U.S. Implementation of the Basel Capital Regulatory Framework

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Summary

The Basel III international regulatory framework, which was produced in 2010 by the Basel Committee on Banking Supervision at the Bank for International Settlements, is the latest in a series of evolving agreements among central banks and bank supervisory authorities to standardize bank capital requirements, among other measures. Capital serves as a cushion against sudden financial shocks (such as an unusually high occurrence of loan defaults), which can otherwise lead to insolvency. The Basel III regulatory reform package revises the definition of regulatory capital and increases capital holding requirements for banking organizations. The quantitative requirements and phase-in schedules for Basel III were approved by the 27-member jurisdictions and 44 central banks and supervisory authorities on September 12, 2010, and endorsed by the G20 leaders on November 12, 2010. Basel III recommends that banks satisfy these enhanced requirements by 2019. The Basel agreements are not treaties; individual countries can make modifications to suit their specific needs and priorities when implementing national bank capital requirements.

In the United States, Congress mandated enhanced bank capital requirements as part of financial-sector reform in the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank Act; P.L. 111-203, 124 Stat.1376). Specifically, the Collins Amendment to Dodd-Frank (1) amends the definition of capital; (2) establishes minimum capital and leverage requirements for banking subsidiaries, bank holding companies, and systemically important non-bank financial companies; and (3) establishes an implementation timeline shorter than that agreed to in the Basel III Accord. In addition, Dodd-Frank removes a requirement that credit ratings be referenced when evaluating the creditworthiness of financial securities. Instead, the Federal Banking Regulators (i.e., the Federal Reserve, the Office of the Comptroller of the Currency, and the Federal Deposit Insurance Corporation) are required to find other appropriate standards by which to determine the financial risks of bank portfolio holdings when enforcing the mandatory capital requirements.

On June 7, 2012, the Federal Banking Regulators announced the final rule for implementation of Basel II.5 and the proposed rule for the implementation of Basel III. As required by Dodd-Frank, the federal regulators implemented risk-weighting methodologies in both sets of rules that would replace credit ratings. Although smaller institutions with total assets under $500 million may still follow some of the regulatory requirements based upon the Basel I capital framework, all banks would be required to use the risk-weighting methodology established by federal regulators in the recent proposed rule. Banks must also increase capital holdings to withstand adverse macroeconomic and financial scenarios.

Although the financial crisis of 2007-2009 precipitated the call for higher capital requirements on the banking system, bank credit arguably could become more expensive for borrowers or even decline during a prolonged recovery. Whether higher capital requirements would result in a reduction of overall lending and systemic risk, however, is unclear. Prior to the financial crisis, banks maintained capital levels that exceed the minimum regulatory requirements and the economy still saw widespread lending. Bank capital reserves may not have been an effective financial risk mitigation tool while a significant amount of lending took place outside of the regulated banking system. Given that lending from non-bank sectors has since diminished, bank capital may grow more effective at mitigating lending risks in the economy, but credit availability may also become more contingent upon the transition to the higher capitalization levels.

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Overview of Capital Adequacy Regulation

Lending is inherently risky. Banks face *default risk* because their assets consist primarily of loans made to borrowers who may not always repay all of the principal and interest owed. In addition, banks face *funding risk* because they must continuously borrow short-term to *fund* their assets (customer loans).[1] In other words, banks provide longer-term (illiquid) customer loans by borrowing the funds via sequences of shorter-term (liquid) loans at relatively lower rates.[2] Profits are generated from the spread between the long-term rates lenders charge their customers and the successive sequences of shorter-term rates they pay for liquidity until the longer-term loans are repaid in full. Hence, if borrowers default on their loans, then lenders might be unable to repay their shorter-term loan obligations (liabilities) to depositors and other financial institutions.

Lenders also face *systemic risk*. Although economists have not agreed upon a universal definition, systemic risk may be viewed as an increase in correlation among individual default and funding risks, largely due to a sudden loss of confidence (panic) of financial market participants following a liquidity disruption or decline in asset prices.[3] In other words, systemic risk can be thought of as contagion, meaning that liquidity and payment problems affecting one or a few entities may spread and create disruptions in the rest of the market. For example, suppose an isolated default event prompts other financial market participants to re-evaluate their estimates of default risk for similar or related financial activities. If market participants suspect that an observed default event is relevant beyond the directly involved entities, then growing pessimism of creditors of investors can suddenly manifest itself in the form of a market retrenchment.[4] Consequently, financial panics have historically been rooted in the uncertainty about future asset prices (e.g., real estate, stocks, financial securities) while such assets were serving as collateral for an innumerable amount of loans.[5] Furthermore, the severity of a national recession depends upon the amount of lending by the entire banking and financial system prior to the bursting of an asset bubble, particularly if many of the outstanding loans suddenly became "underwater," such that the balances owed exceeded the current value of the underlying collateral.

U.S. lending institutions that accept federally insured deposits are collectively referred to as depository institutions, and they must comply with *safety and soundness* regulatory requirements.[6] As part of safety and soundness regulation, banks are required to maintain

[1] Bank assets, which tend to consist primarily of long-term customer loans, may also consist of cash and other financial securities.

[2] Such short-term borrowing may occur in the form of paying interest on customer deposits or repaying loans obtained in the short-term money markets. The short-term money markets consist of repurchase agreements, commercial paper, and the international short-term market known as the London Interbank Offering Rate (LIBOR) market. U.S. banks may also acquire short-term loans by going to the federal funds market or borrowing from the Federal Home Loan Bank System.

[3] A theoretical framework in economics and finance states that confidence in financial markets rises with profitability; a disruption in profitability may result in a sudden and widespread loss of confidence among market participants and, therefore, a financial crisis. For more information, see Lance Taylor and Stephen A. O'Connell, "A Minsky Crisis," *Quarterly Journal of Economics*, vol. 100 (1985), pp. 871-885.

[4] See Sanjiv R. Das, Laurence Freed, and Gary Geng et al., "Correlated Default Risk," *Journal of Fixed Income*, vol. 16, no. 2 (September 2006), pp. 7-32.

[5] See Gertrude Tumpel-Gugerell, Member of the Executive Board of the European Central Bank, "Asset Price Bubbles: How They Build Up and How to Prevent Them?" Speech at alumni event of the Faculty of Economics at University of Vienna, Vienna, May 3, 2011, http://www.ecb.int/press/key/date/2011/html/sp110503.en.html.

[6] See CRS Report R41718, *Federal Deposit Insurance for Banks and Credit Unions*, by Darryl E. Getter and Victor (continued...)

sufficient capital reserves to buffer against default (credit), funding (liquidity), and systemic risks.[7] A bank's capital is defined as the difference between its assets and liabilities. If a bank maintains sufficient capital, a default on one of its assets is less likely to translate into a subsequent failure to repay some of its shorter-term obligations. A capital buffer, therefore, protects bank creditors from loan defaults by bank customers. A bank is considered solvent as long as it maintains capital above a minimum threshold level, and it is considered undercapitalized and faces the prospect of being shut down by its regulator should its capitalization fall below the threshold. Hence, a bank's asset or lending portfolio may grow proportionately with its capital reserves.

The Basel Capital Accords

The work by the Basel Committee on Banking Supervision (BCBS) on the first Basel Capital Accord,[8] Basel I, provided an international consensus framework for bank safety and soundness regulation. The objective of the first Basel Capital Accord was to promote consistent safety and soundness standards while providing an equitable basis of competition for banking institutions in participating countries.[9] In other words, international regulators were concerned that banks might prefer to domicile in countries with the most relaxed safety and soundness requirements. Unless capital reserve requirements are internationally harmonized, variation in standards may also lead to competitive disadvantages for some banks with competitors in other countries. Basel I established the amount of capital relative to assets, expressed as a capital-to-asset ratio, that financial institutions needed to maintain. Although the BCBS has no authority to compel member governments to adopt any specific standards, U.S. Federal Regulators generally adopt rules consistent with the Basel Accords. The first Basel Capital Accord was published in July 1988 and fully implemented in the United States by the end of 1992.[10]

The safety and soundness regulatory framework for banking institutions that stems from the Basel Capital Accords include

- a *Tier 1* capital component made up of mainly common shareholders' equity (issued and fully paid), disclosed reserves, most retained earnings, and perpetual non-cumulative preferred stock. *Tier 1 capital risk-weighted asset ratios* are generally defined as bank capital (e.g., common shareholder equity) in the

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[7] See Douglas J. Elliot, "A Primer on Bank Capital," The Brookings Institution, January 28, 2010, http://www.brookings.edu/~/media/research/files/papers/2010/1/29%20capital%20elliott/0129_capital_primer_elliott.pdf.

[8] The name, Basel Accord, comes from Basel, Switzerland, the home of the Bank for International Settlements (BIS). In 1974, the BIS established the Basel Committee on Banking Supervision (BCBS), made up of representatives from the monetary authorities of 13 countries—Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom, and the United States—to determine and mitigate bank risk in light of different national systems of supervision and deposit insurance.

[9] See Roger W. Ferguson, Jr., "Capital Standards for Banks: The Evolving Basel Accord," *Federal Reserve Bulletin*, September 2003, pp. 395-405.

[10] Basel I was implicitly endorsed in the Federal Deposit Insurance Corporation Improvement Act of 1991 (P.L. 102-242, 105 Stat. 2236; FDICIA). See William R. Keeton, "The New Risk-Based Capital Plan For Commercial Banks," *Economic Review, Federal Reserve Bank of Kansas City*, December 1989, pp. 40-60 at http://www.kc.frb.org/publicat/econrev/EconRevArchive/1989/4q89keet.pdf.

numerator and bank assets (typically weighted according to its likelihood of default) in the denominator. Banks must to hold enough capital reserves to maintain the minimum required capital-asset ratios, which would reduce banks' vulnerability to *unexpected* loan defaults.

- a *Tier 2* capital component that includes allowances for loan and lease losses (ALLL), set aside for *anticipated* (or estimated) loan losses. Loan loss provisioning refers to increasing the amount of ALLL when loan default risks increase; decreases are referred to as "charge-offs" that occur when it becomes apparent that loan(s) will not be repaid. ALLL is adjusted quarterly, and these loan loss reserve proceeds must come from current income earnings (as opposed to total assets).[11]
- stress testing, which is conducted to determine whether a bank can withstand losses arising from a severe recession or systemic risk event and still remain adequately capitalized. Stress testing requirements vary by bank size and type of lending activities, and federal regulators require all U.S. banking institutions to analyze the potential impact of adverse economic conditions on their financial conditions or viability.

The second Basel Accord, Basel II, was developed in response to perceived shortcomings, in particular with the asset risk-weighting system, discussed in more detail in **Appendix A**.[12] In the United States, Basel II was initially applied to only the 19 largest banking institutions.[13] On December 7, 2007, the Federal Banking Regulators published the final regulations to implement Basel II, which became effective on April 1, 2008.[14] The date of expected compliance with some Basel II rules, however, was delayed or waived after the financial turmoil began in 2007.[15]

In response to the 2007-2009 global financial crisis, the BCBS issued what is referred to as Basel II.5 as an amendment to Basel II.[16] Basel II.5 is designed to better capture credit risk in the "trading book" of a bank. The trading book refers to securities that a bank would *not* hold to

[11] Tier 2 capital also consists of subordinated debt, limited-life preferred stock and loan loss reserves, and goodwill.

[12] See Secretariat of the Basel Committee on Banking Supervision, *The New Basel Capital Accord: An Explanatory Note*, Bank for International Settlements, Basel, Switzerland, January 2001, http://www.bis.org/publ/bcbsca01.pdf.

[13] The U.S. federal banking regulatory agencies placed banking organizations with at least $250 billion of consolidated total assets or at least $10 billion of on-balance-sheet risk associated with foreign asset holdings under Basel II; these institutions were required to use the most advanced approaches of the Basel II framework to determine their credit risks. See U.S. Department of the Treasury, Office of the Comptroller of the Currency; Board of Governors of the Federal Reserve System; Federal Deposit Insurance Corporation; and U.S. Department of the Treasury, Office of Thrift Supervision, "Risk-Based Capital Standard: Advanced Capital Adequacy Framework—Basel II," 71 *Federal Register* 185, September 26, 2006.

[14] U.S. Department of the Treasury, Office of the Comptroller of the Currency; Board of Governors of the Federal Reserve System; Federal Deposit Insurance Corporation; and U.S. Department of the Treasury, Office of Thrift Supervision, "Risk-Based Capital Standard: Advanced Capital Adequacy Framework—Basel II," 72 *Federal Register* 235, December 7, 2007.

[15] See CRS Report R40007, *Financial Market Turmoil and U.S. Macroeconomic Performance*, by Craig K. Elwell. While providing guidance for Basel II adoption, the Federal Regulators explained that banks could request compliance waivers. See the *Interagency Statement—U.S. Implementation of Basel II Advanced Approaches Framework* at http://www.federalreserve.gov/boarddocs/srletters/2008/SR0804a1.pdf.

[16] The two documents are collectively known as Basel II.5 or "the 2009 revisions" are Basel Committee on Banking Supervision, *Revisions to the Basel II Market Risk Framework*, March 2009, http://www.bis.org/publ/bcbs148.pdf and Basel Committee on Bank Supervision, *Guidelines for Computing Capital for Incremental Risk in the Trading Book*, http://www.bis.org/publ/bcbs149.pdf.

maturity and would also be accounted for at current market value. A security held to maturity is accounted for in the "banking book" at its original book value, unless the bank decides to sell it; if so, it then moves over to the trading book where it is given fair market value accounting treatment. Distinguishing between assets that should be held in the trading and banking books is not always easy, which makes it difficult to determine the proper accounting and risk weighting treatment.[17] Nonetheless, Basel II.5 is intended to prevent strategic but inappropriate placement of securities in the book that would provide the most favorable accounting treatment of securities at a particular point in time. Regulatory arbitrage can result in a bank having an insufficient capital buffer to mitigate lending risks. Federal Banking Regulators issued proposed rules on the adoption of Basel II.5 revisions in the United States on January 11, 2011;[18] these were amended and re-proposed on December 7, 2011.[19] The final rule on the adoption of Basel II.5, also known as the market capital risk rule, was issued by the Federal Banking Regulators on June 7, 2012.[20]

In a further response to the financial crisis, the Basel III regulatory framework reforms Basel II by revising the definition of regulatory capital and increasing the amount that banks are required to hold. Basel III also requires banks to hold a greater percentage of their assets in cash or in assets that can easily be converted to cash. The quantitative requirements and phase-in schedules for Basel III were approved by the 27-member jurisdictions and 44 central banks and supervisory authorities on September 12, 2010. Basel III compliance requires banks to satisfy all of these enhanced requirements by 2019. On June 7, 2012, the regulators issued a proposed rule to implement Basel III in the United States.[21]

Enhanced Safety and Soundness Requirements Under Dodd-Frank

The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank Act; P.L. 111-203) also addressed capital reserve requirements for banks. The statutory requirements are summarized below.

Removal of References to Credit Ratings

Section 939 of Dodd-Frank requires the removal of any regulatory references to credit ratings.[22] Given the viewpoint that flawed credit ratings may have contributed to the housing bubble, Dodd-Frank reduced "over-reliance" on ratings and encouraged investors to conduct their own

[17] See Basel Committee on Banking Supervision, *Trading Book Survey: A Summary of Responses*, April 2005, http://www.bis.org/publ/bcbs112.pdf.

[18] See Office of the Comptroller of the Currency, Treasury; Board of Governors of the Federal Reserve; and Federal Deposit Insurance Corporation, "Risk-Based Capital Guidelines: Market Risk," 76 *Federal Register*, January 11, 2011 at http://www.gpo.gov/fdsys/pkg/FR-2011-01-11/pdf/2010-32189.pdf.

[19] See Office of the Comptroller of the Currency, Treasury; Board of Governors of the Federal Reserve; Federal Deposit Insurance Corporation, "Risk-Based Capital Guidelines: Market Risk; Alternatives to Credit Ratings for Debt and Securitization Positions," December 7, 2011 at http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20111207a1.pdf.

[20] See announcement at http://www.federalreserve.gov/newsevents/press/bcreg/20120607b.htm.

[21] See announcement at http://www.federalreserve.gov/newsevents/press/bcreg/20120607a.htm. The comment period was extended from September 7, 2012 to October 22, 2012. See http://www.occ.gov/news-issuances/news-releases/2012/nr-occ-2012-118.html.

[22] A credit rating is a third party assessment of the future credit risk of a firm that typically has issued financial securities. See http://www.sec.gov/news/press/2011/2011-59.htm.

analysis.[23] Section 939A required each federal agency to review regulations that would require the use of an assessment of the creditworthiness of a security or money market instrument, and any references to, or requirements in, those regulations regarding credit ratings within one year of enactment (by July 21, 2011). After review, the agencies had to modify all regulations such that any reference to or requirement for reliance on credit ratings was removed. Regulators were required to find other appropriate standards by which to determine the financial risks of bank portfolio holdings while enforcing the mandatory capital requirements, and they must also transmit reports to Congress that contain descriptions of all regulatory modifications made pursuant to the section.[24]

Section 171: The Collins Amendment

The Collins Amendment of Dodd-Frank provides for the development of capital requirements for all insured depository institutions, depository institution holding companies, and systemically important non-bank financial companies.[25] Small bank holding companies with less that $500 million in assets are exempt from the Collins Amendment. In addition, the amendment would not apply to foreign parents of bank and thrift holding companies; Federal Home Loan Banks would also be exempt from these requirements.

Section 171(b) of the Collins Amendment requires Federal Banking Regulators to apply to U.S. bank holding companies and other systemically significant nonbank financial companies the same minimum-leverage capital and risk-based capital requirements that apply to federally insured depository institutions. The minimum requirements cannot be quantitatively lower than the capital requirements that were in effect when Dodd-Frank was enacted. Hence, regulators may set higher (but never lower) ratio requirements than those established for insured depositories that were in effect in July 2010.[26] Hence, Basel I and Basel II (as implemented in the United States) became a floor for future regulatory ratios. On June 28, 2011, the Federal Banking Regulators announced the final rule establishing the two floors that went into effect on July 28, 2011.[27]

The Collins Amendment also had the effect of excluding a class of securities from the definition of eligible Tier 1 capital. *Trust preferred securities* are securities that issuers have an incentive to redeem at some future date.[28] Examples of trust preferred securities may be directly issued preferred stocks with the tax advantages of debt, and the preferred stock that the U.S. Treasury purchased under the Troubled Asset Relief Program (TARP). Basel III, however, requires that

[23] See U.S. Congress, Senate Committee on Banking, Housing, and Urban Affairs, *Dodd-Frank Wall Street Reform: Conference Report Summary*, 111th Cong., 2nd sess., July 1, 2010, http://banking.senate.gov/public/_files/070110_Dodd_Frank_Wall_Street_Reform_comprehensive_ summary_Final.pdf.

[24] For example, the Office of the Comptroller of the Currency (OCC) asked for comments in November 2011 for alternative frameworks that could be applied to the securities purchased by national banks and federal savings associations. See "Alternatives to the Use of External Credit Ratings in the Regulations of the OCC," *Federal Register*, November 29, 2011, p. 73527, available at http://www.gpo.gov/fdsys/pkg/FR-2011-11-29/html/2011-30428.htm.

[25] For more information on the regulation of systemically important firms, see CRS Report R42083, *Financial Stability Oversight Council: A Framework to Mitigate Systemic Risk*, by Edward V. Murphy.

[26] See http://www.arnoldporter.com/resources/documents/Advisory—Dodd-Frank_Act_Mandates_Stricter_Capital_Requirements_071610.pdf.

[27] See http://www.gpo.gov/fdsys/pkg/FR-2011-06-28/pdf/2011-15669.pdf.

[28] For a discussion of trust preferred securities, see http://www.philadelphiafed.org/bank-resources/publications/src-insights/2009/first-quarter/q1si4_09.cfm. For information about the securities purchased by the U.S. Treasury under TARP, see CRS Report R41427, *Troubled Asset Relief Program (TARP): Implementation and Status*, by Baird Webel.

only perpetual securities, such as common stock that generally has no maturity date or incentive to redeem, will be counted as (Tier 1) capital. Given that trust preferred securities were excluded from Tier 1 capital for insured depositories at the time of passage, the Collins Amendment effectively makes this a requirement for large bank holding companies and systemically important nonbanks; small institutions with assets of less than $500 million that are not engaged in significant non-banking activities or off-balance sheet activities are exempt from this requirement.[29] Covered institutions also have three years from the July 2010 enactment date of Dodd-Frank to comply.[30]

U.S. Implementation of Basel II.5, Basel III, and Harmonization with Dodd-Frank

As previously stated, the final rule for implementation of Basel II.5 and the proposed rule for the implementation of Basel III, which will be referred to as Basel III NPR (Notice of Proposed Rulemaking), were both announced on June 12, 2012. In light of Section 939A of Dodd-Frank, U.S. implementation of Basel II.5 and Basel III do not depend on credit ratings. Federal regulators have implemented a system that assigns risk weights to various types of asset holdings (or exposures) based upon various categories of loans, issuers (of financial securities), and borrower underwriting requirements. All bank assets (loans) would be multiplied by the assigned risk weight, and the sum of the risk-weighted assets would then be multiplied by a minimum capital percentage to determine how much capital a bank must hold. Although banks having under $500 million in assets would be able to follow Basel I guidelines for determining their final regulatory capital levels, smaller institutions would likely also see an increase in their capital requirements. Given that all banks must follow the same risk-weighting guidelines, the sum of banks' risk-weighted assets are likely to increase even if the same (Basel I) minimum capital percentages are applied. The risk-weighting issues are discussed in **Appendix A**.

After risk-weighting bank assets, the amount of required capital that must be held for assets in the trading book and the banking book can be determined. The final market capital rule, which implements Basel II.5, applies to the trading books of banks with aggregated trading assets and trading liabilities equal to 10% or more of quarter-end total assets or $1 billion or more. For all assets held in the banking books of banks with $500 million or more in assets, the Basel III NPR provides the guidance with the risk-weighting methodology and the required capital levels. The Basel III NPR also incorporates the enhanced capital and liquidity requirements mandated by Dodd-Frank.[31] The computations of the regulatory capital ratios are discussed in **Appendix B**. **Appendix C** discusses the increase in stress testing requirements for all U.S. banks, which may result in banks holding levels of required capital that would likely exceed the Basel III NPR minimum compliance thresholds.

[29] Off-balance sheet activities refer to risk exposures arising from assets that a bank does not own. For example, a bank may assume some or all of the default risk by providing a guarantee for a loan that it has sold to another institution.

[30] Basel III starts the phasing out of non-perpetual securities in 2013, whereas this period for banks in the United States began when Dodd-Frank became public law, July 21, 2010, which accelerates the compliance schedule.

[31] Safety and soundness provisions of Dodd-Frank that apply specifically to systemically important firms, such as a systemic risk tax and stress-testing, are not addressed in this report. For more information on these topics, see CRS Report R41384, *The Dodd-Frank Wall Street Reform and Consumer Protection Act: Systemic Risk and the Federal Reserve*, by Marc Labonte.

Do Higher Capital Requirements Curb Lending, (Systemic) Risks, or Both?

In theory, increasing safety and soundness requirements in the form of holding more capital should increase the capacity of the banking system to absorb losses associated with its various financial risks. Given that funding loans via the short-term interbank loan markets is typically cheaper than funding them with shareholder equity, banks are reluctant to hold larger amounts of capital than is absolutely necessary. A bank typically must pay its shareholders a greater return than it would to short-term creditors because (1) its return on equity must be competitive with that of other publicly-traded firms; and (2) shareholders require greater compensation for their willingness to shoulder greater default risk. Investors could possibly interpret a bank's decision to raise capital as a sign that its default or funding risks may be increasing.[32] If investors subsequently react negatively to a bank's efforts to raise capital (by seeking higher investment returns elsewhere), then the bank's share price might fall and the risk of bank failure, ironically, could increase.

A bank may attempt to meet increased capital requirements by shifting the higher cost burdens on its customers (borrowers) rather than on existing shareholders. For example, a bank may avoid raising new capital and diluting shareholder equity by reducing portfolio assets (loans), meaning that it may decide to sell some existing assets or reduce future lending.[33] A bank could also pass its higher funding costs on to borrowers by increasing either lending rates or its strategic focus on higher interest rate (unsecured) lending. Hence, a bank must decide how to distribute the costs of higher capital requirements between its shareholders and customers. The distribution of those costs may dampen credit expansion and, therefore, slow the pace of economic recovery.

Although higher capital and stress testing (discussed in **Appendix C**) requirements may provide a larger cushion to absorb unexpected losses, the extent to which a systemic risk event can be mitigated is unclear. Prior to the recent financial crisis, many banks held more than enough capital to be considered well capitalized by regulatory standards.[34] Hence, holding precautionary capital did not necessarily restrain lending by the covered institutions. According to the "paradox of financial instability," the financial system appears at its most robust when it is actually most at risk.[35] The evidence for the paradox is linked to the observation that bank capital is *procyclical*,

[32] See William C. Dudley, "U.S. Experience with Bank Stress Testing," Speech at the Group of 30 Plenary Meeting, Bern, Switzerland, May 28, 2011, http://www.newyorkfed.org/newsevents/speeches/2011/dud110627.html.

[33] If a bank decides to curtail lending to remain in or move toward compliance, it may also have to turn away deposits to maintain proper balance sheet ratios. For information on banks having to turn away deposits, see Eric Dash and Nelson D. Schwartz, "In Cautious Times, Banks Flooded With Cash," *New York Times*, October 24, 2011, http://www.nytimes.com/2011/10/25/business/banks-flooded-with-cash-they-cant-profitably-use.html?pagewanted=all; Paul Davis, "In Cash Glut, Banks Try to Discourage New Deposits," *American Banker*, July 2010, http://www.americanbanker.com/bulletins/-1023018-1.html.

[34] See http://www.imf.org/external/pubs/ft/wp/2010/wp10286.pdf. Large U.S. banking firms held significantly more equity capital than the minimum required by bank regulators under the Basel I requirements over the 1992 through 2006 period. See Allen N. Berger, Robert DeYoung, and Mark Flannery, *How Do Large Banking Organizations Manage Their Capital Ratio?*, The Federal Reserve Bank of Kansas City Economic Research Department, Research Working Paper 08-01, April 2008, http://www.kc.frb.org/Publicat/RESWKPAP/PDF/RWP08-01.pdf.

[35] For a discussion of the paradox of financial stability, see Herve Hannon, "Towards a Global Financial Stability Framework," Speech at the 45th SEACEN Governors' Conference, Siem Reap province, Cambodia, February 2010, http://www.bis.org/speeches/sp100303.pdf?noframes=1.

meaning that it rises during healthy economic periods, when there are fewer defaults, and declines during financial downturns when defaults increase.[36]

Given this procyclicality, bank capital levels have been not so much a reliable predictor of a systemic event but have tended, instead, to be a lagging indicator of distress.[37] Ironically, excessive lending activity may arise when banking institutions grow overconfident as a result of (1) being well-capitalized and (2) as optimism grows with the exceptional performance of an asset used as collateral for loans.[38] Bank capital reserve holdings prior to the recent financial crisis may arguably provide evidence that capitalization levels do not predict or prevent the occurrence of a systemic risk event. In light of many banking crises being explained by the bursting of asset bubbles, which have proven difficult for the Federal Reserve to identify and eliminate, a rise in the pace of aggregate lending activity (especially as lenders' credit risk exposures grow more correlated with the performance of a particular financial market) may arguably serve as a better indicator of vulnerability to a systemic risk event than higher capital requirements.[39]

Bank capital levels may also become more misleading or less effective at mitigating financial risks when a significant amount of lending occurs outside the regulated banking system. Prior to the recent financial crisis, many loans were originated by nonbank (nondepository) institutions and nonbank subsidiaries of bank holding companies; some nonbanks and securitizers that held mortgage loans were not subject to safety and soundness capital requirements.[40] When large

[36] Section 616 of Dodd-Frank requires U.S. banks to maintain a *countercyclical buffer*, which is defined and discussed in **Appendix B**, to address issues related to procyclical capital movements. Countercyclical capital buffers may increase the capacity of banks to absorb losses associated with an unexpected rise in defaults or encourage them to increase the cost of credit, which may dampen the demand for credit. In 2008, however, Spain experienced a property bubble and subsequent banking crisis despite the requirement of countercyclical capital buffers for Spanish banks. For more information, see Gabriel Jimenez, Steven Ongena, and Jose-Luis Peydro, et al., *Macroprudential Policy, Countercyclical Bank Capital Buffers and Credit Supply: Evidence from the Spanish Dynamic Provisioning Experiments*, Barcelona Graduate School of Economics, Working Paper 628, Barcelona, Spain, April 2012, http://research.barcelonagse.eu/tmp/working_papers/628.pdf; and CRS Report R42377, *The Eurozone Crisis: Overview and Issues for Congress*, coordinated by Rebecca M. Nelson.

[37] For a discussion of the limitations of stress testing as early warning devices, see Claudio Borio, Mathias Drehmann, and Kostas Tsatsaronis, *Stress-Testing Macro Stress-Testing: Does It Live Up to Expectations*, Bank for International Settlements, Working Papers 369, Basel, Switzerland, January 2012, http://www.bis.org/publ/work369.htm.

[38] See Franklin Allen and Douglas Gale, "Bubbles, Crisis, and Policy," *Oxford Review of Economic Policy*, vol. 15, no. 3 (1999) at http://finance.wharton.upenn.edu/~allenf/download/Vita/bubbles.pdf. For a discussion about overconfidence in the performance of mortgage assets stemming from overconfidence in rising house values, see Christopher L. Foote and Paul S. Willen, "The Subprime Mortgage Crisis," in *The New Palgrave Dictionary of Economics Online*, eds. Steven N. Durlauf and Lawrence E. Blume, Online Edition ed. (Palgrave Macmillan, 2011). In the recent banking crisis, institutions that experience large losses held high concentrations or were exposure to mortgage securities prior to the downturn in the housing market. See David Greenlaw, Jan Hatzius, and Anil K. Kashyap, et al., "Leveraged Losses: Lessons from the Mortgage Market Meltdown," Proceedings of the U.S. Monetary Policy Forum, 2008, http://research.chicagobooth.edu/igm/docs/USMPF_FINAL_Print.pdf.

[39] See Governor Ben S. Bernanke, "Asset-Price "Bubbles" and Monetary Policy," Remarks before the New York Chapter of the National Association for Business Economics, New York, NY, October 15, 2002, http://www.federalreserve.gov/boarddocs/speeches/2002/20021015/default.htm; and U.S. Department of the Treasury, Office of the Comptroller of the Currency, "Concentrations of Credit, Comptroller's Handbook," December 2011, http://www.occ.gov/publications/publications-by-type/comptrollers-handbook/Concentration-HB-Final.pdf.

[40] Large complex financial institutions sponsored financial conduits that allowed mortgages to be financed off the balance sheets of supervised banks. Some critics argue that such off-balance-sheet activities would not have been able to occur had banks not been given permission to participate in a wider variety financial activities. See Thomas M. Hoenig and Charles S. Morris, *Restructuring the Banking System to Improve Safety and Soundness*, Federal Reserve Bank of Kansas City, May 2011, http://www.kansascityfed.org/publicat/speeches/Restructuring-the-Banking-System-(continued...)

amounts of lending activity occur outside of the regulated financial system, raising capital requirements on regulated depository institutions would not necessarily reduce overall financial risks in the economy.[41] Conversely, if non-bank lending activities substantially decline, then the influence of higher bank capital requirements on overall lending activity may increase, causing credit availability in the economy to become more contingent on (or sensitive to) changes in bank capitalization levels.[42]

(...continued)

05-24-11.pdf. For more information on the supervision of Large Complex Banking Organizations, see Lisa M. DeFerrari and David E. Palmer, "Supervision of Large Complex Banking Organizations," *Federal Reserve Bulletin*, February 2001, pp. 47-57, at http://www.federalreserve.gov/pubs/bulletin/2001/0201lead.pdf.

[41] See CRS Report RS22722, *Securitization and Federal Regulation of Mortgages for Safety and Soundness*, by Edward V. Murphy.

[42] The Federal Reserve attributes the tightening of credit to the disappearance of private-label mortgage securitizations, which may have been able to fund creditworthy borrowers unable to satisfy underwriting criteria set by Fannie Mae, Freddie Mac, or the Federal Housing Administration. See Chairman Ben S. Bernanke, "Housing Markets in Transition," Speech at the 2012 National Association of Homebuilders International Builders' Show, Orlando, FL, February 10, 2012, http://www.federalreserve.gov/newsevents/speech/bernanke20110210a.htm. Section 171 of Dodd-Frank, which requires the same minimum-leverage and risk-based capital requirements that apply to federally insured depository institutions to apply to bank holding companies and systemically significant nonbank financial companies, may reduce the funding advantages previously enjoyed by the non-banking sector relative to the bank sector, thus increasing the sensitivity of credit availability to changes in capital requirements.

Appendix A. Asset Risk-Weighting

Capital adequacy regulation requires banks to hold enough reserves to maintain minimum levels of capital-asset ratios, which are generally defined as bank capital (e.g., common shareholder equity) in the numerator and bank assets in the denominator. Basel I introduced a risk-weighting system that weights (multiplies) the assets in the denominator of the capital-asset ratio by a factor that attempts to capture the relative credit or default risk of bank assets.[43] In the United States, bank assets are assigned into four categories (buckets) that receive fixed weights of 0%, 20%, 50%, and 100%, respectively.[44] The risk-weighting system arguably correlates lower credit risk with liquidity, as it typically assigns lower weights to more liquid assets and higher weights to less liquid assets. For example, cash and U.S. Treasury securities, which are liquid and considered to have zero default risk, receive a risk weight of 0%. These asset holdings would have no effect on a bank's portfolio capital-asset ratio. On the other hand, a loan secured by residential property receives a risk weight of 50%, and a commercial loan receives a risk weight of 100%. Loans with higher risk weights reduce the overall portfolio capital-asset ratio by increasing the size of the denominator. A bank holding a loan that is assigned 100% risk weight would be required to hold 8% of the value of that asset as capital. Should a bank decide to hold less cash and increase its holdings of higher yielding, less liquid loans, then its capital reserves must also increase for its capital-asset ratio to remain intact. Conversely, when capital-asset ratios are low, academic research has found that some banks will substitute toward low risk-weighted asset categories to restore the ratio.[45] The composition of a bank's asset portfolio, therefore, may be influenced by the fixed risk weights assigned to the various assets.

The Basel I weighting system arguably did not sufficiently differentiate among the degrees of risk. To illustrate, Basel I places the same capital charge on all commercial loans regardless of the differences in credit (default) risk. In other words, a bank would be required to hold the same percentage of capital against two commercial loans regardless if one were of relatively higher credit quality relative. Furthermore, the weighting system is unable to capture offsetting risk exposures. The capital surcharge is the same even though holding the loan with lower default risk may compensate for holding the higher risk loan. Hence, banks arguably have an incentive to make higher risk loans with potentially higher yields as opposed to those with lower yields.

Another concern regarding the Basel I weighting system is that banks would be incentivized to hold government securities (e.g., U.S. Treasuries) rather than extend loans where credit shortages may exist, particularly during economic downturns. The government securities of nations that are members of the Organization for Economic Co-operation and Development (OECD) receive a risk weight of 0%. Suppose capital-asset ratios fall below regulatory threshold levels during recessions after an increase in borrower loan defaults. If banks, as discussed earlier, previously had the incentive to hold lower quality loans during an expansionary economic period, they may decide to hold more OECD country sovereign debt rather than make new loans during

[43] See "Minimum Capital Requirements" at http://www.bis.org/publ/bcbs128b.pdf; "Risk Weighting Assets" at http://www.fdic.gov/regulations/resources/directors_college/sfcb/capital.pdf or http://www.ots.treas.gov/_files/422020.pdf.

[44] See Roger W. Ferguson, Jr., "Capital Standards for Banks: The Evolving Basel Accord," *Federal Reserve Bulletin*, September 2003, pp. 395-405.

[45] See Patricia Jackson, coordinator, *Capital Requirements and Bank Behaviour: The Impact of the Basle Accord*, Bank for International Settlements, Basle Committee on Banking Supervision Working Papers, Basle, Switzerland, April 1999, pp. 1-59, http://www.bis.org/publ/bcbs_wp1.pdf.

recessionary periods to keep capital-asset ratios in compliance. These actions may further curtail lending to segments where more severe credit shortages may exist, such as in non-OECD emerging market economies or in the private sector when entering the recovery phase of a business cycle.[46] Hence, the Basel I weighting system that relies on fixed weights results in "procyclical" capital requirements, which means they may incentivize excessive risk taking during expansions and discourage credit availability during economic downturns.[47] A bank's risk exposure may also be *understated* should the default risk of OECD country sovereign (debt) securities increase.[48]

Basel II revised the weighting system to allow for more risk differentiation, specifically by adding more risk weight categories. Given that fixed weights do not vary when financial risks change, Basel II also proposed the use of external credit assessments or ratings to support the determination of the appropriate risk weight assignment.[49] For example, suppose a Nationally Recognized Statistical Rating Organization (NRSRO) gave its highest investment grade rating to a security that still receives a 100% risk weight under Basel I. The highly rated security could receive a 20% risk weight under Basel II, which arguably better reflects the high credit quality. A residential mortgage that would have received a 50% risk weight under Basel I could receive a higher risk weight if the borrower has a high loan-to-value ratio (or made a low downpayment). Second or junior mortgage liens receive higher risk weights than primary mortgage liens. The use of mortgage insurance or other financial insurance such as credit default swaps to mitigate credit risk on some loans may reduce the risk weights assigned to those loans.

Given that Dodd-Frank removes the use of NRSRO credit ratings, the Basel III NPR proposes use of a risk-weighting system that allows for more risk differentiation than Basel I. For example, under the Basel I risk-weighting system, a mortgage could receive a risk weight of 50%. Hence, a mortgage loan of $200,000 would have a risk-weighted asset value of $100,000.[50] Under the Basel III NPR, however, the assignment of a risk weights depends upon the loan type and the amount of borrower's equity in the property. The risk weights range from 35% to 100% for a more traditional first lien residential mortgage that has been prudently underwritten,[51] and the range is 100% to 200% for higher risk mortgages (e.g., mortgages with negative amortization features, no documentation); the final weight assigned is inversely related to the amount of the borrower's equity. Although the Basel III NPR risk-weighting system has a greater array of risk

[46] See Bryan J. Balin, *Basel I, Basel II, and Emerging Markets: A Nontechnical Analysis*, The Johns Hopkins University School of Advanced International Studies, Washington, DC, May 2008, http://www.policyarchive.org/handle/10207/bitstreams/11484.pdf. For more information about OECD, see http://www.oecd.org/home/0,2987,en_2649_201185_1_1_1_1_1,00.html.

[47] Jose L. Fillat and Judit Montoriol-Garriga, *Addressing the Pro-cyclicality of Capital Requirements with a Dynamic Loan Loss Provision System*, Federal Reserve Bank of Boston, Working Paper No. QAU10-4, September 15, 2010, http://www.bostonfed.org/bankinfo/qau/wp/2010/qau1004.pdf.

[48] See CRS Report R41167, *Greece's Debt Crisis: Overview, Policy Responses, and Implications*, coordinated by Rebecca M. Nelson and CRS Report R41955, *Standard & Poor's Downgrade of U.S. Government Long-Term Debt*, by Mark Jickling.

[49] See *Part 2: The First Pillar—Minimum Capital Requirements*, Bank for International Settlements, http://www.bis.org/publ/bcbs128b.pdf.

[50] For an example of Basel I risk weighting and total capital charges of an entire sample bank balance sheet, see Appendix of CRS Report R42574, *Credit Union Commercial Business Lending: Key Issues for Legislation in the 112th Congress*, by Darryl E. Getter.

[51] For a discussion of criteria that would satisfy prudent underwriting in the mortgage market, see CRS Report R42056, *Ability to Repay, Risk-Retention Standards, and Mortgage Credit Access*, by Darryl E. Getter.

weights to differentiate among the degrees of risk, it would still provide procyclical lending incentives for the banking system as previously discussed.

After the value of the risk-weighted asset has been computed, the next step is to multiply the value by the *capital charge* to determine the capitalization requirement. Suppose a borrower purchases a $250,000 home and obtains a $200,000 mortgage, which means the borrower has 20% equity in the property. According to the Basel III NPR, the $200,000 would receive a 50% risk weight, and the value of the risk-weighted asset would be $100,000. For the bank to be *adequately capitalized*, it would need to hold total risk-based capital in the amount of $8,000 (8% capital charge *$100,000) on this loan; to be *well-capitalized*, it would need to hold total risk-based capital in the amount of $10,000 (10% capital charge *$100,000). This example uses only one loan; but the entire balance sheet of a bank is typically risk weighted prior to applying the capital charges, which are discussed in more detail in **Appendix B**.

Appendix B. Capital Charges and Regulatory Ratios

Basel III, Pillar 1[52] modifies the regulatory capital and liquidity requirements established in Basel I and Basel II, generally in the direction of requiring more and higher quality capital.[53] Specifically, the regulatory reform package revises the definition of Tier 1 capital; increases the amount of common tangible equity held as minimum regulatory capital; establishes a capital conservation buffer; introduces a countercyclical capital buffer; introduces a leverage ratio; and introduces two new liquidity ratios—the liquidity coverage ratio and the net stable funding ratio. The regulatory ratios, sometimes referred to as capital charges, are explained in more detail below. The quantitative requirements and phase-in schedules for Basel III were approved by the 27-member jurisdictions and 44 central banks and supervisory authorities on September 12, 2010.

Stricter Definition of Capital, Higher Requirements

Under Basel III, the definition of Tier 1 capital will be more narrowly defined. To raise the quality, consistency, and transparency of regulatory capital, the committee determined that Tier 1 capital must consist predominantly of common equity and retained earnings. The financial crisis demonstrated that the resources to cushion against credit losses and write-downs came out of retained earnings, which is a part of a bank's tangible equity base. Hence, the Tier 1 capital definition is now closer to the definition of tangible common equity ratio, which must be above 2% for a bank not to be considered critically undercapitalized.[54] In addition to tangible common equity, the central bank governors added mortgage servicing rights, deferred tax assets, and holdings in other financial institutions to be part of Tier 1. These three assets are considered very liquid and can be sold to offset unexpected losses. These assets, however, should not exceed in aggregate more than 15% of a bank's Tier 1 capital. This requirement limits dilution of the amount of common tangible equity in Tier 1 capital.

To comply with Basel III, banks must meet a minimum common equity capital requirement of 4.5% by January 1, 2015, up from the Basel II level of 2%. On September 12, 2010, the Basel Committee on Banking Supervision (BCBS) approved a capital requirement policy that would increase the total minimum capital requirement (sum of Tier 1 and Tier 2) to 8% by January 1, 2015, three quarters of which must be Tier 1 capital. By 2019, the total minimum total capital requirement will increase from 8.0% to 10.5% at the rate of 0.0625% per year beginning in January 1, 2016.

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[52] Basel II introduced the concept of three regulatory pillars. Pillar 1 contains the methodology for calculating the minimum capital requirements for banks, among other requirements. Pillars 2 and 3 of Basel II were added to monitor the rise of unintended outcomes. The second pillar requires banks to maintain management mechanisms to conduct ongoing internal self-evaluation of their risk exposures and compliance with the minimum regulatory capital requirement. The third pillar facilitates market discipline and reporting. Specifically, pillar 3 addresses problems with operational risks, which include internal operation failures, such as poor accounting, legal and compliance failures, poor and fraudulent managers and traders, and security failures.

[53] See Basel Committee on Banking Supervision, *Strengthening the Resilience of the Banking Sector*, December 2009, http://www.bis.org/publ/bcbs164.pdf. This document was an expanded and updated version of an earlier document entitled Basel Committee on Banking Supervision, *Enhancements to the Basel II Framework*, July 2009, http://www.bis.org/publ/bcbs157.pdf.

[54] See the definition of "Risk-Based Capital Groups" in the glossary of any FDIC Quarterly Banking Report, http://www2.fdic.gov/qbp/qbpSelect.asp?menuItem=QBP. The tangible common equity ratio is defined as the ratio of a bank's common equity divided by its tangible assets.

Capital Conservation Buffer

The BCBS established a capital conservation buffer to encourage banks to build capital buffers outside periods of financial stress that can be drawn down should their assets deteriorate, thus improving their resiliency to unanticipated losses. The minimum amount of the conservation buffer in Basel III is 2.5% of the banks' risk-weighted assets. The capital held in this buffer must be Tier 1 capital. Building this buffer to meet the requirement may occur by reducing discretionary distribution of earnings, dividend payments, and salary bonus payments. According to Basel III, regulators should forbid banks from distributing capital when banks have depleted their capital buffers.

On September 12, 2010, the BCBS agreed to set the capital conservation buffer at 2.5% of risk-weighted assets to cushion against future periods of stress. The 2.5% capital conservation buffer must consist mostly of common tangible equity. The conservation buffer would increase in increments of 0.625% annually. On January 1, 2016, the conservation buffer must be 0.625 and then rise to 2.5% by January 1, 2019.

Countercyclical Capital Buffer

Lending can grow disproportionately when economic activity is expanding and contract when economic activity is contracting, thus feeding and exacerbating the business cycle. On September 12, 2010, the BCBS established a countercyclical buffer that would equal between 0 and 2.5% of a bank's total risk-weighted assets and consist of common equity or other fully loss absorbing capital. The buffer would grow during economic expansions and decrease during contractions. National regulatory authorities will be allowed to determine when lending growth poses a risk to the stability of the financial system and when a countercyclical capital buffer requirement would be necessary.[55] Section 616 of Dodd-Frank requires a countercyclical buffer for all U.S. banks, similar to the countercyclical capital buffer contained in Basel III.

Leverage Ratio

The leverage ratio is defined as gross capital divided by the average total consolidated on-balance sheet assets. Unlike the Tier 1 and Tier 2 capital ratios, the leverage ratio does not depend upon risk weights. The logic behind this ratio is to illuminate financial risks that could be assigned lower weights and still translate into substantial losses. For example, a bank may guarantee payment to a creditor in the event a debt obligation fails to be repaid by a third-party borrower (who requests the bank's guarantee). Given that the third-party loan would not be held in the bank's portfolio, bank loan guarantees would be assigned a much lower weight relative to the loans held in portfolio, yet the bank would be exposed to off-balance sheet default risks. Hence, the leverage ratio assigns the same level of credit risk to all assets (e.g., loans held in portfolio, asset-backed securities, credit-risk guarantees). Banks would be required to maintain a leverage

[55] The committee also supports the International Accounting Standard Board plans to issue a set of high level guiding principles that would promote an expected loss approach, which is also less procyclical than the current incurred loss approach. See http://www.bis.org/publ/bcbs164.pdf, p. 8.

ratio of 3%, which would serve as a capital backstop and ensure that capital does not fall below a minimum threshold.[56]

On July 26, 2010, the BCBS announced a plan to phase in a leverage ratio requirement rather than to approve a specific leverage ratio. During the observation period, the committee plans to put in place rigorous reporting processes to monitor the ratio. Based on the results, adjustment will be made in the first half of 2017 and a minimum leverage ratio will be determined on January 1, 2018.

Section 165 of Dodd-Frank has a leverage requirement; however, this requirement differs from the leverage ratio requirement proposed under Basel III. The term leverage ratio under Basel III refers to an unweighted capital-asset ratio; Dodd-Frank uses the term to refer to a debt-to-equity ratio. Dodd-Frank requires that bank holding companies and nonbank financial companies supervised by the Federal Reserve maintain a debt-to-equity ratio of no more than 15-to-1.

Section 115(c) of Dodd-Frank required the Financial Stability Oversight Council (FSOC) to study the use of contingent capital instruments for capital regulation. Contingent capital instruments are bonds with scheduled principal and interest payments that would automatically be converted into equity (or written down) after the occurrence of a predetermined event, thus reducing a bank's liabilities relative to its equity during a period of distress. The FSOC recommends further study on the use of contingent capital instruments rather than implementation at this time.[57]

Two New Liquidity Risk Measures: Liquidity Coverage Ratio, Net Stable Funding Ratio

One definition of liquidity is the ability to sell an asset immediately for its original face or book value without incurring losses or significant transaction fees.[58] Bank portfolios generally consist of illiquid assets (longer-term loans) that are funded by shorter-term loans that must be renewed continuously until the longer-term customer loans are fully repaid. Episodes of uncertainty can cause increases in short-term rates relative to long-term rates, which can translate into distress for financial institutions. For example, institutions holding large amounts of illiquid assets may suddenly find themselves competing to borrow the liquid assets of other institutions, even for a short period of time, which drives up short-term rates. A bank may want to liquidate its holdings of asset-backed securities, but if other banks simultaneously make similar financial decisions, the market for such securities may consist of many sellers and few willing buyers. In both cases, even if banks have sufficient capital reserves and are still considered solvent, the scarcity of liquid funds would result in problems repaying short-term funding obligations. Hence, in addition to having sufficient capital to absorb some loan defaults (credit risk), banks need sufficient amounts of liquidity to buffer against unanticipated reversals in cash flow that could result in asset "fire sales," a phenomenon which occurred in 2007 and into 2008.[59] The BCBS, therefore, introduced two new liquidity risk measures to improve resilience to liquidity stress.[60]

[56] For more discussion of the leverage ratio, see http://www.bis.org/publ/bcbs165/splr.pdf.

[57] See Financial Stability Oversight Council, Report to Congress on Study of a Contingent Capital Requirement for Certain Nonbank Financial Companies and Bank Holding Companies, July 2012, http://www.treasury.gov/initiatives/fsoc/Documents/Co%20co%20study[2].pdf.

[58] Economists have various definitions of liquidity rather than a single consensus definition.

[59] See Greenlaw, Hatzius, and Kashyap et al., "Leveraged Losses: Lessons from the Mortgage Market Meltdown," (continued...)

On September 12, 2010, the BCBS established the 30-day liquidity coverage ratio requirement to promote short-term resilience to potential liquidity disruptions. The numerator of the liquidity coverage ratio consists of a bank's stock of high-quality liquid assets, generally government securities and cash, and the denominator measures net cash outflows over a 30-day time period. An observation period began on January 1, 2011, and is set to end in December 2014. During the observation period, the committee plans to monitor the ratio and review the effect on financial markets, credit extensions and economic growth. Based on the results, the minimum liquidity coverage ratio is suppose to be determined and made effective on January 1, 2015.

The BCBS also established the net stable funding ratio (NSFR) to encourage banks to rely upon medium- and longer-term funding of its longer-term loans as opposed to relying primarily upon short-term funding. The numerator of the NSFR would be computed using banks' "available stable funding sources" (ASF) in the numerator divided by assets that "require stable funding" (RSF) in the denominator. The ASF in the numerator would be calculated as the sum of a bank's liabilities and capital using ASF weights. Bank capital would receive a 100% ASF weight; consumer deposits liabilities would receive 70% ASF weight; and shorter-term liabilities would receive lower or 0% ASF weights. In other words, available stable funding sources with longer maturities would be assigned higher weights than those with shorter maturities. The RSF in the denominator would be calculated as the sum of the bank's assets using RSF weights. Cash assets do not require funding and would receive a 0% RSF weight. Loans that mature in less than a year require funding and would receive an 85% RSF; loans that take a year or longer to mature would receive a 100% RSF. In other words, assets that require stable funding receive higher weights the longer they must be funded. The NSFR cannot be lower than 100%. Hence, a bank must either increase its capital reserves if it chooses to fund longer-term consumer loans with sequences of shorter-term loans, or it must diversify the maturities of its own shorter-term borrowings to maintain a NSFR of 100%. The NSFR will not be introduced as a minimum requirement in Basel III until 2018.

On November 4, 2011, Federal Reserve Governor Daniel K. Tarullo indicated that the banking regulatory agencies were making recommendations for changes to the liquidity coverage ratio and mentioned other liquidity alternatives.[61] The liquidity coverage ratio has come under scrutiny, particularly because banks may have to substitute away from originating higher yielding, illiquid loans to hold more lower yielding, liquid assets.[62] The profitability of lending may be impaired, given that compliance may require making fewer loans or funding with longer-term borrowings. In addition, if the banking system held enough highly liquid U.S. Treasury securities to satisfy the liquidity coverage ratio requirements, other financial and non-financial entities may experience a shortage of liquid securities. Moreover, the entire banking system would be more susceptible to a systemic risk crisis if it had a large concentration of liquid (Treasury) holdings that suddenly experienced an increase in credit risk. Hence, the liquidity ratios will have longer time horizons

(...continued)

Proceedings of the U.S. Monetary Policy Forum, 2008, http://research.chicagobooth.edu/igm/docs/USMPF_FINAL_Print.pdf.

[60] This regulatory action may also be considered *macroprudential* in nature given that it would act to alleviate funding pressures that could affect the entire financial system and result in a systemic risk event. See CRS Report R40417, *Macroprudential Oversight: Monitoring Systemic Risk in the Financial System*, by Darryl E. Getter.

[61] See Governor Daniel K. Tarullo, *The International Agenda for Financial Regulation*, Board of Governors of the Federal Reserve System, Speech Delivered at the American Bar Association Banking Law Committee Fall Meeting, Washington, DC, November 4, 2011, http://www.federalreserve.gov/newsevents/speech/tarullo20111104a.htm.

[62] See http://www.bis.org/publ/bcbs165/spl.pdf.

prior to implementation while bank regulatory officials, as well as the BCBS, assess the impact of these requirements on financial markets and make further modifications.

Table B-1 summarizes the Basel III minimum capital requirements and phase-in arrangements. Generally speaking, a bank in compliance with these capital charges would be considered *adequately capitalized*. In other words, the bank has satisfied the minimum levels of capitalization. A bank would need to exceed the capitalization standards in **Table B-1** to be considered *well-capitalized*, and federal regulators have also defined the criteria necessary to achieve that designation.[63] A bank that does not satisfy the minimum capitalization requirements would receive a *prompt corrective action* notice from its primary regulator, which may include penalties and other restrictions.

Table B-1. Basel III Pillar I Requirements and Phase-in Arrangements

(all dates as of January 1; in percentages)

	Years								
Pillar I Requirements	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Minimum Common Equity Capital Ratio			3.5	4.0	4.5	4.5	4.5	4.5	4.5
Minimum Tier 1 Capital			4.5	5.5	6.0	6.0	6.0	6.0	6.0
Minimum Total (Tier 1 + Tier 2) Capital (row 3)			8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Conservation Buffer (row 4)						.0625	1.25	1.875	2.5
Minimum Total Capital + Conservation Buffer (sum of rows 3 & 4)			**8.0**	**8.0**	**8.0**	**8.625**	**9.25**	**9.875**	**10.5**
Optional: Minimum Countercyclical Buffer (row 6)						.0625	1.25	1.875	2.5
Minimum Total Capital + Conservation + Countercyclical Buffers (sum of rows 3, 4, & 6)			**8.0**	**8.0**	**8.0**	**8.6875**	**10.5**	**11.75**	**13.0**
Leverage Ratio	Mon.							Req.	
Liquidity Coverage Ratio	Mon.				Req.				
Net Stable Funding Ratio		Mon.						Req.	

Source: Basel Committee on Banking Supervision, Group of Governors and Heads of supervision announces higher global minimum Standard, September 12, 2010, p. 7.

Notes: Monitor "Mon." = observation period begins, Require "Req." = introduction of minimum standard. (Ref. No: 35/2010)

[63] See http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20120607a1.pdf, Table 6—Proposed PCA (Prompt Corrective Action) Levels for Insured Depository Institutions not Subject to the Advanced Approaches Rule for determining whether a bank is adequately capitalized or undercapitalized.

Appendix C. Stress Testing and Systemic Risk

A bank stress test is a diagnostic tool used to judge the ability of banks and financial institutions to weather adverse macroeconomic and financial conditions.[64] Stress tests are conducted to determine whether banks and financial institutions remain adequately capitalized and solvent under specific adverse economic scenarios. A stress test may include events such as heightened rates of unemployment, an economic slowdown or a recession, or failure of a large complex banking organization.[65] Such events could result in widespread borrower defaults, the inability to obtain short-term funding, and ultimately, depletion of a bank's Tier 1 capital. Thus, stress tests may alert a bank's management and regulators of potential balance sheet weaknesses during an unfavorable economic or financial scenario. Passing a stress test often requires banking institutions to hold more capital than the minimum required.

Dodd-Frank requires bank holding companies and non-bank financial corporations with consolidated assets of more than $10 billion to conduct and report on self-imposed semi-annual stress tests. The Federal Banking Regulators, however, have delayed implementation of supervisory guidance for stress testing financial institutions with assets of $10 billion to $50 billion until September 2013.[66] Sections 165 and 166 of Dodd-Frank require enhanced prudential standards on bank holding companies with total consolidated assets of $50 billion or more; thus bank regulators will also conduct stress tests for these institutions.[67]

Federal regulators currently require all banking institutions to analyze the potential impact of adverse economic conditions on their financial conditions or viability. Stress testing, however, can vary considerably, particularly for banks of different sizes. Examples of specific stress-testing requirements for small banking institutions and the large complex banking organizations follow.

A Stress Testing Example for Small Institutions

Although community banks are less likely to face the same stress testing requirements as banks with $10 billion or more in assets,[68] they are still required to assess their ability to withstand an adverse macroeconomic scenario. For example, federal regulators, concerned about relaxed underwriting standards in commercial real estate (CRE), increased supervisory guidance for banks with significant concentrations in CRE.[69] Community banks, which typically engage in CRE lending, are generally considered vulnerable to loan defaults and possible failure if CRE

[64] Stress testing is also a practice utilized in medicine, nuclear diagnostics, pharmacology, and computer and network systems among others.

[65] For the definition of a large complex banking organization, see Lisa M. DeFerrari and David E. Palmer, "Supervision of Large Complex Banking Organizations," *Federal Reserve Bulletin*, February 2001, pp. 47-57, http://www.federalreserve.gov/pubs/bulletin/2001/0201lead.pdf.

[66] See http://www.federalreserve.gov/newsevents/press/bcreg/20120827b.htm.

[67] See http://www.gpo.gov/fdsys/pkg/FR-2011-12-01/pdf/2011-30665.pdf. Sections 165 and 166 of Dodd-Frank also require enhanced prudential standards to be imposed on non-bank financial companies designated by the Financial Stability Oversight Council. See CRS Report R42083, *Financial Stability Oversight Council: A Framework to Mitigate Systemic Risk*, by Edward V. Murphy.

[68] See http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20120514b1.pdf.

[69] See the announcement of the Interagency Guidance on Concentrations in Commercial Real Estate Lending, Sound Risk Management Practices at http://www.federalreserve.gov/newsevents/press/bcreg/20061206a.htm and the regulatory guidance at http://edocket.access.gpo.gov/2006/pdf/06-9630.pdf.

prices suddenly collapse.[70] Given that CRE losses can be substantial and federal regulators may not be familiar with the default and funding risks unique to a particular geographic area,[71] the guidance required a bank to submit a plan to its regulator regarding its risk management practices if any of the following conditions hold:

- total construction and land development loans was equal to or more than 100% of its total capital reserve;
- total construction, land development, other land and loans secured by multifamily and nonfarm nonresidential property was equal to or greater than 300% of its total capital; or
- the CRE loan portfolio had increased by 50% or more in the span of 36 months.

The risk management plan must outline the bank's plan to reduce or manage its high level of commercial real estate concentrations. The guidance states its intent to encourage institutions to develop risk management practices and levels of capital levels "commensurate with the level and nature of their commercial real estate concentrations" rather than limit CRE lending by banks. Nevertheless, the regulator would likely require banks with risk management plans that are not deemed acceptable to raise additional capital.

Stress Testing of Large Complex Banking Institutions

In February 2009, the Federal Reserve announced the Supervisory Capital Allocation Program (SCAP) for bank holding companies with assets exceeding $100 billion. Under the SCAP, the Federal Reserve conducted a stress test for the 19 largest U.S. bank holding companies, which included an estimation of their revenues, losses, and reserve requirements under two adverse economic scenarios.[72] The SCAP program conducted stress tests for 2009 and 2010. By November 2011, the Federal Reserve introduced the Comprehensive Capital Assessment Review (CCAR) program that annually evaluates the capital planning process of institutions with over $500 billion in assets.[73] The SCAP stress testing will now continue under the CCAR program.[74]

The stress test scenario developed in the fall of 2011 included a sharp contraction in U.S. GDP, an unemployment rate of 13%, a 50% drop in equity prices, a 20% drop in house prices, and a global

[70] Community banks are generally small banks that generally have assets of $1 billion, meet the lending needs of a circumscribed geographic area. See http://www.fdic.gov/news/conferences/communitybanking/community_banking_by_the_numbers_clean.pdf.

[71] See Jose A. Lopez, *Concentrations in Commercial Real Estate Lending*, Federal Reserve Bank of San Francisco, Economic Letter 2007-01, San Francisco, CA, January 5, 2007, http://www.frbsf.org/publications/economics/letter/2007/el2007-01.html.

[72] See http://www.federalreserve.gov/bankinforeg/bcreg20090424a1.pdf.

[73] See http://www.federalreserve.gov/newsevents/press/bcreg/20111122a.htm and http://www.federalreserve.gov/bankinforeg/ccar.htm. The bank holding companies that would be subject to annual stress testing by the Federal Reserve are listed at http://www.ffiec.gov/nicpubweb/nicweb/Top50Form.aspx.

[74] Federal regulators may rely upon the SCAP and CCAR stress testing exercises as models when they implement the Dodd-Frank Act requirements throughout the banking system, particularly for the institutions with $10 billion to $50 billion in assets. See William C. Dudley, "U.S. Experience with Bank Stress Testing," Speech at the Group of 30 Plenary Meeting, Bern, Switzerland, May 28, 2011, http://www.newyorkfed.org/newsevents/speeches/2011/dud110627.html.

recession (to capture the potential of economic stress stemming from Europe).[75] The results from the SCAP were released in March 2012. The simulated total losses that would have been incurred by the 19 BHCs totaled $650 billion; $535 billion would have stemmed from a decline in the value of balance sheet assets and $115 billion would have resulted from a loss of revenue. Only 15 of the institutions would have been able to maintain a Tier 1 common equity ratio of 5% after the adverse scenario.

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[75] See http://www.federalreserve.gov/newsevents/press/bcreg/20120313a.htm, http://www.ny.frb.org/education/pdf/2012/Hirtle_comprehensive_capital_analysis_review.pdf, and http://www.federalreserve.gov/newsevents/speech/tarullo20120410a.htm.