

ECONOMIC COMMENTARY

A Brief History of Bank Capital Requirements in the United States

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Modern capital requirements can appear to be overly complex, but they reflect centuries of practical experience, compromises between different regulators, and legal and financial systems that developed over time. This *Commentary* provides a historical perspective on current discussions of capital requirements by looking at how the understanding of bank capital and the regulations regarding its use have changed over time.

When Alexander Hamilton and Aaron Burr founded their rival banks in the 1780s, their charters required them to hold capital, but the rules were far simpler than the hundreds of pages of regulations facing today's banks.

Today's rather complicated (some would say arcane) rules may look less arbitrary if viewed as the outcome of a centuries-long lived experience in a changing financial, legal, and political landscape. This *Commentary* provides a historical perspective on current discussions of capital requirements by looking at how the understanding of bank capital and the regulations regarding its use have changed over time.¹

What Is Bank Capital?

At a simple level, a bank's capital is the stock or equity put up by the bank's owners. The bank then takes in deposits or other debt liabilities and uses the debt and equity to acquire assets, which means mainly making loans, but they also buy branches, ATMs, and computers. In fact, a rough picture of a bank is that it takes in capital and deposits and makes loans. So this logic also means the capital, or equity, is the difference between the value of the assets and the value of the liabilities. As such, capital can act as a buffer: If the loans don't pay off, the value of the equity gets reduced, but there will (might?) still be enough assets to pay off the depositors so the bank doesn't get closed down. And if the loans do well, the capital owners get to keep the profits after paying the interest due to the depositors.

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This may sound a bit esoteric, but the ideas should be familiar to every homeowner.² To purchase an asset (the home) the buyer puts up some of his or her own money (the equity) and borrows the rest (the mortgage). If the house appreciates in value, the owner can sell it and make a profit after paying off the mortgage (the debt). If the house depreciates, the equity acts as a protective buffer for the lender: As long as the house price falls less than the value of the equity, the owner will get enough money from a sale to pay back the mortgage.

Because banking is such an important part of the economy, regulators have established minimum required levels of bank capital, generally requiring more capital if the bank is larger or is riskier, though exactly what counts as capital these days, and how size and risk are measured, becomes quite complex.

Early Capital Requirements

The intricacies of modern capital requirements appear less tangled when viewed as the outgrowth of centuries of practical experience, of compromises between different regulators, and of legal and financial systems that developed over time. In Hamilton and Burr’s day, banks were required to hold capital, but the rules were far simpler than today (table 1). In the nation’s earliest years, capital most often meant the specie—gold or silver—originally contributed by the bank’s organizers to get it started. (Hammond, 1985, p. 134) Unlike today’s capital requirements, which are set in terms of a specified fraction of assets (perhaps adjusted for risk), back then the law required a minimum absolute

level of capital, which often depended on where the bank was headquartered: Section 7 of the National Banking Act of 1864, for example, prescribed \$50,000 for places with a population of 6,000 or less. State regulations differed both as to capital levels and population, with Maryland at one time having seven categories and Nebraska eight (Grossman, 2010, p. 236).³

Early capital requirements showed more similarity to their modern counterparts than readily meets the eye, however. While the law prescribed a minimum level of capital, bank charters also restricted bank liabilities to a multiple of capital. Of course, mathematically, requiring 10 percent capital is the same as limiting liabilities to being 10 times capital. This was a restriction on liabilities, not assets (as capital ratios are phrased today), but the logic of double-entry bookkeeping makes a limit on liabilities also a limit on assets. This identity never really held, however, because deposits were often exempted and not counted against the liability limit. It seems that Hamilton and the other bank founders assumed deposits would be specie, a usage and an assumption that did not last.⁴

Exempting deposits effectively made the capital requirement a rule that specie backed bank notes and for that reason, Hammond (1985) argues that these restrictions actually represented a different type of bank regulation, namely, a reserve requirement. Where a capital requirement specifies the amount of capital that a bank must hold, a reserve requirement specifies the amount of liquid assets that the bank must hold. This makes the early capital requirement

Table 1. Summary of Capital Regulations

Time period	Capital regulation
18th and early 19th century	Banks chartered by states. Banks required to have a minimum level of capital to start. Rules vary by state.
National Banking Era, 1864	National banks created; starting capital depends on location of bank. Deposits become more important.
20th century	Comptroller considers capital-to-deposit ratio, following states. New Deal lists capital adequacy as requirement for Federal Deposit Insurance Corporation (FDIC) coverage.
Post–World War II	In 1950s, capital only one component of supervision; risk of assets considered. International Lending Supervision Act of 1983 (ILSA) requires supervisors to create capital requirements. United States implements Basel I in 1989; explicit risk-weighted assets. Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) creates prompt corrective action.
21st century: Basel and Dodd–Frank Act	Basel II, 2007, creates standardized and advanced approaches. Basel II and Dodd–Frank Act create capital conservation buffer (CCB), countercyclical capital buffer (CCyB), supplemental leverage ratio (SLR), and global systemically important bank (GSIB) surcharges. Stress tests: Dodd–Frank Act Stress Tests (DFAST) and Comprehensive Capital Analysis and Review (CCAR).

that banks hold a certain amount of gold relative to their liabilities look a lot like a reserve requirement. The restrictions soon explicitly required that banks hold a fraction of liabilities as specie, which made it a classic reserve requirement. Gradually, deposits became more important than bank notes, which eventually disappeared, leading to today's reserve requirements, where banks must hold a certain amount of cash or reserves with the Federal Reserve as a fraction of their deposits.

The early capital requirements also took the idea of capital as a buffer stock very seriously, as equity at times had double, triple, or even unlimited liability (Grossman, 2010, p. 237). That meant that if the bank suffered losses, the equity holders would have to pony up more money. Furthermore, capital did not have to be "fully subscribed" before a bank opened: Section 14 of the National Bank Act of 1863 required just half the capital to be paid in before operations could commence. This created the distinction between authorized and paid-up capital. The remaining "uncalled" capital served as an additional buffer in case of losses. An individual might subscribe for, say, \$1,000 of capital, pay in \$500 with specie, and remain liable for the additional \$500 if the bank had need of it. If the stock had double liability, the individual might then be asked to contribute another \$1,000.⁵

Even today, though, double liability is not completely gone, at least for firms that own a bank, if not for individual investors. An echo remains in the Federal Reserve's "source of strength" doctrine, whereby companies that own or control a bank may be liable for more than their original capital investment. The roots trace back to aspects of the 1956 Bank Holding Company Act, but the doctrine was refined and explicitly added to the Federal Reserve's Reg Y in 1984. It became legislatively codified in section 616(d) of the Dodd-Frank Act (Lee, 2012a, 2012b).

The Twentieth Century

In the early years of the twentieth century, the focus began to change from a minimum absolute level of capital toward the more modern idea of requiring capital based on the size and risk of the bank. In 1914, Comptroller of the Currency John Skelton Williams proposed legislatively mandating a capital-to-deposit ratio of one-tenth (Hahn, 1966), though the proposal never became law. The notion of capital limiting liabilities, such as deposits, rather than assets, such as loans and investments, still held sway. This view even has some modern adherents: The Nobel Prize winner Roger Myerson has suggested that capital requirements be phrased in terms of ratios to liabilities, as the point of capital is to provide a buffer that makes the bank's liabilities safer (Myerson, 2014).

Critics of the capital-to-deposit ratio argued that a bank suffers losses when its assets underperform, so an asset ratio better measures the ability to absorb losses. In 1939 the FDIC defined capital adequacy as having

an asset ratio of better than one-tenth capital to total assets—New Deal legislation had listed adequate capital as a prime criterion for deposit insurance eligibility. In 1942, quantitative criteria were effectively suspended to aid in the war effort by bank supervisors not wishing to restrain banks' purchase of Treasury securities (Orgler and Wolkowitz, 1976). The question returned after the war, however, with the comptroller's office looking at the ratio of capital to what it termed risk assets, that is, assets excluding cash and government bonds, a very early form of "risk-weighted assets" that became important later on. By 1952 the Federal Reserve Bank of New York created an explicit formula for weighting different assets by their risk, and in 1956 the Board of Governors adopted a similar ABC (Analyzing Bank Capital) model. The trend was not monotonic, however, as in 1962 the comptroller, on the urging of banks, de-emphasized formulas (Hahn, 1966) and even in the 1970s maintained that capital ratios were only one part of a suite of tools for assessing bank health (Tarullo, 2008). Furthermore, the different regulators had different definitions of what counted as capital. Capital ratios were used as a supervisory instrument, but the legal authority to enforce capital limits was at best unclear. The Federal Reserve lost a court battle in 1959 when it tried to revoke Federal Reserve membership on the basis of capital problems (Orgler and Wolkowitz, 1976).

In the 1970s, oil shocks and stagflation created an uncertain macroeconomic environment. Large firms reduced their dependence on banks by accessing commercial paper and other products in the capital markets; savers moved into money market funds. Several high-profile failures, such as Herstatt and Franklin National, highlighted the problem. Banks' efforts to compete led to the erosion of the New Deal regulatory regime, which was based on restricting activities and investments. As the old regime crumbled, supervisors increasingly moved to capital regulation as a substitute for direct control. In 1981 the Office of the Comptroller of the Currency (OCC) and the Federal Reserve jointly issued formal capital ratios, of 5 percent capital to assets, while the Federal Deposit Insurance Corporation (FDIC) separately issued a 5 percent guideline (Tarullo, 2008). In 1983 this was extended to the largest 17 banks in the United States, and later that year legislation explicitly required the agencies to set capital ratios. The legislation (the International Lending Supervision Act of 1983, or ILSA) was in part a response to a court ruling that regulators did not have authority to close a bank based on a low capital ratio by itself.

Basel Takes Center Stage

Throughout the 1970s and early 1980s, while capital was becoming a more important regulatory tool, international aspects of capital regulation became increasingly prominent. Worries that differing regulations created an uneven playing field, giving some large international banks (particularly the Japanese) an unfair advantage, coupled with concerns about bank resilience after the Latin American debt crisis, led to

a renewed emphasis on coordinated requirements across countries (Wagster, 1996). The forum for this was the Basel Committee on Banking Supervision (BCBS), a group created by the G-10 countries and housed at the Bank for International Settlements (BIS) in Basel, Switzerland.

This is not the place to go into the rather complicated international politics that led to the first Basel agreement, known as Basel I, but the final version of the accord was released in July 1988. However, as an international agreement it had to be implemented by the separate national authorities, which for the United States occurred in January 1989 (with a four-year transition period).

The major reform of the Basel I accord was the introduction of risk-weighted assets (RWA). The worry was that a straight capital ratio did not depend on an asset's risk, and so made no distinction between a bank with loans to major corporations and AAA rated bonds, and one loaded up on risky ventures. A capital requirement might then even encourage banks to take more risk, getting a higher return for the same amount of capital. Basel's approach was to assign assets to one of five categories of credit risk, with the riskier categories requiring more capital. For example, sovereign debt was given a weight of 0 percent, residential mortgages got 50 percent, and commercial loans 100 percent. In addition, there were conversion factors for off-balance-sheet items, such as loan commitments, which had not previously been subject to capital requirements at all.

Basel I created two minimum capital requirements, one for core capital, termed "tier 1" at 4 percent of RWA, and one for total capital, which was the sum of tier 1 capital plus additional items called "tier 2" capital.⁶ These definitions were somewhat different from the US definitions of "primary" capital and "total" capital used before Basel (Walter, 2019, p. 11). However, US supervisors retained a capital ratio against total assets (that is, not risk weighted), termed a leverage ratio. This was meant to protect against risks beyond credit risk, and sprang out of a fear that some banks might become highly leveraged by concentrating on assets with lower risk weightings.

National regulators did not always wait for international consensus: A major change in US capital requirements arrived in 1991 with the Federal Deposit Insurance Corporation Improvement Act (FDICIA), which introduced prompt corrective action (PCA). The idea was to get banks to build up their capital before it became so low that they failed or were closed. FDICIA created categories of capital ratios based on total, as opposed to risk-weighted, assets. Banks below the highest category, "well capitalized," were subject to restrictions on executive pay and on acquiring other banks or branches and could face heightened supervision. If a bank was critically undercapitalized, the regulator had to put the bank into receivership or conservatorship.

Even as it was rolled out, people were aware of weaknesses in Basel I, such as considering only credit risk, and choosing

a somewhat arbitrary number of risk classes and weights. And while some of the issues could be addressed, such as by the amendment of 1996, which added market risk (the risk of interest rate changes for those assets the bank held for trading) to the accord, other developments, such as the rise of securitization and the development of internal risk models by banks, required more extensive changes. For example, in the securitization process, a bank could sometimes reduce its capital requirement without reducing its risk by selling off a portion of its loans and buying back only the risky part (or "tranche") of the resulting security. While securitization and other off-balance-sheet activities provided many advantages to banks and borrowers, such as diversifying balance sheets, they also were prone to being used for such regulatory arbitrage.

To address these weaknesses, the international community again worked through the BCBS for a second accord. Basel II did not change the minimum capital level, but it made major changes to the way RWA was calculated. Smaller banks could continue to adhere to the Basel I rules for calculating RWA, dubbed the "standardized approach," but larger banks also had to apply a new formula, dubbed the "advanced approach." This involved calculating a (rather complicated) formula based on expected losses produced by a bank's own internal risk model. Affected banks are required to have capital equal to the greater of the standardized and advanced approaches.

Basel Meets Dodd and Frank

The US rules implementing Basel II were finalized in July 2007, to take effect in April 2008. This timing guaranteed a need for a Basel III to respond to the great financial crisis. As in the case of prompt corrective action, national and international changes moved in parallel. Basel III standards were promulgated by the BCBS in December 2010, shortly after the July signing of the Dodd-Frank Act (DFA). In 2013, US regulations effectively jointly implemented both strands of capital requirements.

Basel II promoted 3 pillars of capital regulation: minimum capital requirements, supervisory review of capital adequacy, and market discipline. Pillar I on minimum capital requirements proved most amenable to detailed regulations, and along with adjusting the requirements for credit risk and securitization exposures, brought in market risk and operational risk to the picture.

The new regulations applied to all banks and to bank holding companies (companies that owned or controlled a bank) with assets over \$1 billion. The regulations also introduced a new definition of capital, "common equity tier 1" (CET1), in response to concerns that tier 1 capital was too broad a definition and did not provide a sufficient buffer during the crisis. A minimum CET1 ratio was added to the previous requirements—the tier 1, total, and leverage requirements remained. The definitions behind risk weighting also were shifted, with many more risk categories than the five (four in the United States) initially specified in

Basel I. Some of these risk weights exceeded 100 percent so that an item contributed more to RWA than its value.

The regulation implementing Basel III and the DFA considerably complicated bank capital requirements, and to a great degree this was deliberate, with the idea that large and more sophisticated banks should face stiffer requirements. In part, these stricter standards were implemented by creating requirements for a series of so-called capital buffers. There is the capital conservation buffer (CCB), which requires banks to retain earnings if their capital is less than 2.5 percent above the minimum ratio, with the restrictions getting stricter the further the buffer falls below 2.5 percent. Large bank holding companies that are felt to be particularly important and designated a global systemically important bank (GSIB) also face the GSIB surcharge, an additional charge calculated to offset the systemic risk caused by being a GSIB. On top of that, the GSIBs have to meet a total loss absorbing capacity (TLAC) threshold, where they must meet a minimum ratio of equity plus long-term debt. The idea is to provide an additional buffer (loss absorbing capacity) before depositors and the FDIC take a loss.

The supplemental leverage ratio (SLR) is not a buffer on top of other requirements, but for those banks using the advanced approach, it has them calculate leverage in an alternative manner, including off-balance-sheet items such as derivatives and credit commitments. These advanced-approach firms must meet both the 4 percent leverage ratio and the 3 percent SLR. GSIBs have a 2 percent “leverage buffer” added to their SLR and thus face a 5 percent standard.

Along with tailoring capital requirements to differing banks, the regulation implementing Basel III and the DFA also tailors the requirements to economic conditions. The capital rules described so far apply whether the economy is in a boom or in a recession and cannot easily be varied when risks in the financial system change. The countercyclical capital buffer (CCyB) is an attempt to add some cyclical variability to the regulations: It can vary between 0 percent and 2.5 percent of RWA and is set at the discretion of the national authority, which, in the case of the United States, is the Board of Governors of the Federal Reserve. Like the CCB, the CCyB is meant to get banks to build up the buffer, and so they face restrictions on earnings disposition until they reach the level.

Stressing the Last Taxi

One conundrum created by capital requirements is often referred to as the last taxi problem. It stems from an old story about a traveler arriving by train late one evening. Worried about being able to find a cab so late in the evening, he is relieved to see a taxi waiting, under a sign saying “one taxi must always remain at the train station.” The traveler hops in the cab, names his hotel, but the cabbie refuses to move, and points to the sign. Thus a bank has capital to protect against losses and against going insolvent

and thus getting shut down but now faces the prospect of being shut down for violating capital requirements. The supervisory stress test attempts to get around this problem by making sure banks will have enough capital to operate when conditions get bad—when there is a “stress environment.” Banks (and bank holding companies) are required to project revenues, losses, reserves, and capital under three stress scenarios, denoted the baseline, the adverse, and the severely adverse scenarios. Banks are required to show that they will have enough capital to meet requirements under the stress scenarios. The stress tests actually come in two flavors: those mandated by Dodd-Frank, known as Dodd Frank Act Stress Tests, or DFAST, and for larger firms, the Comprehensive Capital Analysis and Review, or CCAR.

The stress tests represent a large departure from previous capital requirements. While the forward-looking estimate of losses builds on the advanced approach requirements of Basel II, where banks had to hold capital against expected losses, the stress tests add scenarios meant to mimic the losses observed in a recession or other adverse stress event. Furthermore, tests results for individual firms are publicly disclosed. This allows regulators and particularly the public to make horizontal comparisons across firms with regard to their capital positioning. The repeated nature of the test (occasionally for DFAST, yearly for CCAR) also encourages firms to improve their risk measurement and risk management techniques, perhaps as important a result as requiring enough capital.

Conclusion

Since the time of Hamilton and Burr, the laws and regulations around bank capital have changed dramatically, both in format and scope as the economic, financial, and legal environment has changed. And the evolution has not ended. In May 2018 the Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA) amended provisions in the Dodd-Frank Act, adjusting risk weights and changing the capital planning requirement associated with the stress tests. In 2019, the Federal Reserve proposed consolidating the capital buffer with the stress test requirements, tailoring the buffer to the risk of individual banks (Quarles, 2019). So it is quite likely that the long evolution of capital requirements will continue.

Footnotes

1. This *Commentary* is not meant to provide legal advice or supervisory guidance on current capital requirements.
2. Admati and Hellwig (2013) use this analogy to great effect.
3. What is often considered a major determinant of a firm’s capital structure (Myers, 2001), the corporate tax rate, did not play a major role in the early American economy. The corporate income tax was introduced on a permanent footing in 1909, with a temporary measure having been used in the Civil War (Slemrod, 2008).

4. It also seems that regulators then were less concerned with protecting depositors than with protecting people holding the other large class of bank debt, namely, bank notes. Remember that throughout the 1800s the “money” in circulation was more likely to be a note issued by a bank rather than government currency. Protecting note holders was considered more important, as they were often poor, and failure of the bank to pay would be a particular burden on them (Smith, p. 343, 1976).

5. Double (or higher) liability became less common after the 1930s, with Arizona (the last remaining state with it) finally removing it in 1956 (Esty, 1998).

6. Tier 1 capital includes common stockholders’ equity, noncumulative perpetual preferred stock, minority interest in consolidated subsidiaries, and some other items. Total capital adds in tier 2 capital, which includes some amount of allowances for loan losses, cumulative perpetual preferred stock, long-term preferred stock, and some subordinated debt. In addition, tier 2 capital cannot exceed tier 1 capital.

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