however, by a Basel Committee decision that received virtually no public attention. Basel I defined two kinds of regulatory capital, Tier 1 and Tier 2, with two corresponding required capital ratios. The most restrictive requirement was that a bank's Tier 1 capital must be at least 4 % of its risk-weighted assets (RWA). Tier 1 capital was originally defined to include shareholders' equity and claims such as non-cumulative perpetual preferred stock that would absorb loss yet permit the bank to continue operations.

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. This tax incentive for increasing leverage is countered to some extent by the rising cost of debt as creditors attempt to protect themselves against the rising expected cost of financial distress as leverage increases. Global systematically important banks (G-SIBs) generally 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 perceive regulatory requirements rather than market forces as the main constraint on their ability to increase leverage. This has led to a proliferation of market innovations to produce instruments sufficiently similar debt so that the tax authorities would permit the interest payments to

⁴ A truly risk-sensitive measure of capital adequacy would have shown deterioration to the extent that increases in risk-absorbing capital in the numerator failed to offset the substantial increase in properly risk-weighted assets in the denominator. Large banks failed to increase retained earnings. Indeed, in several egregious cases they paid dividends that exceeded their earnings and they issued negligible equity during the crisis. Thus, risk-weighted capital ratios should have declined markedly.

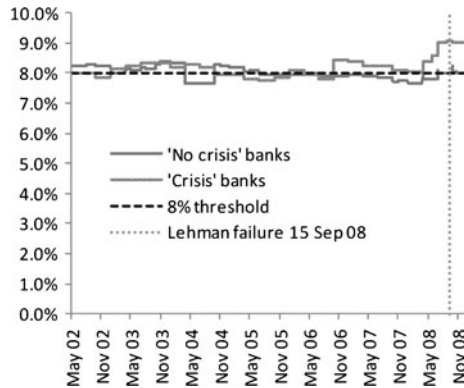


Fig. 1 The risk-weighted capital ratio failed to measure increasing risk. Source: Capital IQ and Bank of England calculations. Haldane, Andrew, 2011, “Capital Discipline,” January 9, Chart 5

be tax deductible, yet enough like equity so that the regulatory authorities would deem them eligible for inclusion as Tier 1 capital. One such innovation, particularly popular in the United States was trust preferred shares (TruPS).⁵ This decision to permit TruPS and other similar instruments to count as Tier 1 capital betrayed a troubling lack of understanding of 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 absorb loss while remaining a going concern, the Basel Committee permitted several of these kinds of innovative instruments 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. In fact, as conventionally measured, on the basis of total assets not risk-weighted assets, regulators had authorized an even larger expansion in leverage. As an approximation RWAs are roughly 50 % of total assets. Thus, the regulators implicitly authorized an expansion of leverage to 100:1, an astonishingly reckless capital structure for any kind of firm.⁶

Surely this was not what the regulators intended. Instead, this is likely a prime example of one of the dangers of an excessively complex capital structure: changes that may be introduced as relatively minor technical adjustments, can have major, unperceived implications for safety and soundness. Regulators may have been unwitting victims of the complicated regulatory structure that they themselves had created.

⁵ 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 (SP) 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).

⁶ It should be noted that most banks refrained from taking full advantage of the more permissive leverage ratio and banks in the United States were constrained by a capital requirement that their limited leverage.

In summary, the opacity of the complex regulatory structure created several problems that exacerbated the vulnerability of the financial system to a crisis. Lack of transparency made it difficult to verify compliance with prudential regulations and impeded effective market surveillance and discipline. Moreover, regulatory complexity facilitated lobbying and 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. Complexity may have facilitated regulatory capture.

Without doubt, increased complexity raised the costs of implementing, monitoring and complying with regulations. Moreover, it is difficult to argue that 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 resulting from the adoption of a more complex regulatory system.

Andrew Haldane (2011) summarized the defects in the more complex approach to capital regulation well when he observed, “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” (pg. 4).

Complexity in the Organization of Regulation

Figure 2 displays an overview of the structure of financial regulation in the United States. Notwithstanding the elegant simplifications made by the graphic artists at the *Financial Times*, it is apparent that financial oversight is complex and fragmented across a number of private and official entities. While some regulatory authorities have an institutional focus based on the charter of an entity, others have a functional focus based on how a transaction is classified or the market in which it trades.

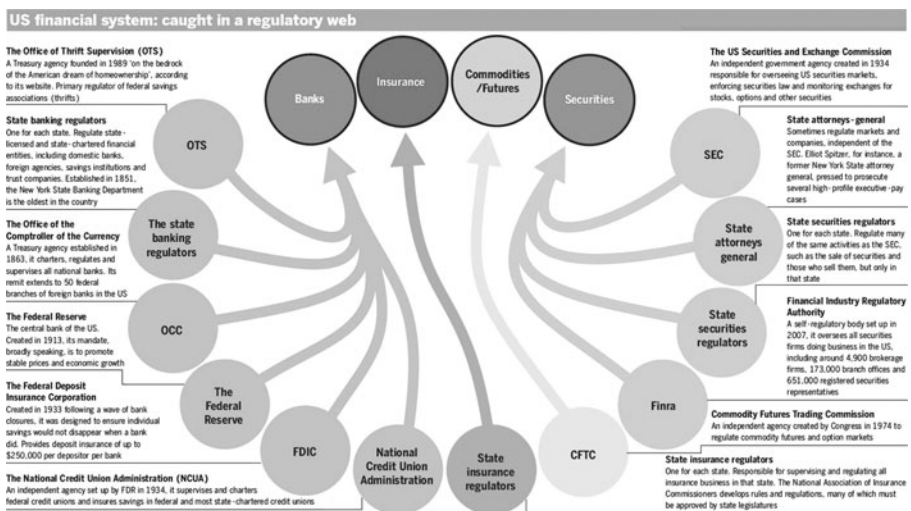


Fig. 2 The structure of financial regulation in the united states (also available at www.link.springer.com/10.1007/s11293-016-9488-4). Source: Financial Times

Despite a strong emphasis on both the functional and institutional approaches to regulation in the U.S., gaps and inconsistencies in oversight were ubiquitous. Financial innovations have undermined the logic for the statutory definitions of functions and institutions so that essentially the same product can be regulated very differently depending on the charter a firm has selected.

The establishment of supervision of bank and financial holding companies might have been expected to compensate for these gaps and inconsistencies. Before the Dodd-Frank reforms, however, the Fed, which had responsibility for oversight of holding companies, focused mainly on the bank subsidiary within the holding company and monitoring firewalls constructed to protect the bank subsidiary from activities conducted by affiliates. No regulatory authority assumed responsibility for monitoring the aggregate risk exposures of large institutions, much less the interplay of risks among them.

The crisis revealed profound flaws in the U.S. regulatory structure. Even within the institutional silos established by law, the performance of the regulators was miserable. Despite the responsibility and power to oversee banks, the Federal Reserve Board (FRB) found it necessary to bailout three of five largest bank holding companies (BHCs) in the U.S. Despite the responsibility and power to oversee the five largest investment banks, the Securities and Exchange Commission (SEC) failed to prevent them from taking excessive insolvency risks that led to the bankruptcy of one (Lehman Brothers), the subsidized, forced mergers of two others (Bear Stearns and Merrill Lynch) and the emergency conversion into financial holding companies of the remaining two (Goldman Sachs and Morgan Stanley). Moreover, the SEC failed to detect, much less prevent, the largest financial fraud in history. Despite the responsibility and power to oversee thrift institutions, the Office of Thrift Supervision failed to prevent the collapse of the largest thrift institution (Washington Mutual). Moreover, it was so inept at monitoring the thrift established by American International Group (AIG) that it failed to detect massive derivatives exposures. The potential losses on these exposures led the authorities to commit \$180 billion in public funds to prevent a default by AIG.

Fragmentation of oversight enabled several financial institutions to make use of their ability to shift regulatory jurisdictions to minimize regulatory constraints or avoid effective regulation and supervision altogether. This increased the vulnerability of the financial system to a crisis and greatly complicated the management of the crisis once it erupted.

Complexity in Legal Structures

Over the past two decades, G-SIBs have grown in geographic complexity. For a variety of reasons, much of this expansion has occurred through the establishment of subsidiaries (Carmassi and Herring 2015). On average G-SIBs had established more than 1000 majority-owned subsidiaries in 44 countries by 2013. (See Table 1.) This created corporate structures that are largely opaque to creditors and outside shareholders and thus dull market discipline.

G-SIBs are generally managed on a centralized basis with minimal regard for the corporate legal structure. But in the event of financial distress, legal structures cannot be ignored. To paraphrase Mervyn King, former governor of the Bank of England, G-SIBs live as an integrated businesses, but fragment into hundreds (if not thousands) of separate legal entities in death.

Table 1 The Cross-Border Complexity of G-SIBs*

	Assets	%Foreign Assets	Total Subsidiaries	Number of Countries	%Foreign Subsidiaries	%Subs in Off shore Centers
Average	\$1.587 trillion	42 %	1002	44	60 %	12 %
Range high	\$3.100 trillion	87 %	2460	95	95 %	28 %
Range low	\$0.243 trillion	5 %	56	14	7 %	3 %

*G-SIBs: Global systematically important banks. Assets and total subsidiaries as of year end 2013; number of countries, % of foreign subsidiaries and % of subsidiaries in offshore financial centers as of May 2013; % of foreign assets as of year end 2012. Source: Computations from Bankscope data and banks' annual reports

Complexity in geographic structure means that at least two or more regulators must be involved in any resolution decision. Thus geographic complexity in legal structures increases the coordination challenges geometrically. The regulatory authorities have announced an objective of being able to resolve any G-SIB over a weekend during which the resolution authorities take control of a group near insolvency and ensure that all systemically important operations are open for business on the following Monday morning. This is an enormous coordination problem requiring not only close cooperation in the initiation of a resolution, but also in obtaining the appropriate authorizations for the systemically important operations to reopen for business on the Monday following the resolution weekend.

If the authorities have not made adequate preparations for an orderly resolution weekend, they will face seemingly insuperable difficulties in coordinating legal proceedings in multiple jurisdictions. Information is likely to become so fragmented that it may be impossible to salvage any going-concern value that the G-SIB may have had. The prospect of a disorderly resolution is likely to prove so frightening that it will provide what may seem like a compelling rationale for bailing out the G-SIB as the only feasible way to save the system, no matter how frequently and fervently the authorities have declared an end to bailouts.

How has Regulatory Reform Addressed the Problem of Complexity?

The short answer is the problem of complexity has been completely ignored. Indeed, most reforms have layered on still more complexity.

Reform in the Structure of Regulation

In the wake of the financial crisis, virtually every major country introduced sweeping financial reforms. Most 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 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 been accompanied by tens of thousands of pages of new rulemakings and guidance even though implementation is not yet complete.

SEC Commissioner Dan Gallagher (2014) prepared a diagram that shows the new rules applicable to U.S. Financial Service Holding Companies from July 2010 passage of the Dodd-Frank Act to 2013 (reproduced here as Fig. 3). The diagram contains a remarkable amount of information. Although it was not possible to reproduce the color coding for each of the rule making entities in the U.S., it is instructive to simply list them: the Securities and Exchange Commission, the Commodities Futures Trading Commission, the Office of the Comptroller of the Currency, the Federal Deposit Insurance Corporation, the Treasury Department, the Consumer Financial Protection Bureau, the Office of Financial Research, the National Credit Union Administration, the Financial Stability Oversight Council, the Federal Housing Finance Agency, the Federal Reserve Board of Governors, the Department of Housing and Urban Development, the Federal Financial Institutions Examination Council and the Financial Crimes Enforcement Network.

Although most foreign jurisdictions have fewer rule-making agencies, a U.S. based G-SIB must comply with the new rule-makings of these agencies as well. The diagram is virtually illegible, but that is very much the point. The blizzard of new rule makings has been so intense that institutions have found it challenging to simply keep up with the announcements of new rules much less to interpret and comply with them.

The complexity of new rule makings in the U.S., of course, reflects the overlapping welter of U.S. regulatory agencies sketched in Fig. 2. The Dodd-Frank Act could have

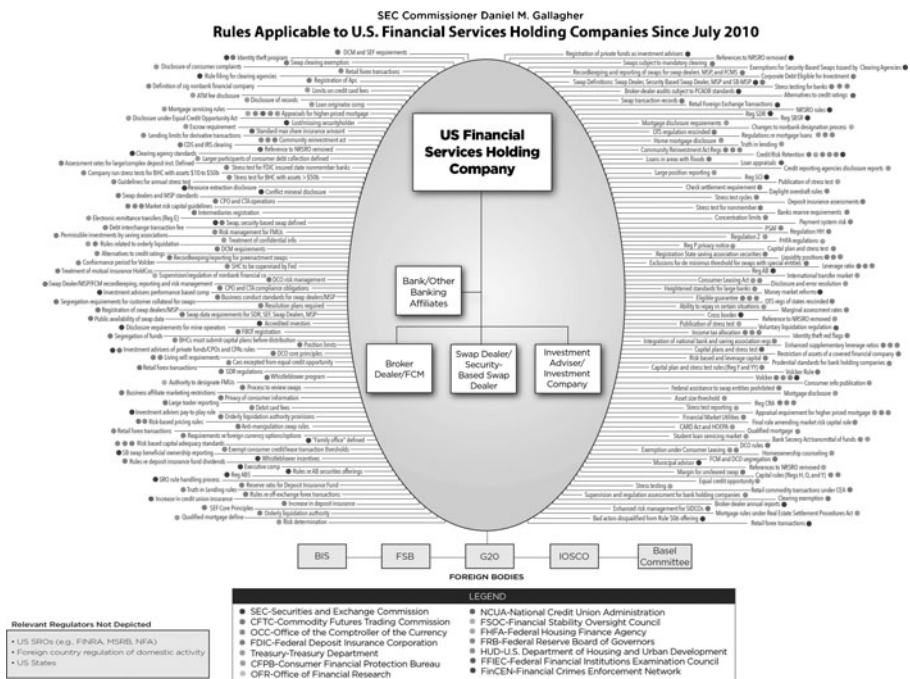


Fig. 3 New rules applicable to u.s. financial services holding companies (July 2010–2013) (also available at www.link.springer.com/10.1007/s11293-016-9488-4). Source: Gallagher (2014)

presented an opportunity to reengineer a regulatory system that had failed so abysmally. It did make a modest gesture toward simplification by eliminating the Office of Thrift Supervision, but this improvement was more than offset by the creation of new agencies and expanded powers for existing regulatory entities.

Reform of Capital Regulation

A closer look at capital regulation illustrates the problem. The failure of capital regulation to prevent or even reflect 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.⁷ 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.

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.

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 U.S. banks face an additional complexity because they must compute their risk-weighted capital requirements using two different approaches for determining the risk weights. A large bank⁸ must 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, G-SIBs 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 FRB has taken a more complicated approach to calibrating the surcharges. It has adopted two

⁷ The regulators did succeed in eliminating some of the more dubious account entries such as deferred tax losses from the computation of regulatory capital.

⁸ Defined in the Dodd-Frank Act as a BHC with consolidated assets \geq \$50 billion.

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 required to compute its G-SIB surcharge under Method 1 and Method 2, which substitutes 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 had been much more effective than the complex risk-weighted ratios in identifying problem banks. 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 U.S. has long imposed a limit on leverage that has been maintained while the more complicated Basel ratio was being introduced. The standard leverage ratio in the U.S. requires that all banks maintain Tier 1 capital equal to at least 4 % of average consolidated on-balance-sheet assets. In addition, the U.S. regulators have decided to impose a supplementary leverage ratio that is 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 U.S. 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.

Some bankers 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. Under the new regime, banks must not only comply with current capital requirements, but also demonstrate to regulators that they will be able to remain in compliance with five specified minimum capital ratios at the end of a nine-quarter, severely-adverse stress scenario. 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. U.S. based G-SIBs are currently required to conduct two kinds of stress tests: a Comprehensive Capital Analysis and Review (CCAR) and Dodd Frank Asset Stress Tests (DFAST). 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 U.S. BHC.

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 is with regard to the capital action assumptions. In the CCAR stress tests, a bank's planned dividend payments and stock buy-backs are combined with projections to estimate the BHC's post-stress capital ratios. In contrast, the DFAST projections rely on a standardized assumption that

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

If BHCs are not able to demonstrate they will be able to meet their capital requirements under the specified stress conditions (or if the regulators are not satisfied with the robustness of the bank's underlying models) and its plans for capital actions, the bank may be constrained in its ability to pay dividends or repurchase its shares. In practice, this means U.S. based G-SIBs must issue regulatory capital in excess of its current requirement.

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 (Federal Reserve Board, 2015). 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 (FRB 2015, p1).

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 2, which displays each of these required capital ratios organized by the relevant numerator (identified on the left column) and the relevant denominator (identified on the top row).⁹ The table identifies five different denominators and six different numerators that underlie 38 different regulatory capital requirements.¹⁰ In contrast, recall that under the Basel I regime U.S. 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.

Conceptually, it is as if the regulators have required that banks solve a large, complex linear programming problem in which banks attempt to maximize profits subject to 40 plus constraints.¹¹ Compliance is clearly more costly than under the Basel I regime which imposed only a fraction of the constraints on capital ratios. This is true for the banks that must understand these requirements, devise and install information technology systems that will capture the appropriate data and monitor the ratios to ensure compliance. Supervisors also face a heavier burden in oversight and verification. The sheer quantity of regulatory ratios increases the difficulty for outside stakeholders to evaluate capital adequacy. When presented with a wide array of ratios, they will understandably want to know which of the ratios is most important.

⁹ It is troubling that, despite the number of ratios, the regulators have not included any ratios based on market rather than accounting measures of capital. These measures could be observed and verified in real time. Moreover, they gave timely warnings of the impending crisis during 2007 and 2008. It could certainly be argued that not only have the regulators produced an excessive number of regulatory ratios, but also they have focused on the wrong ratios. This point is important, but beyond the scope of this paper.

¹⁰ Table 2 is based on the assumption that all capital requirements have been fully implemented. The table would have been even more complex if transitional arrangements had been taken into account.

¹¹ Of course, banks must deal with a number of other regulatory requirements and constraints in addition to these required capital ratios.

Table 2 Regulatory capital requirements for U.S. G-SIBs (also available at www.link.springer.com/10.1007/s11293-016-9488-4)

	A	B	C	D	E
	Denominator	RWA Standardized Base ¹	Average On-Balance Sheet Assets	Average On-Balance Sheet Assets + Off-Balance Sheet Items	General Approach RWA
Numerator	1	Minimum Common Equity Tier 1 Ratio (CET1) = 4.5%	Minimum CET1 = 4.5%		
	2	CET1 Capital Conservation Buffer: 2.5% above Minimum CET1 Ratio ²	CET1 Capital Conservation Buffer: 2.5% above Minimum CET1 Ratio		
	3	CET1 Systemic Risk Buffer: 0.25% above Capital Conservation Buffer	CET1 Systemic Risk Buffer: 0.25% above Capital Conservation Buffer		
	4	G-SIB Minimum CET1 (method 1) = 7% + Method 1 G-SIB Surcharge ³	G-SIB Minimum CET1 Ratio = 8.5%		
	5	Minimum CET1 (method 2) = 7% + Method 2 G-SIB Surcharge	DPASST Post-Stress Test CET1 Ratio = 8.5%		
CET1	6	Minimum Tier 1 Ratio = 6% ⁴	Minimum Tier 1 Ratio = 6%	Standard Leverage Ratio: 3%, minimum ⁵	Supplementary Leverage Ratio for Advanced Approaches
	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		Enhanced Supplemental Leverage Ratio for G-SIBs: 2.5%
	8	G-SIB Minimum Tier 1 Ratio (method 1) = 8.5% + Method 1 G-SIB Surcharge	G-SIB Minimum Tier 1 Ratio = 10.5%		Enhanced Supplemental Leverage Ratio for Insured Depository Institutions within G-SIB holding companies: 2.0%
	9	G-SIB Minimum Tier 1 Ratio (method 2) = 8.5% + Method 1 G-SIB Surcharge	G-SIB Minimum Tier 1 Ratio (method 2) = 8.5% + Method 1 G-SIB Surcharge		CCAR Post-Stress Test Minimum Leverage Ratio: 2.0%
	10				DPASST Post-Stress Test Minimum Leverage Ratio: 2.0%
Tier 1	11	CCAR Post-Stress Test Tier 1 Minimum Ratio: 2.0%	CCAR Post-Stress Test Tier 1 Minimum Ratio: 2.0%		
	12	DPASST Post-Stress Test Tier 1 Minimum Ratio: 2.0%	DPASST Post-Stress Test Tier 1 Minimum Ratio: 2.0%		
	13	Minimum Total Capital Ratio = 8%	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	Total Capital Ratio (method 1) = 10.5% + Method 1 G-SIB Surcharge	Total Capital Ratio (method 1) = 10.5% + Method 1 G-SIB Surcharge		
Total Capital = Tier 1 + Tier 2	16	G-SIB Minimum Total Capital Ratio (method 2) = 10.5% + Method 1 G-SIB Surcharge	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%	CCAR Post-Stress Test Total Capital Minimum Ratio: 8%		
Tier 1 Common ⁶	18	DPASST Post-Stress Test Total Capital Minimum Ratio: 2%	DPASST Post-Stress Test Total Capital Minimum Ratio: 2%		
	19				CCAR Post-Stress Test Tier 1 Common Ratio: 2.5% DPASST Post-Stress Test Tier 1 Common Ratio: 2.5%
External TLAC	20	Minimum External TLAC Ratio: 18%	Minimum External TLAC Ratio: 18%		
	21	External TLAC Buffer: 2.5% + Method 1 G-SIB Surcharge + Constructed Buffer	External TLAC Buffer: 2.5% + Method 1 G-SIB Surcharge + Constructed Buffer		
External Long-Term Debt (LTD)	22	Minimum LTD Ratio: 6% + Method 2 G-SIB Surcharge	Minimum LTD Ratio: 6% + Method 2 G-SIB Surcharge		
	23				Minimum External LTD Ratio: 74.5%

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^a Federal Register (2013), p.62029, ^b Federal Register (2013), p.62031, ^c Average total consolidated assets, minus amounts deducted from Tier 1 capital (Federal Register 2013, p.62030), ^d Federal Register 2013, p. 62038, ^e Federal Register 2013, p. 62021, ^f Federal Register, 2015, p. 49094 for all G-SIB adjustments

The sheer complexity of these ratios poses the troubling question of whether policy makers understand how banks will react to changes in macroeconomic conditions. Different banks are likely to find some ratios more binding than others, but this may well depend on the business model they pursue. Do the regulatory authorities have a clear understanding of what activities they are implicitly encouraging or discouraging with this welter of capital ratios?

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 in any way undermining the strength of the system.

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 the German negotiators wished, that we would want to add 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.¹²

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 is unclear that DFAST provides any additional information of supervisory importance. If DFAST were eliminated then rows 5, 12, 18 and 20 could be eliminated.

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 seem 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 *Advanced Approaches*. If a strong defense cannot be made of continuing to require that banks meet the *Advanced Approaches* 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 U.S. GSIBs are being held to a standard at least as high as

¹² 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 with regard to CET1.

those based abroad, which will be evaluated according to 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, it is unclear why a standard leverage ratio is maintained when a more sophisticated measure of average on-balance-sheet assets and off-balance-sheet items is available. Perhaps because the standardized ratio has been in place for a long time, one could argue that it should be continued for some period. Even so, it seems a good candidate for elimination in the near future.

These very simple proposals could reduce the complexity of capital regulation by 75 %. Quite possibly regulators might argue that one or more of these deleted ratios make an important incremental contribution to the safety and soundness of the system and justified 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.

Why Does Regulatory Reform Usually Lead to More Complexity?

One key reason may be that process of 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.

In addition, experts may be opposed to simplification. Bankers have much to gain from identifying and exploiting opaque loopholes, which may go almost unmonitored in a complicated regulatory system. 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 and tax accountants have invested large amounts of their human capital in understanding (and often contributing to) complexity and see no clear 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. These talented individuals could be employed producing goods and services that 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 on Banking Supervision (2013) 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; and (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 U.S. seems especially resistant to proposals for regulatory simplification. Nonetheless, there has been no shortage of plans issued over the past 60 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 in the U.S. Indeed, the system has become markedly more complicated. This is especially puzzling in light of the fact that 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 U.S.? 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. This view of the regulatory system constrains the possible scope for sustaining 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 banking and bank regulatory reform is complicated and the consequences of bad policies may not emerge for a number of years. The dominant political coalition with a stake in the existing system may add further complexities to make it difficult for the majority of 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 et al. 2006) emphasizes that sustainable reforms need to be robust to withstand political pressures. They emphasize that 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 U.S.

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” (pg. 1). What would it take to exorcise this demon from the U.S. financial regulatory system?

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