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Article

A Review of the Regulatory Impact Analysis of Risk-Based Capital and Related Liquidity Rules

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Abstract: This paper reviews the cost-benefit analysis, or “regulatory impact analysis” (RIA), in US bank regulators’ risk-based capital (RBC) rule proposals. We review the principles of cost-benefit analysis and its application by US bank regulators. We provide a brief background on RBC rules and review the literature on their costs and benefits. We then evaluate 27 proposed RBC rules and related rules on bank liquidity. We find that nine of the 27 rules include RIAs. Five of the RIAs claim the proposed rule will create net benefits, but none provide quantitative evidence that the benefits exceed the costs. In two proposals, the evidence cited indicates the rules’ net benefits may actually be negative.

Keywords: banks; capital; risk-based capital; regulation; cost-benefit analysis

JEL Classification: G21; G28; G32; E58



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1. Introduction

Since 1991, US bank regulators have relied on the risk-based capital (RBC) ratio as their primary measure of bank risk. This paper evaluates cost-benefit analysis (CBA), officially termed “regulatory impact analysis” or “regulatory impact assessment” (RIA), in 27 proposed RBC and related liquidity rules from 1986 to 2018. We find that nine proposals contain RIAs. Five of the nine RIAs claim the proposal will create net benefits, but none contain quantitative RIAs. Contrary to the academic literature, the proposals assume that RBC ratios are better measures of bank risk than simple leverage ratios. The negative effects of RBC rules are often understated or ignored. In two proposals, evidence cited indicates the rule’s net benefits will be negative rather than positive.

CBA is commonly used to analyze economic policies in order to encourage the adoption of policies that will create net benefits for society and to guard against those that might cause harm. Such analyses can be problematic when evaluating financial regulations since their effects on financial stability may be difficult to quantify. The costs may also be difficult to quantify since poorly designed regulations can unintentionally reduce financial stability by encouraging banks to increase their risk-taking activities. RIA can ideally prevent regulators from enacting policies that might increase risk in the financial system, or at least offer guidance on risk minimization between competing policies. In the United States, some bank regulators are exempt from legal requirements to conduct RIA in their rule making process. Many rule proposals nonetheless contain RIAs, especially rules jointly issued by multiple agencies following the 2008 financial crisis.

US RBC rules are based on the 1988 Basel Accords (or “Basel I”) created by the Basel Committee on Bank Supervision (BCBS), an international organization of bank regulatory agencies. RBC rules were first proposed by the Office of the Comptroller of the Currency (OCC) in 1986, finalized in 1989, and became effective in 1991. They were extended to small banks in 2003. The RBC system has been revised over time based on Basel II, Basel III, other

proposals from the BCBS. Bank regulators, including former Federal Reserve Chair [Janet Yellen \(2015\)](#), claim “there has been cost-benefit analysis” of bank capital regulations, but few rule proposals contain quantitative measures of their benefits or costs.

The RBC ratio replaced the simple leverage ratio of equity over assets as regulators’ most important measure of bank risk.^{1,2} The RBC ratio has equity capital in the numerator, but the denominator is a weighted measure of bank assets. The weights are determined by the regulators according to each asset’s perceived level of risk. The RBC ratio is intended to provide a more sensitive measurement of bank risk relative to unweighted leverage ratio, but it is not clear that the theoretical literature or empirical evidence actually support this assumption. As [VanHoose \(2007, p. 3680\)](#) describes, “the intellectual foundation for the present capital-regulation regime is not particularly strong.”

If the empirical evidence was overwhelmingly in favor of RBC regulations, or if such regulations were effective at stabilizing the banking sector during periods of financial turmoil, then RIA of RBC regulations might be unnecessary. Because the supposed advantages and effectiveness of the RBC ratios are contested, however, it is important to review the literature on the costs and benefits of the RBC system. Section 2 discusses the principles of CBA and their application by US bank regulators. After a brief background in Section 3 of RBC rules and their implementation in the United States, Section 4 provides an overview of literature on the costs and benefits of RBC rules. A number of studies dispute the assumption that RBC ratios improve the measurement of bank risk. Others find that RBC ratios encourage banks to increase their risk-taking activities, which increases their probabilities of failure and may have contributed to the 2008 financial crisis. Studies of optimal levels of capital find the requirements should be higher, in some cases much higher, than the current levels.

We also discuss two proposed and finalized bank liquidity rules: the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR). These are related to RBC rules in two important ways. First, each of these rule employs its own asset weighting system. As with RBC rules, regulatory risk weights banks’ investment decisions, which may have adverse side effects such as increasing asset risk. As the LCR RIA ([OCC 2014, p. 4 f. 6](#)), notes, for example, “Introducing requirements for HQLA does effectively require covered institutions to invest in similar portfolios of buffer assets, which could magnify the effects of fire-sales in those assets.” Second, the RIAs for both the LCR and NSFR specifically discuss the interaction with bank capital rules. As the [OCC et al. \(2020, p. 2\)](#) note, “the NSFR requirement increases in stringency based on risk-based measures of the top-tier covered company.” Thus, CBA of LCR and NSFR is, according to the regulators, dependent on the RIA of RBC.

Section 5 reviews 27 proposed and final RBC and liquidity rules. We emphasize three important findings. First, no comprehensive RIA of RBC has ever been conducted. Because RBC rules were introduced in piecemeal fashion and expanded incrementally over time, no rule proposal contains an RIA of the entire RBC system. Each RIA considers only the marginal change in regulations in the given proposal, never the full system of RBC rules nor the overlap of capital and liquidity rules.

Second, none of the proposals provide quantitative evidence that the benefits of a rule will exceed its costs. Nine of the 27 rules examined contain RIAs. They provide basic estimates of the increases in banks’ compliance costs and sometimes increases in expenses to the regulators themselves. Regarding benefits, they assume the new rules will create economic benefits, such as increases in economic stability, but no quantitative evidence of these benefits is provided. In addition, the RIAs avoid discussing, much less quantifying, unintended costs such as perverse incentives that might increase bank risk.

¹ Prior to the adoption of RBC standards, banks were required to maintain “primary capital equal to at least 5.5 percent of total assets and total capital equal to at least 6.0 percent of total assets”(OCC 1986, p. 10602).

² The term “leverage” may sometimes refer to the ratio of equity capital divided by total assets or to its reciprocal of assets over equity. This paper uses the term as a synonym for the simple capital ratio of total equity over total assets. We find this preferable to the term “capital ratio,” which has a variety of definitions.

Third, we find two RIAs in which the studies cited indicate the rules may create negative net benefits. The 2018 proposed change in required capital thresholds was intended to make the RBC ratio a stronger marginal constraint on bank risk since the RBC is assumed to be a better measure of risk than the leverage ratio. Evidence cited in the proposal, however, shows that RBC ratios are actually worse risk metrics than leverage ratios. The 2016 NSFR proposal claims it will improve financial stability and economic growth, but the main study cited finds that the net benefits of NSFR will be *negative* when bank capital levels are high, as they have been since 2016. Given these findings, Section 6 calls for better analysis in future RBC and liquidity rules.

2. The Role of Cost-Benefit Analysis

CBA is used to ensure that policy makers understand the expected benefits and harms that their policies will create for society. As Sunstein (2015, p. 263) describes, “Cost-benefit analysis is best understood as a way for agencies to ensure that their decisions are informed—that they are based on knowledge about likely consequences, rather than on dogmas, intuitions, hunches, or interest-group pressures.” While the expected benefits and costs of any policy can never be fully quantified, CBA provides a process by which policy makers can verify that there is evidence to support their decisions.

A number of studies have pointed out limitations of CBA, especially as applied to financial regulation. Coates (2015), for example, notes that benefits and cost of financial regulation may be difficult or impossible to quantify and argues that quantitative CBA “better deserves the label *guesstimated* CBA” (p. 124 emphasis in original). But even “guesstimates” of expected effects may be useful for gauging whether a policy will create net benefits for society. Gordon (2014, p. S366) similarly argues that “While the regulator presumably will employ experience and pragmatics in promulgating rules [. . .], the conventional tallying of benefits and costs is not realistic.” Despite this assumption, reliance on “experience and pragmatics” without CBA has led to numerous, costly regulatory failures, especially in the area of financial regulation.

In contrast, there is much evidence that financial regulators have failed to evaluate the full effects of their policies and that CBA might help rectify these shortcomings. As Cochrane (2014, p. S77) notes “most proposed regulations, as most diagnoses of financial problems, rely on very thin grounds of causal mechanisms,” and “the vast bulk of current financial regulations are motivated by hazy, inconsistent, and incoherent goals that have little quantifiable social benefit” (p. S91).³ Though estimates of the effects of regulation will never be perfectly accurate, many economists argue that data-driven CBA can offer useful guidance in regulatory decisions. Krishnamurthy (2014, p. S273), for example, “uses historical evidence to illustrate how cost-benefit analysis can be useful in forcing regulators to confront their theories with evidence.”

In the United States, the banking system is jointly regulated by the OCC, the Federal Reserve System (Fed), the Federal Deposit Insurance Corporation (FDIC), and up to 2011, the Office of Thrift Supervision (OTS). RBC rules were first proposed in the late 1980s by the OCC for national banks and by the Fed for bank holding companies (BHCs). Over time, the jurisdictions of these agencies have seen increasing overlap. Since 2008, most rules have been made jointly by multiple agencies.⁴

Before implementing a final rule, US regulators must publish rule proposals for public discussion through a process of “notice and comment.” The regulators provide a Notice of Proposed Rule-making (NPR) with the preliminary format of the rule. An NPR is sometimes preceded by an Advanced Notice of Proposed Rule-making (ANPR) or simply a request for public comment. After receiving comments from the public, the regulators publish the final rule, including the effective date and general replies to the comments

³ A similar critique applies to monetary policy. Selgin et al. (2012) find that the Federal Reserve has not achieved its stated goal of improving macroeconomic stability, while Selgin (2010) considers central banks as *sources* of financial instability.

⁴ For discussion of the statutory obligations of various financial regulatory agencies in their RIAs, see Peirce (2012).

received. When RIAs are conducted, they are typically included in the NPR, although some RIAs are published in the final rule, especially when incorporating feedback from public comments.

RIAs are required of the OCC (and formerly the OTS) but only for major rules, also known as “significant regulatory actions.” The [OCC et al. \(2003, p. 45946\)](#) explain:

Executive Order 12866 requires preparation of an economic analysis for agency actions that are “significant regulatory actions.” “Significant regulatory actions” include, among other things, regulations that “have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities.”

Many of the RBC rule proposals were not deemed by the regulators to be major rules and therefore do not include RIAs. Although not required by Executive Order 12866, RIAs are occasionally provided for rule proposals that are not considered significant regulatory actions or that are authored by regulatory agencies that are exempt from the order.

RIAs by US financial regulators generally follow the guidance of a 2003 memo from the Office of Management and Budget (OMB). [OMB \(2003\)](#) Circular A-4 outlines the recommended, but not required, best practices for RIA under Executive Order 12866. These include the identification and measurement of costs and benefits as well as the evaluation of relevant alternatives. This includes any “description of the unquantified effects” as well as “the key reason(s) why they cannot be quantified.” As we discuss in Section 5, however, RIAs omit many important costs of RBC regulations identified in Section 4.

In 2011, Executive Order 13563 provided further guidance to “improve regulation and regulatory review.” Section 1(c) of the order specifically allows regulatory decisions based on “values that are difficult or impossible to quantify, including equity, human dignity, fairness, and distributive impacts.” The characteristics listed in the quotation are best described as “qualitative” in the sense of being impossible judge quantitatively.

Unfortunately, financial regulators often use the word “qualitative” synonymously with the more accurate term “unquantified.” A clearly written RIA should distinguish between effects that are unknowable versus those that are simply difficult to measure. In addition, any RIA that makes the quantitative assertion that the proposal will create net benefits for society should support that claim with quantitative evidence.

Ideally, an RIA would verify that a proposed policy is expected to create net benefits to society. For some financial regulations, however, a full accounting of such effects may not always be realistic. While it would be impossible to measure all benefits and costs of any particular policy, regulators should at least consider the magnitudes of the positive and negative expected effects that are well known and likely to occur. Partial equilibrium analyses, such as in [BCBS \(2010a\)](#), provides a basic framework for weighting competing factors that regulators deem most important (although [BCBS \(2010a\)](#) in particular is sometime mischaracterized in RIAs as discussed in Section 5.2). A full CBA is not possible using this method, but it at least provides a quantitative comparison of benefits and costs. For cases in which even this basic analysis is not used, such as those that consider only qualitative factors, regulators should refrain from making positive claims about a policy’s net benefits since the net effects cannot be determined.

Given the difficulties of CBA of financial regulations, what should be the standards expected for RIAs? First, we check each regulatory proposal to see if it includes RIA. As [Ellig \(2018, p. 8\)](#) describes, “reasonable people surely can agree that regulators should not adopt a regulation unless they are reasonably certain that it will solve a real problem at some reasonable cost.” Second, if RIA is provided, we check to see if it simply compares potential options or if it makes the specific claim that the rule will create net benefits. Third, if the RIA claims the rule will create net benefits, we check for quantitative evidence that would support this conclusion.

Other studies have evaluated the effectiveness of RIA in various ways. A report by the Government Accountability Office ([GAO 2011](#)) analyzed the coordination and use of CBA

by the financial regulatory agencies following the Dodd–Frank Wall Street Reform and Consumer Protection Act (Dodd–Frank Act) of 2010. As the abstract describes, the report reviewed “regulators’ rulemaking policies and 10 final rules found inconsistencies in the extent to which OMB’s guidance was reflected.” Ellig (2016) evaluates RIA by a number of regulatory agencies and finds (p. 82) that “use of regulatory analysis fall far short of the standards articulated in [Executive Order] 12866 and OMB Circular A-4.” We follow on these prior studies by examining which rule proposals by bank regulators contain RIA, which claim net benefits of the proposed policy, and which support those claims with quantitative evidence.

3. Background on Risk-Based Capital Rules

After the Savings and Loan crisis of the 1980s, US regulators were considering alternative approaches to the regulation of banks and savings associations. At the same time, an international consensus was building to standardize regulations across countries based on discussions by the BCBS at the Bank for International Settlements (BIS). Basel I (BCBS 1988) proposed a simple RBC framework that has since been adopted in 27 BCBS member countries as well as 70 non-member countries (Coen 2017). The framework was enhanced by later proposals Basel II (BCBS 2004), a revision known as Basel 2.5 (BCBS 2009), and Basel III (BCBS 2010b).⁵ US bank regulators have, for the most part, implemented the rules of the RBC system in accordance with the proposals of the BCBS.

The main objective of Basel I was to introduce a measure of bank capital that would require higher capital for banks with higher levels of asset risk. The RBC ratio has capital in the numerator, but the denominator is a measure of risk-weighted assets (RWA) where the weight for each asset is set by regulators based on its perceived riskiness. Equation (1) shows the calculation of the RBC ratio where w_i is the weight assigned to each asset type i , and a_i is the dollar value of asset type i on the bank’s balance sheet. Capital K may be measured in a variety of ways such as total equity or tangible equity capital (TEC).

$$RBC\ ratio = \frac{K}{RWA} = \frac{K}{\sum(w_i \times a_i)} \quad (1)$$

Unfortunately, the RBC ratio may not effectively represent banks’ true asset risk exposure. Despite the near infinite variation in asset risk, the BCBS system uses just five risk-weighting categories. As the BCBS (1988, p. 8) notes, “there are inevitably some broad-brush judgments in deciding which weight should apply to different types of assets.” Basel II and Basel III attempt to improve the simplistic methods of Basel I. Bernanke (2006), for example, argued that Basel II would enhance the RBC system since “Basel I, with its broad-brush system for setting the risk weights on various classes of bank assets, is increasingly inadequate for measuring risk.” In truth, Basel II and III vastly complexified the RBC system by adding a myriad of new ratings, rules, and requirements, but the fundamental features of the RBC weighting system are the same as first proposed in 1988.⁶

In addition to its evolving RBC regime, US regulators have recently introduced rules that require banks to maintain minimum levels of liquid assets. Liquidity was a major concern in the 2008 financial crisis. Banks have long been required to hold minimum cash reserves as percentages of transaction deposits. New regulations such as the LCR and NSFR require minimum levels of high quality liquid asset (HQLA) holdings as percentages of expected cash outflows. As with RBC, the HQLA weights are determined by the regulators based on each asset’s perceived level of liquidity. These liquidity rules are intended to complement bank capital rules. As discussed later, however, the theoretical and empirical effects of overlapping capital and liquidity regulations remain controversial.

⁵ For further background on the BCBS and the Basel Accords, see <https://www.bis.org/bcbs/history.htm>.

⁶ On RBC complexity, see Hogan and Manish (2016), Herring (2016, 2018), and Barth and Miller (2018).

4. The Costs and Benefits of Risk-Based Capital

This section briefly reviews the academic literature on RBC regulations. Regulators claim the main benefit of RBC ratios is that they provide a better measure of bank risk than simple leverage ratios. Academic studies, however, tend to find the opposite. In fact, RBC ratios can encourage banks to increase, rather than decrease, their risk-taking activities. Complex RBC ratios increase banks' compliance costs as well as the budgetary costs to regulatory agencies, indirectly funded by taxpayers. A number of studies estimate the optimal levels at which capital requirements should be set. The section concludes with brief discuss the distributional effects of regulation.

4.1. Benefits of RBC Rules

According to the regulators, the main benefit of RBC rules is that weighting capital requirements by asset risk provides a more accurate measure of overall bank risk than do simple measures such as the unweighted leverage ratio. The OCC's original proposal OCC (1986, p. 10602) argued that RBC ratios would make "capital policy more sensitive, in a systematic fashion, to the risk exposure of individual national banks." A later joint proposal by the Fed, FDIC, OCC, and OTS for a "standardized approach" (OCC et al. 2008, p. 44026) to extend the application of RBC rules to all US banks states the benefit of such rules is that they will "enhance safety and soundness by improving the risk sensitivity of regulatory capital requirements." Bernanke (2006) similarly argued that "Basel II will make it easier for supervisors to identify banks whose capital is not commensurate with their risk levels and to evaluate emerging risks in the banking system as a whole."

Despite these claims, it is not clear in practice or even in theory that RBC ratios provide the regulators with improved measures of bank risk. As VanHoose (2007, p. 3680) explains, "[t]his literature produces highly mixed predictions, however, regarding the effects of capital regulation on asset risk and overall safety and soundness for the banking system as a whole." In particular, models that incorporate moral hazard, "are more likely to indicate that capital regulation does not necessarily improve bank safety and soundness" (p. 3695). Given that the theoretical literature remains ambiguous, it is important to review the empirical literature regarding the effectiveness of RBC ratios.

Early studies such as (Avery and Berger 1991) found that RBC ratios outperformed simple leverage ratios at identifying bank risk, but recent research tends to contradict those results. Estrella et al. (2000, p. 33) find that "the risk-weighted ratio does not consistently outperform the simpler ratios, particularly with short horizons of less than two years." Haldane and Madouros (2012) find that leverage ratios are better predictors of risk for a sample of international banks but find mixed results for US banks.⁷ Demirgüç-Kunt et al. (2013, p. 1447) study a sample of 381 banks from 12 countries and find that "the relationship between stock returns and capital is stronger when capital is measured by the leverage ratio rather than the risk-adjusted capital ratio." Similarly, Acharya et al. (2014, p. 36) examine publicly available data on US bank stress tests and find that "when capital shortfalls are measured relative to risk-weighted assets, the ranking of financial institutions is not well correlated, [...] whereas rank correlations increase when required capitalization is a function of total assets." Hogan (2015) finds that leverage ratios are better than RBC ratios at predicting US banks' stock return volatility and Z-scores, while Hogan and Meredith (2016) similarly find that leverage ratios are better predictors of BHC balance sheet and market-based measures of risk such as equity tail risk and equity-implied bank risk.⁸

⁷ Estrella et al. (2000) and Haldane and Madouros (2012) find that RBC ratios may be better predictors of long-term risk for US banks, but Hogan et al. (2018) find that those results do not hold using more recent data. RBC ratios may be better or worse, depending on the sample period and are therefore not accurate for long-term predictions.

⁸ Studies also find that compliance with the Basel Core Principles for Effective Bank Supervision have no effect on bank stability (Demirgüç-Kunt and Detragiache 2011) or efficiency (Ayadi et al. 2016).

Two further findings from these studies are worthy of note. First, the different results in early versus recent studies appears to be due to the fact that [Avery and Berger \(1991\)](#) and others relied on *estimated* RBC ratios since the actual RBC ratios were not yet available. The authors use data from banks' *Reports on Conditions and Income* (Call Reports) to estimate their RBC ratios based on preliminary risk weights from Fed press releases. [Hogan et al. \(2015\)](#) replicate [Avery and Berger \(1991\)](#) using data from 2001–2011 and find that *estimated* RBC ratios are better risk metrics than simple leverage ratios. In [Hogan et al. \(2018\)](#), however, the authors find that banks' *actual* RBC ratios are *not* better predictors of risk. Thus, the difference between early and later studies seems largely attributable to the use of *estimated* versus *actual* RBC ratios.

Second, some studies use R-square statistics to argue that the leverage and RBC ratios together are superior to using either metric alone. [Estrella et al. \(2000, p. 50\)](#), for example, find that pseudo-R-squared increases when both ratios are used. They argue that "it may be possible to derive substantial benefits from the use of simple ratios—for instance, as supplementary or backstop requirements." In contrast, [Hogan \(2015, p. 38\)](#) finds that "the R-squared statistics [...] indicate that the RBC ratio adds very little explanatory power." Perhaps more importantly, the notion that one rule will provide a supplement or "backstop" for the other implies a nonlinear relationship, which cannot be evaluated using a linear regression model. It is thus unlikely that R-squared statistics can be used to resolve this issue, especially if the effects of these constraints are nonlinear.

One reason RBC ratios may be inferior predictors of risk is that they sometimes encourage banks to take more risk rather than less. The risk weighting system gives banks the incentive to increase their holdings of assets whose risks have been underrated by the regulators and to divest assets whose risks are overrated. Consider the examples of mortgage-backed securities (MBSs) and collateralized debt obligations (CDOs). These assets provide diversified baskets of loans securitized to allow buyers access to tranches with varying degrees of risk. Given these advantages, MBSs were initially assigned moderate risk weights of 0.2 for those issued or guaranteed by US government agencies and 0.5 or higher for private label MBSs. Because the regulatory capital cost of MBSs was low relative to their rates of return, banks had the incentive to increase their holdings of MBSs and decrease holdings of other assets, especially those rated as overly risky by the regulators. A similar ratings mismatch occurred for CDOs. As demonstrated in the 2008 financial crisis, however, regulators severely underestimated the riskiness of CDOs and MBSs which played a major role in spreading contagion through the financial system. As the BCBS (2009, p. 1) acknowledges, a "main contributing factor [...] was that the current capital framework [...] does not capture some key risks."

[Hogan and Manish \(2016, pp. 219–20\)](#) provide a simple example shown in Table 1.⁹ Assume banks A and B each hold three assets: cash, MBSs, and mortgage loans which have respective risk weights of 0.0, 0.2, and 0.5. As in US RBC weightings, MBSs are rated as lower risk than regular mortgage loans despite their higher risk exhibited in the 2008 financial crisis. Of their USD 100 in assets, both banks have USD 10 in cash, but Bank A has USD 80 in loans and USD 10 in MBSs, while Bank B has only USD 60 in loans and USD 30 in MBSs. On the liabilities and equity side of the balance sheet, Bank A has USD 21 in equity, giving it a leverage ratio of 21%. Bank B has USD 18 in equity and thus a leverage ratio of 18%. Calculating the RBC ratios using Equation (1), we find that the RBC ratios of the two banks are equal at 50% despite the fact the Bank B has more risk on the left side of the balance sheet in terms of greater MBS holding and also more risk on the right side due to its lower equity capital. In this example, the RBC ratio is not a useful measure of bank risk.

⁹ For further examples, see [Jones \(2000\)](#) and [Acharya and Schabl \(2009\)](#).

Table 1. Examples of capital and RBC ratios.

Bank A				Bank B			
Assets (risk weight)		Liabilities and equity		Assets (risk weight)		Liabilities and equity	
Cash (0.0)	\$10	Equity	\$21	Cash (0.0)	\$10	Equity	\$18
Loans (0.5)	\$80	Debt	\$79	Loans (0.5)	\$60	Debt	\$82
MBSs (0.2)	\$10			MBSs (0.2)	\$30		
Total	\$100	Total	\$100	Total	\$100	Total	\$100
Capital ratio = 21% RBC Ratio = 50%				Capital ratio = 18% RBC Ratio = 50%			

Source: Reproduced with permission from Hogan and Manish (2016, p. 219).

Several studies provide evidence that banks in the United States (Miller 2018; Duca and Ling 2020) and Europe (Mariathasan and Merrouche 2014; Ferri and Pesic 2017) gamed the RBC rating system in order to increase returns (and risk) while still appearing safe. Figure 1 from Slovik (2012) shows the trend in the ratio of RWA to total assets for 15 of the largest international systemically important banks for the first two decades after RBC rules were introduced. One potential explanation for the downward trend is that banks over the period continually reduced the risk profiles of their investment portfolios. As Herring (2018, p. 192) describes, however, “a more plausible interpretation is that banks became increasingly skillful at regulatory arbitrage, increasing their exposures to credit risk even as the regulatory measure of credit risk declined.”

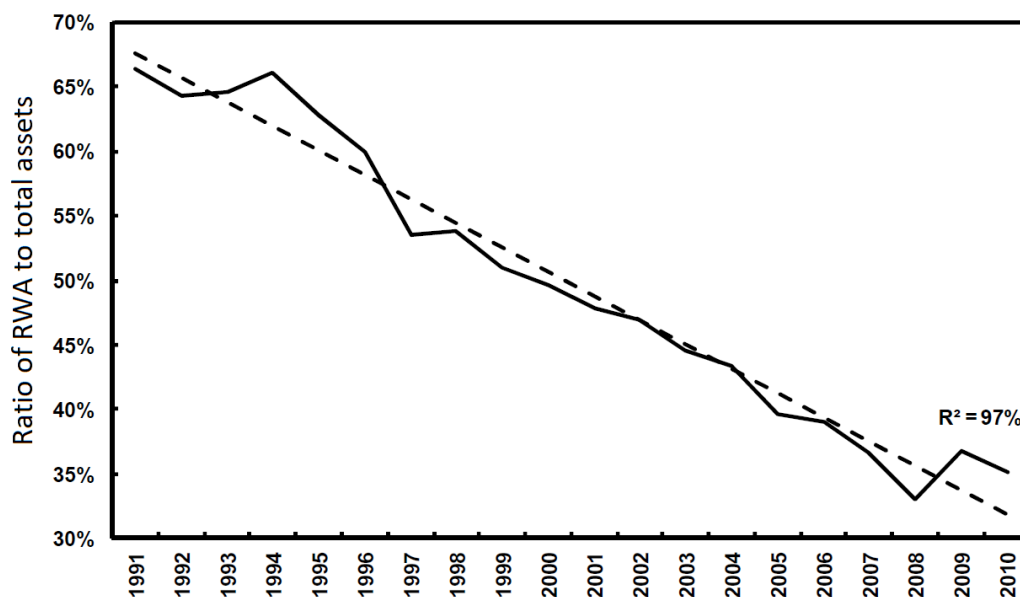


Figure 1. Ratio of risk-weighted to total assets for systemically important banks. Source: Reproduced with permission from Slovik (2012, p. 6).

Friedman (2011) provides an overview of how regulatory risk weighting contributed to financial crises in the United States and Europe. In the United States, banks responded to RBC rules by vastly increase their CDO and MBS holdings. According to Friedman (2011, pp. 26–27), “all the banks’ MBS exposure seems to have been acquired in pursuit of capital relief.” In 2008 when falling prices led to a fire sale in the CDO and MBS markets, this shared risk exposure spread losses and panic throughout the banking system (Merrill et al. 2012). In Europe, sovereign debt received among the lowest risk ratings despite their potential for default. This mismatch incentivized regulatory arbitrage by which many banks, especially German banks, acquired large amounts of relatively high-yield sovereign debt, especially Greek government debt.¹⁰ The end result was the same as in the United

¹⁰ Efing (2019) finds that RBC rules also influenced European banks’ holdings of asset-backed securities.

States: systemic exposure to a single financial market caused a banking crisis across the continent. “The panic phase of the European crisis was triggered by a downgrade from A- to BBB+ for Greek debt on 21 April 2010” (Friedman 2011, p. 28). In both Europe and the United States, crises in the banking systems appear to be linked to systemic risk exposure created by misrated assets in the RBC framework.

Miller (2018) provides evidence that RBC ratios were related to increases in banks’ highly-rated, private label securities such as CDOs and MBSs, which in turn were associated with higher bank risk. The study analyzes banks’ response to the 2001 “Recourse Rule,” a change in RBC standards that lowered the risk weight only for highly-rated tranches of private label securities. Since the rule proposal did not specify which banks would be subject to the rule, the study uses banks’ comments on the rule proposal as a proxy for those likely to be affected. As Figure 2 shows, banks that did not comment on the rule did not, on average, alter their holdings of highly- or lowly-rated securities. Banks that did comment on the proposal slightly decreased their average holding of lowly-rated securities but substantially increased their highly-rated securities. Miller (2018) further shows that banks with larger holdings of highly rated securities are associated with higher risk as illustrated by percentage changes in their z-scores and equity return volatilities. Changes in bank risk were even more sensitive to CDO holdings than to holdings of highly-rated securities such as MBSs.

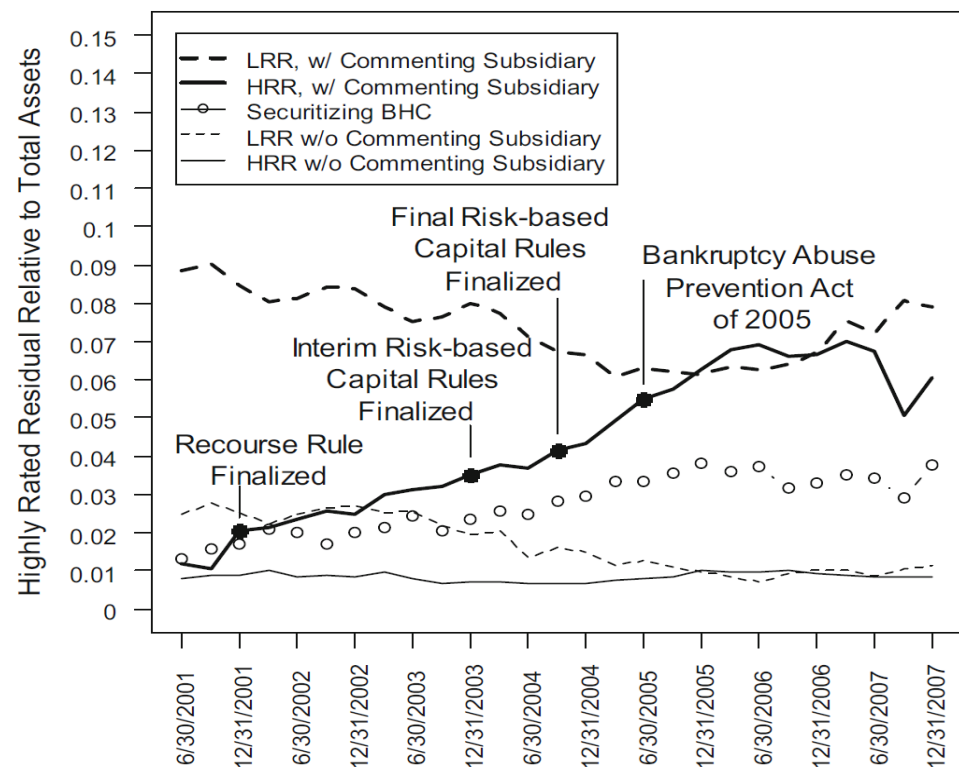


Figure 2. Estimated holdings of low-risk and high-risk CDOs at US banks. *Source:* Reproduced with permission from Miller (2018, p. 208).

In addition to increasing risk at the individual bank level as found by Miller (2018), higher holdings of highly-rated CDOs and MBSs may be related to increased liquidity risk in financial markets. Erel et al. (2014, p. 404) find that “holdings of highly rated tranches were correlated with a bank’s securitization activity.”¹¹ Gorton and Metrick (2012, p. 425) argue that securitized banking was “at the nexus of the crisis,” connecting losses on subprime mortgages to the run on the market for repurchase agreements (repos).

¹¹ Erel et al. (2014) do not find explicit evidence of regulatory arbitrage, but they note (p. 407) that their results “are consistent with a more sophisticated view of regulatory arbitrage.” Extending Erel et al. (2014), Miller (2018) does find evidence of regulatory arbitrage as previously discussed.

If RBC ratings affected banks' securitization activities as they did to banks' highly rated securities as shown in Figure 2, then the RBC system should be credited as a contributing factor in the run on the repo market and the contagion to other financial markets.

Figure 2 shows the average highly- and lowly-rated securities holdings for the sample of non-commenting banks. These banks serve as a control group that was not affected by the 2001 Recourse Rule. They provide a useful counterfactual to the affected banks. Both highly- and lowly-rated private label securities holding for non-commenting banks are mostly unchanged over the sample. Highly-rated securities holdings are stable at about 1% of assets, while average lowly-rated securities fall slightly from just under 3% of assets to around 1% by the end of the sample period. These results indicate that in the absence of the Recourse Rule, securities holdings for commenting banks would likely have remained stable as well.

Although the incentives of the RBC system may have caused banks to increase their highly-rated CDO and MBS holdings, this result is not attributable to regulatory arbitrage alone. Regulators at the time believed CDOs and MBSs were diversified and therefore less risky than regular mortgage loans. Their risk ratings gave banks the incentive to hold CDOs and MBSs rather than mortgage loans by assigning CDOs and MBSs lower regulatory risk weights. In retrospect, this was a mistake since these assets experienced larger losses than expected due to the nationwide character of the housing bust (Zimmer 2014), a lack of transparency that made them difficult to value, (Ashcraft et al. 2010; Gorton 2009), and because encouraging banks to hold the same types of assets increased systemic risk (Merrill et al. 2012). The build up of CDOs and MBSs in the banking system was not simply the consequence of regulatory arbitrage but was rather the direct result of regulators' faulty assessment of CDO and MBS risk.

4.2. Costs of RBC Rules

The most common costs in RIAs of RBC rules are the increases in compliance costs for banks and in monitoring costs for regulators. Many studies analyze increases in compliance costs, but the marginal effects of any particular regulation are difficult to identify. In a bank survey by the FDIC (2012, p. IV), for example, "most stated that the strain on their organization came from the cumulative effects of all the regulatory requirements that have built up over time." Hogan and Burns (2019) find that new regulations following the Dodd–Frank Act of 2010 increased banks' total noninterest expenses by an average of USD 50 billion per year. Peirce et al. (2014) find that Dodd–Frank regulations have caused banks to reduce or discontinue many products and services including residential mortgage lending. While few provisions Dodd–Frank deal directly with bank capital regulations, these types of costs are well known and might be expected to be included by regulators in their RIAs.

New regulations also increase the costs to regulators who must monitor banks' compliance and penalize any violations. These budget increases are ultimately borne by taxpayers. In the 2008 proposed standardized RBC framework, for example, the OCC and OTS estimated respective cost increases of USD 7 million and USD 6.2 million to their agencies, along with increased compliance costs of USD 74 million for national banks and USD 136.7 million for savings associations (OCC et al. 2008, pp. 44027, 44029). This approach may understate the effects of multiple regulations since each RBC proposal considers its own rule in isolation, not the cumulative increases in rules or compliance costs over time.

Figure 3 shows the budgets from the Fed, FDIC, and OCC/OTS from 2001 through 2017, the total of which roughly doubled over the period.^{12,13} The black line in the figure is the number of pages in the Code of Federal Regulations (CFR) Title XII on Banks and

¹² Data gathered from the *Regulators' Budget* reports by the Weidenbaum Center on the Economy, Government, and Public Policy at Washington University in St. Louis and the George Washington University Regulatory Studies Center, available online at <https://regulatorystudies.columbian.gwu.edu/regulators-budget>.

¹³ Some banks are also subject to rules by other regulatory agencies such as the Consumer Financial Protection Bureau (CFPB) and the Securities and Exchange Commission (SEC).

Banking, a proxy of the number of bank regulations, which grew by 160% over the period.¹⁴ The largest budget increase came in 2010 with the passage of the Dodd–Frank Act, while large increases in regulations came in 2012 and 2013 when the rules pursuant to Dodd–Frank were finalized. Since costs to the regulators almost doubled over this period, one might expect the increases in banks’ costs of compliance to be at least as large.

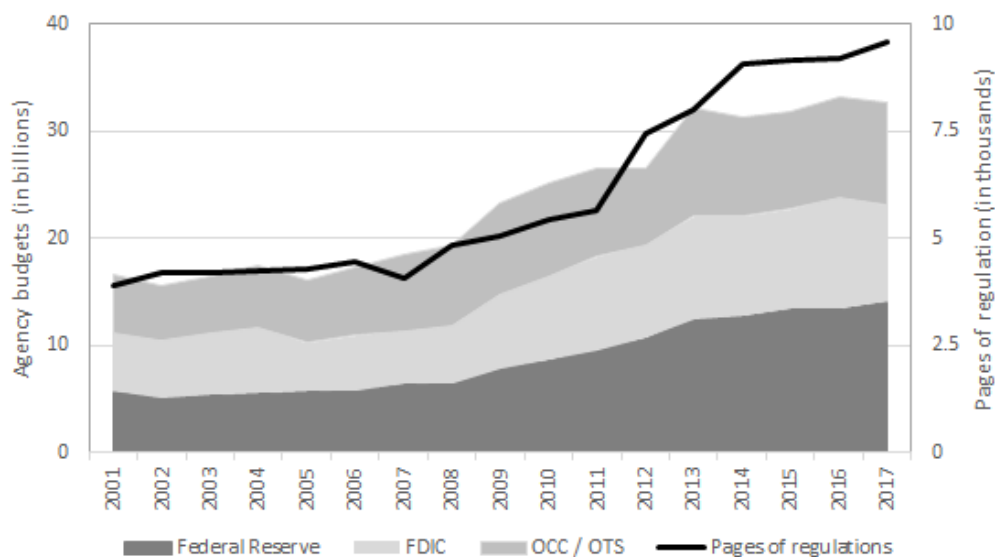


Figure 3. Budgets of the primary bank regulators and pages in CFR Title XII on Banks and Banking. Sources: Data from Code of Federal Regulations and *Regulators’ Budget* reports.

4.3. Capital Levels

Several studies estimate the optimally required levels of bank capital. These studies often balance the tradeoff of reducing the probability of financial crises against lower rates of lending and economic growth. Although these studies cover a number of countries and employ a variety of approaches and assumptions, this section provides an overview of the recent literature.

Studies since 2008 provide a wide range of estimates for the optimal levels of bank capital. Van den Heuvel (2008, p. 316) finds only small benefits from reducing bank failures and concludes “that capital requirements are currently too high.” In contrast, the BCBS (2010a, p. 7) focuses on the benefits of reducing financial crisis and finds optimal rates of tangible equity capital (TEC) as a percentage of RWA of around 13%. Miles et al. (2013), using data from the UK, find that optimal levels should be much higher, around 20% of RWA. Cline (2016) estimates the optimal levels of TEC of 6.6% of total assets or 11.7% of RWA, higher than the equivalent Basel III benchmarks. Dagher et al. (2016) finds the optimal capital levels for globally systemically important banks to be in the range of 15–23% of RWA, while Firestone et al. (2017) find a similar range of 13–25% of RWA for US banks. Using methods similar to Cline (2016) but taking into account a larger sample of banking crises, Barth and Miller (2018) estimate a much higher optimal leverage ratio of 19%. Bim et al. (2020) review many of these studies and finds that the consensus range is “likely either similar to, or higher than was originally estimated by the Basel Committee.”

Unfortunately, these studies generally ignore the negative effects of RBC rules. Several convert between leverage and RBC ratios without accounting for changes in banks’ incentives to take risk. They often use leverage and RBC ratios interchangeably in their policy recommendations. Most assume higher capital requirements will reduce output volatility

¹⁴ Another proxy for regulations is the number of regulatory restrictions estimated by QuantGov based on restrictive language such as “shall” or “shall not” and “may” and “may not.” For Title 12, the number of pages and number of restrictions show very similar patterns. Data on regulatory restrictions are available online at <https://www.quantgov.org>.

and financial crises, but they fail to consider the added risks of bank failures and banking crises that could be caused by requiring banks to measure capital in terms of RWA.

It is also unclear how capital and RBC rules interact with other regulations such as liquidity requirements. As [Haldane \(2015, p. 391\)](#) describes, “there is considerable uncertainty, as distinct from risk, about the impact of these new regulatory constraints on banks’ behavior and business models, both individually and in combination.” Theories differ on how such regulations might optimally be combined. [Adrian and Boyarchenko \(2018, p. 45\)](#), for example, find that “liquidity requirements are preferable to capital requirements,” while the [BCBS \(2010a, p. 30\)](#) find that liquidity requirements are harmful when capital is high.

While required capital levels have increased since 2008, the findings of the literature on optimal capital levels have generally not been incorporated into the regulatory process. As [Posner \(2014, p. 1\)](#) describes, “regulators have never performed (or at least disclosed) a serious economic analysis that would justify the levels that they chose.” The original RBC proposal from the [OCC \(1986, pp. 10602, 10607 emphasis added\)](#), for example, explicitly states that it “is *not* intended to increase the required level of capital at most national banks” and that “[t]he goal of the proposed risk-based capital standard is *not* to further increase the level of required capital for the industry.” Instead of setting capital requirements at the optimal levels, regulators chose the politically expedient path of setting levels so that few banks will be affected, a practice [Posner \(2014\)](#) calls “norming.” [Posner \(2014, p. 1\)](#) deems this approach a “regulatory failure” and argues that it “may therefore have contributed to the financial crisis of 2007–2008.”

As a whole, the literature discussed in Sections 4.1–4.3 is much less favorable than the regulators’ assumptions regarding the costs and benefits of RBC. Several studies cast doubt on the assumption that RBC ratios improve the measurement of bank risk. Imprecise risk weights encourage banks to alter their asset allocations, which can increase both their leverage and asset risk. The continuous expansion of the RBC system has increased costs for both banks and regulators to an extent that has not been considered in RIAs. A number of studies recommend that the levels of bank capital requirements should be increased, but as [Posner \(2014\)](#) describes, their findings have gone largely unheeded by US regulators.

4.4. Distributional Effects

One issue that is not typically discussed in financial RIAs is the effects of regulatory policy on different income levels. RIAs are used to advise policy makers on the costs and benefits of a particular policy, but they may also discuss the distributional effects on different groups. [OMB \(2003\)](#) advises that distributional effects may be included in RIA “so that decision makers can properly consider them along with the effects on economic efficiency.”

While RIAs generally take a utilitarian focus on total welfare, the tradeoffs of who gains and who loses may be important to politicians and the public. For example, the practice of “redlining” initiated in the 1930s by the Home Owners’ Loan Corporation may have accomplished its goal of reducing banks’ exposure to loan default risk, but it had the unintended effect of severely limiting credit access to low-income and minority borrowers ([Woods 2012](#)). Such consequences may be unintended, but they are often predictable using standard economic analysis.

Regulations increase bank expenses and therefore the cost of lending, which can reduce economic activity and the hiring of low-skilled workers. [Beck et al. \(2010\)](#) examine the effects on income inequality of state-level deregulations from the 1970s to 1990s that increased competition in the banking sector. As seen in Figure 4, they find that individuals with low incomes benefited, while effects on those with higher incomes were not statistically significant. These results are “driven by a reduction in inequality between skilled and unskilled workers and a reduction in income inequality among unskilled workers” (p. 1665) with no indications of reverse causality. While these results do not reflect the overall costs

or benefits of deregulation, the public should be aware that the costs of regulation are likely to be borne by members of society with the lowest skills and incomes.

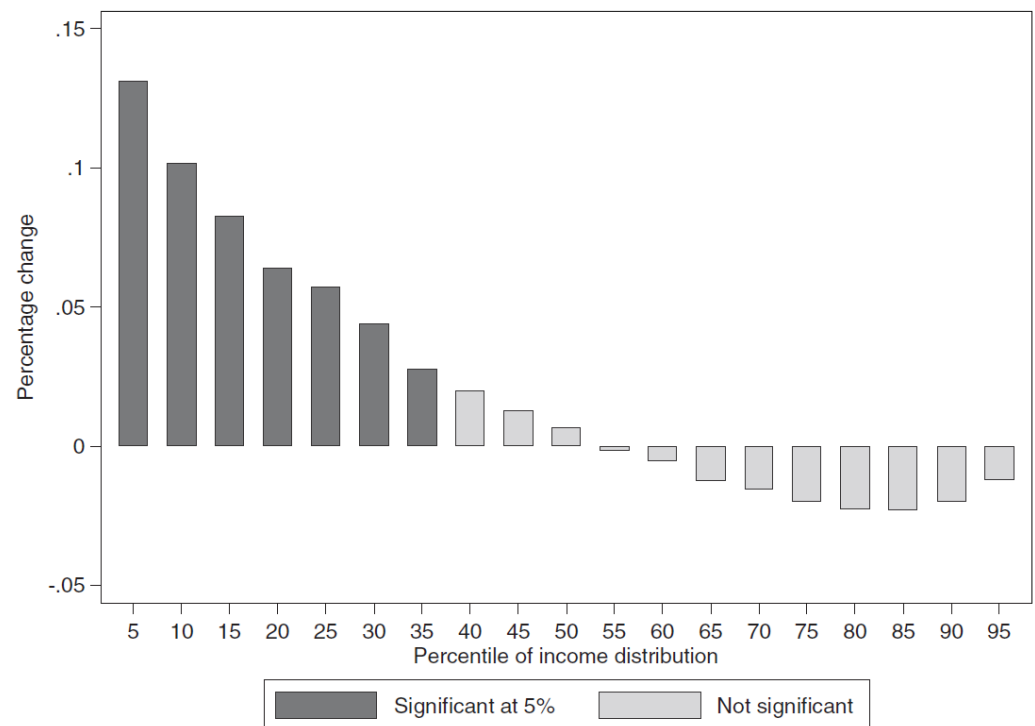


Figure 4. Effects of deregulation on percentiles of the income distribution. *Source:* Reproduced with permission from Beck et al. (2010, p. 1651).

5. Regulatory Impact Analysis of Risk-Based Capital

This section discusses the RIAs provided in the regulators’ proposed and final RBC rules and related liquidity rules. First, we review 27 proposed and final RBC and liquidity rules. Of these, nine include RIAs. Five of the nine conclude that the proposal will create net benefits, but none include quantitative evidence that the benefits exceed the costs. Next, we discuss the nine RIAs in further detail. Several provide quantitative estimates of the costs of the rule, but none attempt to quantify the benefits. Finally, we discuss two cases in which the studies cited in the RIAs indicate that the net benefits of the proposed rule may be negative.

RIAs are typically included in the NPR, although they are sometimes deferred to the final rule, especially when the public feedback is important to determining the rule’s potential benefits or costs. We focus on rule proposals (mostly NPRs), in which the regulators typically assess whether a rule will be considered a “major rule” and therefore is likely to include an RIA. In some cases, we also discuss the final rules, especially in cases when the NPR states that the rule’s impact will be assessed in the final rule. In each proposal, we focus on sections dedicated to RIA, although we sometimes discuss evidence cited in the preamble or text of the proposal.

5.1. Basel RBC Rules

The RBC system based on Basel I was first outlined in an ANPR by the OCC (1986). RBC requirements were officially proposed for US national banks by the OCC (1987) and were extended to include other large banking organizations by the OCC et al. (1988). These proposals state that the RBC rule proposals would not be considered to be “major rules” requiring RIAs (OCC 1987, p. 23052; OCC et al. 1988, p. 8568). The rules were finalized by the OCC (1989) and the Fed (1989). The final rule by the OCC (1989, p. 4177) confirms

that “this final rule does not constitute a ‘major rule’ and, therefore, does not require the preparation of a final regulatory impact analysis.”

Several adjustments were subsequently made to the Basel I framework. For example, the Market Risk Amendment, introduced by the OCC et al. (1995) and finalized by the OCC et al. (1996), modified the risk weights for trading assets to be set according to their value-at-risk (VAR). The final rule was determined not to be a “significant regulatory action” (p. 47366). The OCC et al. (2000) proposed, and OCC et al. (2001) finalized the Recourse Rule, which, as discussed in Section 4, had the unintended consequence of increasing banks’ CDO and MBS holdings and risk exposure. The OCC et al. (2000, p. 12331) noted that RIA would likely not be required since “The OCC believes that the costs associated with raising this new capital are below the thresholds prescribed in the Executive Order,” a finding which the OCC and OTS confirmed in the final rule (OCC et al. 2001, p. 59629).

The OCC et al. (2003) proposed a new framework based on Basel II which updated the RBC system and allowed banks to use their own internal risk-based (IRB) models. The OCC et al. (2007) revised this proposed framework and created a new set of “Advanced Approaches” regulations for large or internationally active banks with either USD 250 billion or more in total assets or USD 10 billion or more in foreign exposures. The Advanced Approaches framework became the basis of enhanced regulatory standards required for larger, more complex banks with potentially wider systemic footprints. Despite the fact that the Advanced Approaches framework applied to only a small number of banks, this rule was found by the OCC to be a “significant regulatory action” and thus includes an RIA (pp. 69389–96). The RIA that claims the proposal will create net benefits. As discussed in the next section, however, the RIA provides no quantitative evidence that the benefits exceed the costs.

In 2008, the regulators jointly proposed a standardized framework that would apply RBC requirements to smaller banks savings associations. The OCC et al. (2008, pp. 44026–29) includes an RIA with estimated costs of USD 74 million to small banks by the OCC and USD 137.6 million to savings association by the OTS, plus additional costs of USD 7 million and USD 6.2 million to the respective agencies themselves. Both the OCC and OTS cite the “enhanced risk sensitivity” of RBC ratios as the primary benefit, but neither provide a quantitative estimate of benefits of the proposed rule. Despite the lack of quantitative evidence, both the OCC and the OTS agree (p. 44028) that the benefits of the proposed rule justify its potential costs.

Because faulty credit ratings resulted in poor risk assessments in the 2008 financial crisis, Section 939A of the Dodd–Frank Act of 2010 directed bank regulators to remove the use of credit ratings from their regulatory analysis and replace it with other risk measures.¹⁵ The OCC et al. (2011b) proposed a set of market risk measures that were later revised by the OCC et al. (2012a). The proposal (pp. 1909–10) contains an RIA under the OCC’s requirements from the Unfunded Mandates Reform Act, which estimates the cost of the proposal at USD 334 million per year. The RIA claims to produce net benefits, but includes only “qualitative benefits” (p. 1909 emphasis added) with no quantitative evidence that the benefits exceed the costs.

Section 619 of the Dodd–Frank Act, known as “the Volcker Rule,” instructed bank regulators to make new rules prohibiting proprietary trading and investment in hedge funds or private equity funds. Implementation of the Volcker Rule required bank regulatory agencies to adjust the definitions and ratings used in their market risk capital rules. The Volcker Rule is one of the most significant regulatory changes since the 2008 financial crisis, yet neither the proposal (OCC et al. 2011a) nor the final rule (OCC et al. 2014c) includes RIAs. Although the regulators were required by Congress to implement this rule, there would be value in understanding its benefits and costs.

Three separate but related rule changes were proposed in 2012. Based on Basel III (BCBS 2010b), the OCC et al. (2012a) revised the risk weights of the Advanced Approaches

¹⁵ For more information, see <https://www.federalreserve.gov/publications/other-reports/credit-ratings-report-201107.htm>.

system and revised the market risk rule to exclude credit rating-based risk assessment as required by the Dodd–Frank Act Section 939A. The [OCC et al. \(2012b\)](#) created additional capital rules and increased banks' required capital levels as well as creating a Capital Conservation Buffer, an additional level of capital required in order for a bank to pay dividends to shareholders or bonuses to its executives. The [OCC et al. \(2012c\)](#) makes revisions to the standardized risk weights in the RBC system that apply to all US banks and savings associations. These proposed rules were finalized in 2013 by separate rulemakings by the [FDIC \(2013\)](#) and the [OCC and Fed \(2013\)](#). None of the proposals or final rules include RIAs.

In addition to traditional regulations, the Fed conducts stress tests of banks' capital and liquidity needs based on economic scenarios in which banks might be exposed to simultaneous negative shocks. Stress testing began in 2009 with the Supervisory Capital Assessment Program (SCAP) for BHCs with USD 100 billion or more in total assets. SCAP evolved into the Comprehensive Capital Analysis and Review (CCAR), beginning in 2011, of BHCs with USD 50 billion or more in total assets. Rules for the capital planning process were proposed by the [Fed \(2011a\)](#) and formalized later that year by the [Fed \(2011b\)](#). In the following year, the Dodd–Frank Act Stress Test (DFAST) was added for banks with total assets of USD 10 billion or more. The DFAST is administered by the bank itself based on scenarios created by the Fed. The results are then submitted to the Fed for evaluation. The rules for this process were proposed by the [Fed \(2012a\)](#) and finalized by the [Fed \(2012b\)](#). None of these proposed or final rules include RIAs.

The regulators created new rules that required banks to plan for their capital recovery from unexpected shocks and, in the case of failure, their own resolution. Resolution plans, also known as "living wills," were proposed by the [Fed and FDIC \(2011a\)](#) and finalized by the [Fed and FDIC \(2011b\)](#). Requirements for capital recovery plans were proposed by the [OCC \(2015\)](#) and finalized by the [OCC \(2016\)](#). The [OCC \(2018a, 2018b\)](#) raised the asset threshold for banks requiring recovery plans from USD 50 billion to USD 250 billion. None of these proposed or final rules include RIAs.

The Fed proposed several smaller rules that adjust large banks' capital requirements. The [Fed \(2014, 2015a\)](#) proposed and finalized a capital "surcharge" on Globally Systemically Important Banks (GSIBs). The [Fed \(2015a\)](#) includes an appendix that details the calibration and "expected impact" of the levels chosen by the regulators, but it specifically notes that "cost-benefit analysis was not chosen as the primary calibration framework for the GSIB surcharge" (p. 49116). A Countercyclical Capital Buffer (CCyB) was proposed by the [Fed \(2016\)](#) as a macroprudential tool to raise or lower large banks' capital requirements. The [Fed's \(2016\)](#) appendix outlines the implementation of the CCyB but does not discuss its costs and benefits. The [Fed \(2015b, 2017\)](#) proposed and finalized rules that require banks with USD 50 billion or more in total assets to maintain minimum levels of Total Loss Absorbing Capital (TLAC). The TLAC proposal ([Fed 2015b](#)) and final rule ([Fed 2017](#)) both include RIAs asserting net benefits, but neither provides quantitative evidence that the rule's benefits exceed its costs.

As a complement to the RBC system, the proposals by the [OCC and Fed \(2013\)](#) and the [FDIC \(2013\)](#) proposed a supplementary leverage ratio (SLR) of 3% for all banks. The [OCC et al. \(2013b\)](#) added capital "buffers" to correspond to the agencies' Prompt Corrective Action (PCA) framework, where 4% was required for the bank to be considered "adequately capitalized" and 5% to be considered "well capitalized." The proposal also introduced an additional *enhanced* supplementary ratio (eSLR) for banks with USD 700 billion or more in total assets or custody assets of USD 10 trillion or more. The SLR and eSLR were finalized by the [OCC et al. \(2014b\)](#). The eSLR was originally set at 3% for adequately capitalized bank and 6% for well-capitalized banks, but it was revised by the [OCC and Fed \(2018\)](#) and set equal to half of the GSIB surcharge. The thresholds of the required capital levels were then revised by the [OCC et al. \(2018b\)](#). Three of these proposals contain RIAs: the revised SLR and eSLR ([OCC et al. 2013b](#), pp. 51111–13), the revised eSLR ([OCC and Fed 2018](#), pp. 17321–22), and the revised capital threshold

proposal (OCC et al. 2018b, pp. 66038–39). Unfortunately, the RIAs lacks quantitative evidence and discuss only the effect on banks’ balance sheets, not on economic stability.

Regulators have also created liquidity rules, which, as discussed in Section 4.2 may have positive or negative interactions with capital rules. The OCC et al. (2013a, 2014a) proposed and finalized an LCR rule which specifies the minimum level and potential types of liquid assets a bank must hold based on its estimated liquidity needs over a 30-day period. The rule’s HQLA rating of investment quality municipal bonds was revised by the OCC et al. (2018a). The proposal (OCC et al. 2013a) contains a preliminary RIA, and the OCC (2014) issued a full RIA as an independent document to accompany the final rule. Unfortunately, neither RIA contains quantitative estimates of the proposal’s costs and benefits.

Another proposed liquidity rule is the NSFR, which specifies the level and potential types of liquid assets a bank must hold based on its “available stable funding,” a weighted measure of its liabilities. The NSFR proposal by the OCC et al. (2016) does include an RIA. Despite the absence of quantitative evidence of its benefits, the regulators (p. 35163) conclude that the rule’s benefits will exceed the costs. The NSFR was finalized by the OCC et al. (2020), which contains an RIA (pp. 274–86). While it does not provide a full accounting of benefits and costs, the RIA (p. 278) states that “This analysis indicates that the final rule is likely to increase the overall resilience of the banking system.”

Table 2 summarizes the rules discussed in this section. Of the 27 rules, nine include RIAs. In all cases, the regulators conclude that the rule will create net benefits. In no case, however, do they provide quantitative evidence that a rule’s benefits will exceed its costs.

Table 2. Regulatory Impact Analysis (RIA) in capital and liquidity rule proposals.

Year	Rule	Regulatory Agency	Includes RIA	Claims Net Benefits	Quantitative Evidence
1986	RBC Standards ANPR	OCC			
1987	RBC Standards for national banks	OCC			
1988	RBC Standards for all large banks	OCC, Fed, FDIC			
1996	Market Risk Capital Rules	OCC, Fed, FDIC			
2001	Recourse Rule	OCC, Fed, FDIC, OTS			
2003	Basel II	OCC, Fed, FDIC, OTS	✓	✓	
2008	Standardized Framework	OCC, Fed, FDIC, OTS	✓	✓	
2011	Orderly Resolution Plans	Fed, FDIC			
2011	Revised Market Risk Rules	OCC, Fed, FDIC	✓	✓	
2011	Volcker Rule	OCC, Fed, FDIC			
2011	CCAR Stress Tests	Fed			
2012	DFAST Stress Tests	Fed			
2012	Advanced Approaches	OCC, Fed, FDIC			
2012	Basel III	OCC, Fed, FDIC			
2012	Standardized Approach	OCC, Fed, FDIC			
2013	LCR	OCC, Fed, FDIC	✓		
2013	SLR & eSLR	OCC, Fed, FDIC	✓		
2014	GSIB Rules	Fed			
2014	Revised LCR	OCC, Fed, FDIC			
2015	Recovery Plans	OCC			
2015	TLAC	Fed	✓	✓	
2016	CCyB	Fed			
2016	Revised Recovery Plan Threshold	OCC			
2016	NSFR	OCC, Fed, FDIC	✓	✓	
2018	Revised eSLR	OCC, Fed	✓		
2018	Revised LCR HQLA	OCC, Fed, FDIC			
2018	Revised Capital Thresholds	OCC, Fed, FDIC	✓		
Total	27		9	5	0

Overall, the regulators’ rule proposals are notable for their lack of quantitative evidence and CBA. Although it is possible that some rules have been overlooked, we have attempted to include the most relevant and important RBC rules and related liquidity rules. Even if one or a few missing proposals did include quantitative RIAs, it would still be a very low number relative to the number of rules made during this period. Not only has no CBA ever been done of the complete RBC system, but the evidence shows that no quantitative RIA has ever been done for any individual RBC rule.

5.2. Lack of Quantitative Evidence

The previous section identifies nine rule proposals that contain RIAs. Here we take a closer look at the language and evidence provided in those RIAs. We find that none include quantitative evidence of the proposal's net benefits to banks or to economic stability.

5.2.1. Basel II

The implementation of Basel II was proposed by the [OCC et al. \(2003\)](#) and finalized by the [OCC et al. \(2007\)](#). The RIA by the OCC (p. 69393) estimates the costs of the rule at USD 498.9 million based on a one-time adjustment and ongoing costs to banks and administrative costs to the OCC. The OCC's RIA (pp. 69391–92) lists eleven benefits of the new rules including:

- “Better allocation of capital and reduced impact of moral hazard.”
- “Improved signal quality of capital as an indicator of solvency.”
- “More efficient use of required bank capital.”

None of the listed benefits, however, include numerical estimates. The proposal (p. 69391 emphasis added) acknowledges this lack of quantitative evidence:

Cost and benefit analysis of changes in minimum capital requirements entail considerable measurement problems. On the cost side, it can be difficult to attribute particular expenditures incurred by banks to the costs of implementation because banks would likely incur some of these costs as part of their ongoing efforts to improve risk measurement and management systems. On the benefits side, measurement problems are even greater because the benefits of the rule are *more qualitative than quantitative*.

Despite the dearth of quantitative evidence of its benefits, the OCC (p. 69395 emphasis added) found that “[a]lthough the anticipated benefits of the final rule are difficult to quantify in dollar terms because of measurement problems, the OCC is confident that the anticipated benefits *well exceed* the anticipated costs.” The OTS's RIA (p. 69395) explains that “OTS commented on the development of, and concurs with, OCC's RIA.”

The OCC and OTS impact analyses do cite three quantitative impact studies (QIS-3, QIS-4, and QIS-5) that estimate the expected effects of Basel II. The focus of these studies, however, is on how bank capital levels will be affected by the Basel II framework. They do not consider changes in banks' asset holdings or risk profiles that would be necessary to determine the net effects of the rule changes proposed by the [OCC et al. \(2007\)](#).

5.2.2. Standardized RBC Framework

The [OCC et al. \(2008\)](#) proposes a standardized RBC framework that would be applied to all banks and savings institutions. The proposal estimates that the total costs of the rule will be USD 224.8 million per year, but the OCC and OTS each argue that the rule's benefits will exceed the costs. As the OCC's RIA (p. 44025 emphasis added) describes:

The broad social and economic benefit that derives from a safe and sound banking system supported by vigorous and comprehensive supervision, including ensuring adequate capital, *clearly dwarfs* any direct benefits that might accrue to institutions adopting the Standardized Option. Similarly, the social and economic cost of any reduction in the safety and soundness of the banking system would *dramatically overshadow* any cost borne by banking organizations subject to the rule.

Given that the supposed benefits of the rule “clearly” and “dramatically” outweigh the costs, the regulators deem a quantitative RIA unnecessary. They continue:

The banking agencies are confident that the enhanced risk sensitivity of the proposed rule could allow banking organizations to more effectively achieve objectives that are consistent with a safe and sound banking system.

Notably, the regulators do not say here that the rule *will* lead to enhanced stability, only that it “could” be “consistent with” achieving the objective of stability. No quantitative estimate of benefits is given nor any evidence that the rules will provide regulators with “enhanced risk sensitivity” or create “a safe and sound banking system.”

The OTS similarly argues (p. 44028 emphasis added) that “the benefits of the proposed rule justify its costs.” It is unclear how this determination is made since no dollar amount of benefit is given. They acknowledge that “[t]he measurement of benefits is more problematic [than for costs] because the benefits of the NPR are *more qualitative than quantitative*.”

5.2.3. Market Risk Capital Rules

The OCC et al. (2011b) proposed adjustments to their market risk capital rules that revised definition of a “covered position” and the calculation of required capital for trading activities. The OCC’s RIA (pp. 1908–10) estimates that banks will need to raise an additional USD 50.7 billion in capital to comply with the rule. The added capital will replace tax-exempt debt, which will increase the banks’ taxes by USD 334 million per year. The OCC assumes that the rule will create “benefits of increased sensitivity to market risk, increased transparency, the improved targeting of trading positions, reduced procyclicality of market risk capital, and the protective advantages of additional capital.” However, they provide no quantitative or qualitative evidence that the rule will create the benefits described.

In fact, the RIA specifically describes the “*qualitative* benefits,” with no scale or magnitude by which the benefits can be compared to the costs. Despite the lack of quantitative evidence, the OCC’s RIA (p. 1910) concludes that, “[a]lthough there is some concern regarding the burden of the proposed increase in market risk capital and the effect this could have on bank lending, in the OCC’s opinion, the proposed rule offers a better balance between costs and benefits than either the baseline or the alternatives.”

5.2.4. Liquidity Coverage Ratio

The LCR was proposed by the OCC et al. (2013a), which contains a preliminary RIA (pp. 71850–56) by the OCC. They calculate that “total cost is between USD 165 million and USD 246 million per year.” The proposal also discusses other potential (but not quantified) costs such as liquidity hoarding, “gaming” of the rule, and added operational costs. The agencies conclude that they do not expect the rule to have “a significant adverse effect on economic growth, competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises.” The benefits expected from the LCR are that it “lowers the probability of a liquidity crisis and may limit the severity of liquidity crises when they do occur” (p. 71851). The RIA cites a number of studies discussing the potential benefits of bank liquidity, but it provides no quantitative estimates of the magnitude of benefits that might be expected from the LCR. Instead, the RIA states (p. 71853 emphasis added) that “[t]he benefits of the proposed rule are *qualitative in nature*, but substantial nonetheless.”

The final RIA by the OCC (2014) is provided as an independent document. The structure is similar to the proposal, but the costs are increased to “between USD 2.0 billion and USD 4.0 billion, of which USD 1.7 billion to USD 3.6 billion will recur annually” (p. 1). The RIA discusses mostly the same unquantified costs and benefits listed in the proposal. The OCC (2014 Appendix B, p. 36) cites several studies that find LCR requirements will reduce bank lending and GDP growth. As in the proposal, the OCC provides no quantitative evidence of the proposal’s benefits and make no claims about its net benefits.

The RIA (p. 8) defends the lack of quantitative evidence by citing guidance from the OMB (2003, p. 10), which states that “[w]hen important benefits and costs cannot be expressed in monetary units,” CBA “can even be misleading, because the calculation of net benefits in such cases does not provide a full evaluation of all relevant benefits and costs.” This argument, however, is not adequate to justify the lack of quantitative analysis of capital and liquidity rules. While it may be true for some issues, it is clearly not the case that the costs and benefits of regulation cannot be expressed in monetary terms. The

literature on optimum capital levels discussed in Section 4.3 weighs the monetary benefits of higher capital against the costs, including Firestone et al. (2017), a working paper from the Federal Reserve Board of Governors. One study frequently cited in regulatory proposals, BCBS (2010a), which quantitatively compares the benefits and costs of capital and liquidity, was conducted “with contributions from Federal Reserve staff” (Fed 2015a, p. 49116). So not only are US regulators aware that quantitative analysis of regulations is possible, but they have contributed to such analyses themselves and frequently cite it in their RIAs. If the regulators find BCBS (2010a) to be “misleading,” then why is it so frequently cited in regulatory proposals? If it is not misleading, then why not use such analysis to quantitatively analyze the costs and benefits of the LCR?

Strangely, the RIA by the OCC (2014, p. 15 emphasis added) argues that “[t]he final rule would provide *one quantitative benefit* and several significant qualitative benefits.” It states that “[t]he quantitative benefit of the proposed rule is the increased LCR buffer itself [. . .] USD 362 billion of additional HQLA.” While the USD 362 billion is indeed *quantitative* in the sense of being a number, it is not clear why the increase in HQLA would be considered a *benefit*. Perhaps this increase in HQLA will create some quantifiable marginal benefit that could be compared to the quantified costs, but the full USD 362 billion itself is not the amount of that benefit. This should be clear since the same USD 362 billion in HQLA is used (pp. 1–2 fn.2, p. 11) to calculate the estimated costs of funding. The dollar amount of HQLA may be used as a basis to calculate the cost or benefit, but the USD 362 billion is itself neither a benefit nor a cost. Since this USD 362 billion is not a “quantitative benefit” as described, we conclude the RIA provides no quantitative evidence of benefits from the LCR.

5.2.5. Supplementary Leverage Ratio

The proposal by the OCC et al. (2013b) revises SLR and introduces the eSLR. This proposal includes an RIA (pp. 51108–13), but like the others, it provides no quantitative evidence of the proposal’s benefits. The costs of the proposal are estimated at “between USD 474 million and USD 694 million per year” (p. 51112). The RIA (p. 51111) lists several potential benefits of the rule, including increasing “loss absorbing capital held by covered BHCs” and mitigating “the threat to financial stability posed by systemically important financial companies.” The proposal provides no quantitative evidence of these assumed benefits. The RIA does not claim that the proposal will create net benefits, only that higher capital creates a tradeoff between the cost of funding and bank stability. The proposal does cite the assessment methodology by the BCBS (2011), which notes (p. 23) that it is “based on imperfect models and involve numerous assumptions and judgements,” and “should therefore be supplemented with appropriate judgement.”

5.2.6. Net Stable Funding Ratio

The NSFR proposal by the OCC et al. (2016) RIA relies heavily on the BCBS (2010a). The regulators estimate the costs of the proposal at USD 519 million per year (p. 35161) plus other “macroeconomic costs” (p. 35162), which the proposal fails to quantify. Regarding the benefits, the regulators (pp. 35162–63 emphasis added) explain that:

If the NSFR reduces the probability of a financial crisis even slightly, then the benefits of avoiding the costs of a crisis, specifically a decline in output, would outweigh the relatively modest aggregate cost of the rule.

No quantitative evidence is provided to show that the NSFR will reduce their probability “even slightly” enough to cover its estimated costs.

While the RIA by the OCC et al. (2016) does not provide evidence that the rule will decrease the probability of a financial crisis, it does provide (pp. 35162–63) some basic data on the cost and probability of such a crisis:

A BCBS study [BCBS (2010a)], estimated that, prior to the regulatory reforms undertaken since 2009, the probability that a financial crisis could occur in a given year was between 3.5 percent and 5.2 percent and that the cumulative economic

cost of any single crisis was between 20 percent and 100 percent of annual global economic output.

There are several points to note regarding this quotation. First, the cost estimates are based on data “prior to the regulatory reforms undertaken since 2009,” but there is no discussion of whether, or by how much, the probability of a crisis has been reduced by new regulations since that time. Second, the quotation discusses losses to global economic output, but it is unclear how much of a change in global output should be attributed to US banks or whether losses outside the United States should be included in US regulators’ RIAs.

Third, and perhaps most importantly, the quotation above does accurately represent the costs of a crisis because the numbers provided in the BCBS (2010a) are assumptions, not “estimated” as described by in the quotation. The OCC et al. (2016, pp. 35162–63 emphasis added) claims that “A BCBS study [. . .] *estimated* that [. . .] the cumulative economic cost of any single crisis was between 20 percent and 100 percent of annual global economic output.” That description is not accurate because the BCBS (2010a) did not estimate the cumulative cost of a crisis. The study simply cites a speech by Haldane (2010), which considers three potential scenarios in which the costs of a crisis might range from 25% to 100% of output. As the BCBS (2010a, p. 11 emphasis added) describes, “Haldane (2010) provides a range of estimates for the 2007–09 banking crisis *assuming* that a varying fraction of output losses experienced in 2009 will be permanent—the fractions are 25%, 50% and 100%.” In other words, the numbers 25% and 100% were simply *assumptions* of Haldane (2010), not *estimates* as described by OCC et al. (2016). While it seems plausible that the costs of a crisis might be within this range, it is worrisome that the regulators do not appear to be accurately representing the main study cited in their RIA and that they do not distinguish between evidence and assumptions. The only quantitative “evidence” in the RIA is not evidence at all.

Aside from the BCBS (2010a), the OCC et al. (2016, p. 35161) also cites the BCBS (2016) to provide support for its claim that “the net social benefit of liquidity regulation is expected to be significantly positive.” However, the BCBS (2016) provides only unquantified results, noting (p. 27 emphasis added) that “net benefit evaluation can only be *qualitatively conjectured*, on the basis of the information that is available.” This qualitative conjecture provides no quantitative evidence for the claim by the OCC et al. (2016) that the net benefits of the regulation will be “significantly positive.” The proposal cites a few other studies, but none provide quantitative evidence of positive effects of the NSFR on economic stability or evidence that the benefits of the proposed rule will exceed its costs.

The final NSFR rule’s RIA (OCC et al. 2020, pp. 274–86) does not analyze the effects of the NSFR on the banking system or financial stability but simply “the potential impact of the final rule on the funding structure of covered companies” (p. 274). Though not providing a full CBA, the RIA (p. 278) argues that “Maintaining stable funding requirements may reduce the risk of covered company failure and the vulnerability of the financial system more broadly” and that “the final rule is likely to increase the overall resilience of the banking system.” It concludes (p. 279) that “the historical perspective suggests that the final rule will help lock in the gains in funding stability made since the financial crisis.” The RIA does evaluate an alternative policy of applying the level 1 HQLA status to collateral assets and short-term lending transactions, concluding that the rule should apply “a zero percent RSF factor” for both assets. The final rule also acknowledges the dependence on RBC rules, noting (p. 2) that “the NSFR requirement increases in stringency based on risk-based measures of the top-tier covered company.”

5.2.7. Total Loss-Absorbing Capital

The agencies’ TLAC proposal contains RIA in both the proposal (Fed 2015b, pp. 74937–39) and the final rule (Fed 2017, pp. 8284–87).¹⁶ The final rule’s RIA finds that GSIB banks will need to issue USD 120 billion in new long-term debt (LTD) to meet their TLAC

¹⁶ We quote here from the final rule Fed (2017). The proposal Fed (2015b) contains almost identical language.

requirements. This will increase their costs of funding “in the range of USD 680 million and 2.0 billion annually” and would reduce total lending in the economy by “between USD 4.2 and USD 20.2 billion per year.” The overall cost to GDP growth, they claim, will be “very modest.”

Regarding benefits, the RIA claims that “the proposed requirements would decrease the likelihood and cost of a financial crisis” (p. 8285) and that it would “materially reduce the risk that the failure of a covered BHC would pose to the financial stability of the United States” (p. 8287). No quantitative evidence or qualitative studies are provided to support these claims. Despite the lack of evidence, the RIA (p. 8285 emphasis added) argues that “the estimated benefits would outweigh the estimated costs and that the proposed external TLAC and LTD requirements would yield a *substantial net benefit* for the U.S. economy.”

As in the NSFR proposal, the RIA (p. 8287 emphasis added) claims that BCBS (2010a) “estimated that, prior to the regulatory reforms undertaken since 2009, the probability of a financial crisis occurring in a given year was between 3.5 percent and 5.2 percent and the cumulative cost was between 20 percent and 100 percent of annual economic output.” As previously discussed, the BCBS (2010a) does not estimate the cumulative cost of a financial crisis. Rather, it states (p. 11) that the range of costs are *assumptions* based on Haldane (2010). In addition, the probabilities of a crisis are given “prior to the regulatory reforms undertaken since 2009.” If the regulators believe that regulatory reforms between 2009 and 2017 effectively reduced the probability of a financial crisis, then the probability of a crisis should be much smaller than those given by the BCBS (2010a).

5.2.8. Revised eSLR

The eSLR was revised by the OCC and Fed (2018, pp. 17321–22). The level was recalibrated to “generally serve as a backstop to risk-based capital requirements” (p. 17321). The RIA (p. 17321) calculate that “the proposal would reduce the amount of tier 1 capital required across the GSIBs by approximately USD 400 million” at the BHC level. BHC subsidiary Insured Depository Institutions (IDIs) would also see a change in capital under the new eSLR standard of “approximately USD 121 billion less than what is required under the current eSLR standard” (p. 17321). It is unclear how these reductions in capital would affect stability at the BHC and IDI levels, and the proposal makes no specific claims regarding its net effects. While no quantitative evidence is provided, the regulators argue that the new thresholds will be sufficient to continue “supporting the safety and soundness of GSIBs and helping to maintain financial stability” (p. 17322).

5.3. Revised Capital & Liquidity Thresholds

The OCC et al. (2018b, pp. 66038–39) reduced the required eSLR and LCR thresholds. The RIA, conducted by the Fed, notes that these changes may cause “increased risk to [bank] holding companies during a period of elevated economic stress or market volatility.” The RIA provides estimates of how banks’ capital and liquidity levels will be affected, but it provides no data on how these changes will affect bank risk and economic stability.

The RIA (p. 66038) states that for the subset of banks to which the rule would apply, “the Board expects the proposal to slightly lower capital requirements under current conditions (approximately USD 8 billion, or 60 basis points of total risk-weighted assets among these banking organizations).” It does not, however, quantify how much of an “increased risk to [bank] holding companies” will be caused by such a change in capital. It is therefore impossible to tell whether the cost savings are worth the increased risk exposure.

In their analysis of the changes in the LCR threshold, the Fed found that HQLA would be reduced by USD 34 billion for Category IV banks and by USD 43 billion for Category III banks. They argue (p. 66039 emphasis added) that such effects would be “modest.”

- “the reduction in LCR requirements would *modestly* reduce the liquidity buffers.”
- “the reduction in LCR requirements would *modestly* increase the net interest margin.”
- “the likelihood of experiencing material financial distress during a period of elevated economic stress or market volatility would increase only *modestly*.”

The expected increase in net interest margin is a benefit to banks, while the reduction in liquidity buffers and elevated likelihood of financial distress are costs. Given the vague language, it is unclear what the net effects will be for banks or the banking system. Again, the proposal provides no quantification of these effects nor any evidence that the benefits of the proposal exceed its costs.

Summary

Five of the RIAs discussed in this section claim the proposals will create net benefits. Yet none provide quantitative evidence to support this conclusion. Without quantitative evidence, how can the regulators know that the benefits will exceed the costs?

If the benefits of a proposal really are very large, then it should be easy to prove that they exceed the costs, even if those benefits are difficult to quantify. Suppose, for example, the cost of a regulation is USD 1, but the benefits might be anywhere in the range of USD 1 million to USD 100 million. In this case, the benefits clearly exceed the costs, even though the benefits are uncertain and difficult to quantify. In such a case, the regulators need not provide an exact estimate of benefits, but only quantitative evidence that they are indeed very large, even when the exact dollar amount is difficult or even impossible to quantify.

Not only do the rule proposals not include quantitative RIAs, they fail to cite any quantitative studies that provide evidence that the benefits exceed the costs. Perhaps there are many such studies, but if so, it seems all the more curious that none are cited. It is unclear whether such evidence exists or if it was simply not provided by the regulators.

In addition, the negative side effects of proposed regulations are rarely discussed and never quantified. Rule proposals assume that RBC ratios improve risk identification, but they ignore the evidence against it. They never address the problem that such rules can increase bank risk. The TLAC RIA (Fed 2017, p. 8286) acknowledges detrimental effects on bank lending, but it ignores the risks that might arise from requiring banks to increase LTD. The LCR proposal by the OCC et al. (2013a, p. 71855) acknowledges that it could lead to liquidity hoarding, but it still assumes the rule will improve liquidity in the banking system. The result is that the unintended costs are never measured, the costs of compliance always seems small, and the benefits are always assumed to exceed the costs.

5.4. Cases of Negative Benefits

In two cases, evidence cited in the RIAs contradicts the supposed benefits of the proposed rule, indicating that the net benefits of the rule may be negative. The OCC and Fed (2018) assume that regulators can use RBC ratios to better identify bank risk. The OCC et al. (2016) assume the NSFR will improve economic stability. The evidence cited in their RIAs appear to contradict those assumptions.

5.4.1. Revised eSLR

The OCC and Fed (2018) revised the methods of calculating banks' minimum required levels of SLR, eSLR, and TLAC. The intent of reducing the eSLR was to make RBC ratios rather than a simple leverage ratio (the eSLR) the binding constrain on banks' risk-taking activities. As the proposal describes (p. 17319) the problem it sought to address was that "the standards in the eSLR rule have generally become a binding constraint rather than a backstop to the risk-based standards." Discussing the proposal in testimony before the U.S. Senate Committee on Banking, Housing, and Urban Affairs, Federal Reserve Vice President for Supervision Randall Quarles argued that RBC ratios are better measures of risk than leverage ratios such as the eSLR. When bound by a leverage ratio, he explained, banks "will bear the same capital cost if [they] take on a very risky asset versus if [they] take on a less risky asset." To resolve this problem, the OCC and Fed (2018, p. 17320) propose adjusting banks' required capital levels in order to "help ensure that the leverage capital requirements generally serve as a backstop to risk-based capital requirements."

The eSLR revision (p. 17319) is based on the notion that "risk-based and leverage capital measures contain complementary information about a bank's condition." As evidence,

the proposal cites [Estrella et al. \(2000\)](#). As discussed in Section 4.1, however, the evidence of complementarity between the leverage and RBC ratios is not strong. The findings of [Estrella et al. \(2000\)](#) are based on minor improvements in R-squared that are disputed by other studies, and the linear regression model in their study cannot be used to evaluate the nonlinear relationship between leverage and RBC ratios.

More importantly, the findings of [Estrella et al. \(2000\)](#) do not support the main assumption of the eSLR proposal—that RBC ratios are better than leverage ratios at measuring bank risk. As they describe “the risk-weighted ratio does not consistently outperform the simpler ratios, particularly with short horizons of less than two years” (p. 33).¹⁷ The study (p. 50) finds that “risk weighting can overstate differences in asset return variances and hence reduce the accuracy of the risk-weighted ratio as a measure of capital adequacy.” This evidence directly contradicts the assumed benefits of the revised eSLR proposal, that it will improve the accuracy of regulators’ risk measurement. If the benefits of this proposal are negative, as this evidence suggests, then its net benefits must also be negative.

5.4.2. Net Stable Funding Ratio

A similar contradiction can be found in the NSFR proposal by the [OCC et al. \(2016\)](#). The proposal’s RIA relies heavily on [BCBS \(2010a\)](#) as evidence of the economic benefits of the NSFR. As the proposal (p. 35163) describes, “The BCBS Economic Impact report estimated significant net benefits from the Basel III reforms, including the Basel III NSFR, in connection with reducing the likelihood and severity of financial crises.” This description, however, does not accurately reflect the findings of [BCBS \(2010a\)](#).

The [BCBS \(2010a\)](#) surveys the empirical literature on the cost of bank capital and liquidity regulations in terms of higher lending spreads and the benefits of reduced output volatility. It estimates the effects of capital regulations in the presence and absence of liquidity regulations and “focuses on the Net Stable Funding Ratio (NSFR)” (p. 1). The study (p. 30) finds that capital and liquidity requirements are complementary when capital is low. As capital rises, however, the marginal benefit of liquidity falls, “with the incremental net benefits from reducing the probability of banking crises gradually declining to become negative beyond a certain range.” This indicates that liquidity requirements such as the NSFR may have negative net benefits when the level of bank capital is high.

Table 3 shows the net benefits of capital and liquidity regulations from [BCBS \(2010a\)](#), p. 29; Table 8). At various levels of bank capital shown in column 1, columns 2–4 estimate the net benefits to GDP from capital rules alone under three scenarios: a financial crisis with no permanent effects, with moderate permanent effects, and large permanent effects.¹⁸ Columns 5–7 show the net benefits of both capital and liquidity rules under the same three scenarios. In columns 8–10, we calculate the marginal net benefit of liquidity rules in each scenario as the net benefits from capital and liquidity rules minus the net benefits from capital rules alone. As previously noted, the benefits of liquidity decline as capital increases. As the final three columns of Table 3 show, the marginal benefits of liquidity rules become negative at 9% capital under the assumption of no permanent effects of a banking crisis, at 11% with moderate permanent effects, and at 13% with large permanent effects.

Given that liquidity rules might have good or bad effects depending on banks’ capital levels, what would the effects on the US economy have been at the time of the proposal? Table 4 lists the TEC ratios of the eight US GSIBs, the only banks to which the rule would have applied. As the table shows, all eight had TEC ratios above 11%, the level at which the marginal benefits of liquidity regulations become negative assuming the permanent effects of a crisis are moderate as shown in Table 3. This indicates, based on [BCBS \(2010a\)](#)

¹⁷ As discussed in Section 4.1, RBC ratios are also not better predictors for horizons longer than two years.

¹⁸ As the study describes (p. 29), “Net benefits are the difference between expected benefits and costs; expected benefits are calculated assuming a crisis has a moderate permanent effect (cost of a crisis equals 63%), no permanent effect (cost of a crisis equals 19%) and large permanent effect (cost of a crisis equals 158%).”

as cited in the proposal (OCC et al. 2016), that the net effects of NSFR to the US economy would actually be negative.

Table 3. Benefits of liquidity requirements at different levels of bank capital.

Permanent Effects:	Capital Rules Only			Capital & Liquidity Rules			Benefit of Liquidity Rules		
	None	Moderate	Large	None	Moderate	Large	None	Moderate	Large
Capital									
8%	0.20	0.87	2.32	0.25	1.23	3.33	0.05	0.36	1.01
9%	0.31	1.44	3.87	0.29	1.56	4.30	−0.02	0.12	0.43
10%	0.33	1.71	4.70	0.28	1.75	4.91	−0.05	0.04	0.21
11%	0.31	1.87	5.23	0.25	1.85	5.30	−0.06	−0.02	0.07
12%	0.27	1.94	5.54	0.20	1.89	5.55	−0.07	−0.05	0.01
13%	0.21	1.96	5.73	0.14	1.90	5.70	−0.07	−0.06	−0.03
14%	0.15	1.95	5.84	0.07	1.89	5.80	−0.08	−0.06	−0.04
15%	0.08	1.92	5.90	0.00	1.85	5.85	−0.08	−0.07	−0.05

Source: Data on net benefits from BCBS (2010a, Table 8). Net benefits are measured as the percentage effect on the level of economic output per year. Capital is measured as total equity capital (TEC) over risk-weighted assets (RWA). Benefits of liquidity are calculated as net benefits with capital and liquidity rules minus net benefits with only capital rules.

Table 4. US GSIBs' 2016 tangible equity capital (TEC) ratios.

Bank Holding Company	Total Assets (in Billions)	TEC Ratio
JPMorgan Chase & Co.	\$2490	11.17%
Bank of America Corporation	\$2188	12.32%
Wells Fargo & Company	\$1930	11.04%
Citigroup Inc.	\$1792	15.43%
Goldman Sachs Group, Inc.	\$860	15.31%
Morgan Stanley	\$815	14.74%
Bank of New York Mellon	\$333	15.04%
State Street Corporation	\$243	14.90%
Simple average		13.7%
Weighted average		12.9%

Source: Data from Federal Reserve Y9-C reports as of 31 December 2016.

We can estimate the expected effects of the NSFR based on the data in Tables 3 and 4. The simple average TEC ratio in Table 4 is 13.7%, and the weighted average is 12.9%. Assuming an average TEC ratio of 13%, the marginal benefits of the NSFR ratio in Table 3 would be −0.06% of GDP if financial crises have moderate permanent effects. US GDP was \$18.7 trillion in 2016, the year of the proposal. Multiplying the percentage loss −0.06% by 2016 GDP, we calculate a net loss of USD 11.226 billion. Subtracting the compliance costs of USD 519 million estimated by OCC et al. (2016), we find that the NSFR would create an expected net loss of USD 11.725 billion per year to the US economy. The net loss assuming large permanent effects of financial crises would be USD 6.132 billion, and no permanent effects would indicate an annual net loss of USD 13.616 billion.¹⁹

6. Conclusions

US regulators, including former Fed Chair Janet Yellen (2015), claim to conduct analysis of proposed capital rules. However, RBC regulations based on the Basel Accords have not been successful at reducing bank risk. RBC rules gave banks the incentive to increase their holdings of highly-rated securities such as CDOs and MBSs during the early 2000s, which exposed them to higher risk and probability of failure during the 2008 financial crisis. Given the dangers they pose, regulators should take extra care in creating such rules to ensure they do not inadvertently lead to increased bank risk or decreased economic stability.

This study examines 27 RBC and related liquidity rules. Due to the incremental nature of RIAs, we find that no comprehensive analysis of the RBC system has ever been done. Of the 27 rules examined, only nine include RIAs. Five of the RIAs claim that the proposals

¹⁹ This excludes other costs such as misincentives and market distortions omitted by the OCC et al. (2016).

will create net benefits, but none provide quantitative evidence to support that conclusion. In two cases, evidence cited in the RIAs indicate that the net benefits from the rules may actually be negative.

We hope in the future that US bank regulators will use more stringent analysis in their proposed and final rules. It appears some may already be taking steps in that direction. In 2018, for example, the Fed created a new Policy Effectiveness and Assessment section tasked with “conducting ex ante analysis of the costs and benefits of pending regulations as well as the ex post assessment of existing regulations.”²⁰ Fed Chair Jerome Powell (2018) said this unit would have “a strong quantitative approach that is tightly focused on cost-benefit analysis.” He also added, however, that “we already do cost-benefit analysis in everything we do,” which, as the evidence in this study indicates, does not appear to be the case. Further studies will be necessary to assess future RIAs and to encourage transparency and accountability in the rule-making process.

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