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Global Standards for Liquidity Regulation

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Abstract:
Liquidity risk has received increased attention recently, especially in light of the 2007–2009 financial crisis when banks' extensive reliance on short-term funding, maturity mismatches between assets and liabilities, and insufficient liquidity buffers made them quite susceptible to liquidity risk. To mitigate such risk, the Basel Committee on Banking Supervision introduced an improved global capital framework and new global liquidity standards for banks in December 2010 in the form of the new Basel Accord (Basel III). This brief offers several insights from the crisis experience and identifies the problems that the new liquidity regulation attempts to address. Because a consistent implementation in the G-20 jurisdictions is critical to avoiding regulatory arbitrage and because the United States and Europe differ somewhat in the way current regulation is designed and will be implemented, this brief also summarizes underlying differences between the United States and Europe in factors such as banking structure, funding models, and political processes.

JEL Classifications: G28, G01, F33

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1. Introduction

The 1988 *Basel Capital Accord*, known as Basel I, an international agreement by member countries of the Bank for International Settlements (BIS), represents a path-breaking development in bank capital regulation. Basel I, which was developed by the BIS's Basel Committee on Banking Supervision (BCBS), was intended to improve the safety and soundness of banks by imposing uniform minimum capital requirements tied to credit (default) risk. Basel I was refined in 1996 to incorporate market risk, and in 2004, the Revised Capital Framework (Basel II) updated the credit risk assessment method of Basel I and added operational risk considerations (BCBS 1988, BCBS 1996, and BCBS 2004).[1] In 2010, a new version, Basel III, extended the framework with several innovations and added liquidity requirements, in part as a response to the problems revealed by the 2007–2009 financial crisis (BCBS 2010a and BCBS 2010b). While these three comprehensive international agreements reflect an evolutionary process, they have had a single underlying purpose: to strengthen regulation, supervision, and risk management of the banking industry, and thus the stability of the international banking system. While Basel III continues the effort, the ongoing evolution of the financial environment suggests that Basel III is unlikely to be the final word.

The inclusion of liquidity requirements in Basel III was a response, in part, to deficiencies in prior bank regulations made abundantly apparent during the recent financial crisis. Short-term funding in financial markets withered in the crisis, contributing to substantial stress in a number of financial instruments and institutions, culminating in the failure of major financial intermediaries.

Liquidity risk and the associated run risk for financial intermediaries has increased in importance over the past few decades due to the marked change in financial intermediaries' funding models associated with shifts in the structure and functioning of financial markets and institutions. These changes emanated in large part from financial innovation and regulatory

[1] The Basel II framework was further extended in 2006 by focusing on the banking book (Basel 2.5).

changes, each responding to the other.[2] Innovative financial engineering, increased reliance on short-term wholesale funding, and the use of increased leverage have made financial institutions and markets more interconnected and more sensitive to funding conditions. This interdependency has contributed to increased spillover effects among financial institutions, markets, and the economy when real or financial shocks occur (Fahri and Tirole 2012 and Van Rixtel and Gasperini 2013).

Liquidity creation through asset transformation is an integral function of financial intermediation. At the same time, it can pose a threat of bank runs, or more generally, liability runs, whereby creditors withdraw short-term funding from financial intermediaries. Liquidity crises, such as the 1998 collapse of Long-Term Capital Management, the events of 9/11, and the 2007–2009 financial crisis, have in common the potential to spread across markets and institutions, setting in motion dynamics that can substantially amplify the initial disruption (Blanchard 2009, Brunnermeier and Pedersen 2009, and Borio 2010). When markets become illiquid, making it difficult to sell assets or to fund them, financial intermediaries can be subjected to extreme stress as their ability to continue to fund their assets is impaired. Liquidity spirals can result when financial intermediaries rely heavily on short-term funding and hold opaque assets that are difficult to value (Brunnermeier 2009). Potential repercussions include forced deleveraging through the liquidation of assets in fire sale conditions, further price declines, collateral calls, the imposition of higher margin requirements, and eventually a systemic illiquidity crisis. The increased uncertainty about counterparty risk and future funding needs creates an additional dynamic, making it difficult for financial intermediaries to maintain market access. The feedback effects between illiquidity and concerns about the potential insolvency of a financial intermediary by its counterparties can generate a self-fulfilling prophecy, leading to the actual insolvency of the financial intermediary, as can be seen, for example, in the fate of Bear Stearns and Lehman Brothers early in the financial crisis.

[2] Ed Kane has referred to the pattern of response and counter-response between the regulated and the regulators as the regulatory dialectic. See, for example, Kane (1981).

Concerns about liquidity crises and the risk of bank runs are not new. We have long known that liquidity crises can disrupt economic activity and threaten financial stability. In fact, it was just such a disruption during the Great Depression that led to the establishment in 1933 of the Federal Deposit Insurance Corporation (FDIC) to provide deposit insurance to U.S. banks, with the aim of preventing future runs on banks. And the United States is not alone: Demirgüç-Kunt et al. (2014) find that of 189 countries covered in their database, 112 countries had explicit insurance as of the end of 2013. In fact, deposit insurance systems in many countries, along with central bank interventions as the lender of last resort (LOLR), have been able to mitigate the worst consequences in many past financial crises.

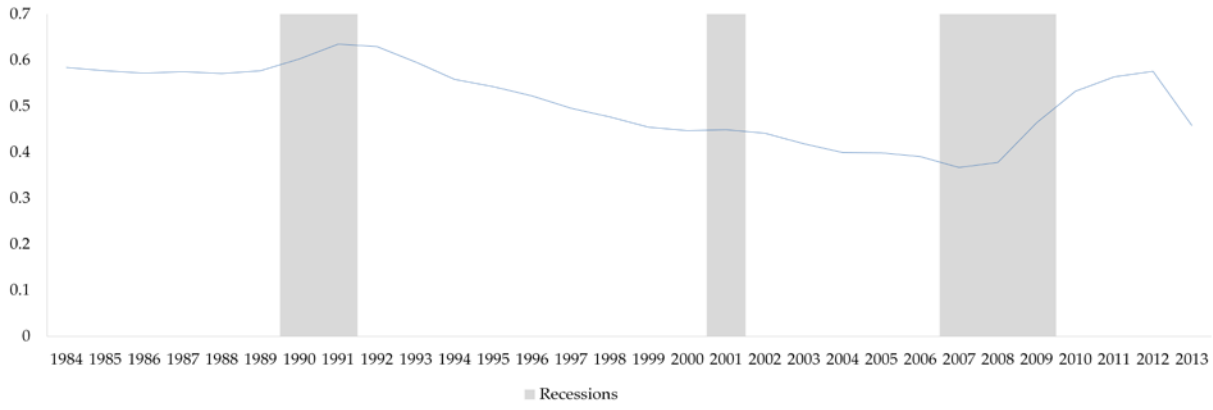
It became glaringly apparent during the 2007–2009 financial crisis, however, that deposit insurance could no longer provide sufficient protection against a massive liquidity crisis. Demirgüç-Kunt et al. (2014) confirm that, with the exception of isolated bank runs (for example, Northern Rock in the United Kingdom), bank deposits remained stable in most countries during the financial crisis, while runs on other types of bank funding, such as uninsured short-term wholesale funding, inflicted considerable damage.[3] After the collapse of Lehman Brothers in 2008, runs on money market funds (MMFs), which had generally been considered to be an effective and low-risk source of short-term funding, contributed to instability in financial markets and disruptions to bank funding. In response, the federal insurance safety net was temporarily extended to MMFs in 2008 through the Temporary Guarantee Program for MMFs. In addition, the U.S. Federal Reserve (like some other central banks) replaced funding normally provided in these money markets by using a mix of traditional and less traditional policy tools, including emergency liquidity facilities. Carlson et al. (2015) argue in this context that liquidity regulations combined with other regulatory tools are important complements to the LOLR tool and are particularly valuable in mitigating moral hazard. While the existence of the LOLR is important during a systemic shock such as the 2007–2009 financial crisis, it is as important to

[3] No common definition exists for uninsured short-term wholesale funding. Le Leslé (2012), for example, describes wholesale funds as those raised on a short-term basis through instruments such as commercial paper, large certificates of deposit, and repurchase agreements. We use a similar approach in this brief by including federal funds purchased, securities sold under agreements to repurchase, certain time and brokered deposits, borrowed money (less than one-year maturity), and short-term foreign deposits (see Figure 3).

have in place at individual financial institutions liquidity buffers that can be run down in response to an idiosyncratic shock.

The experience of the financial crisis made it clear that the potential effectiveness of deposit insurance in limiting the damage emanating from a liquidity crisis had eroded over time, as depository institutions had reduced their dependence on insured deposits. Figure 1 shows that in the United States the share of insured deposits in bank liabilities exhibited a relatively steady decline leading up to the 2007–2009 financial crisis, although the decline could be temporarily disrupted by a flight to safety into insured accounts. Such reactions by investors moving funds from capital markets into insured-deposit accounts tend to occur in response to recessions as well as other major systemic shocks, such as the stock market crash of October 19, 1987; times of geopolitical instability, such as the Russian government's default in August 1998; or uncertainty emanating from an ongoing national political debate, such as the U.S. debt-ceiling crisis of 2013 or the European sovereign debt crisis in 2013.

Figure 1: Estimated U.S. FDIC-insured deposits (1984-2013)
as a share of total liabilities

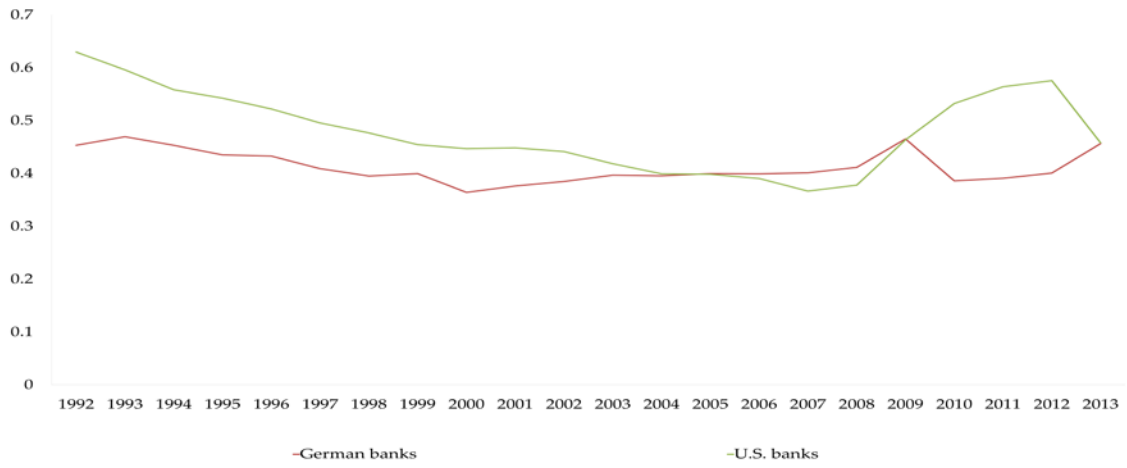


Notes: The U.S. Congress enacted the Financial Institutions Reform, Recovery, and Enforcement Act in 1989 through which the former Federal Deposit Insurance Fund was renamed the Bank Insurance Fund (BIF) and the FDIC assumed responsibility for the new Savings Association Insurance Fund (SAIF), which replaced the Federal Savings and Loan Insurance Fund. In February 2006, the Federal Deposit Insurance Reform Act of 2005 merged the BIF and the SAIF into the Deposit Insurance Fund. This change was made effective March 31, 2006. The coverage limit was increased from $40,000 to $100,000 in 1980. In 2008, the coverage limit was temporarily increased to $250,000 under the Emergency Economic Stabilization Act of 2008. The Dodd-Frank Wall Street Reform and Consumer Protection Act made this coverage limit permanent.

Sources: Federal Reserve Board (Haver Analytics), FDIC

This is not a uniquely U.S. phenomenon. For example, much the same thing happened in Germany.[4] As Figure 2 shows, German banks' core deposits represented a declining proportion of total liabilities through the end of 2000.[5] For comparison, the figure also shows, from Figure 1, U.S. commercial and savings institutions' insured-deposit ratio, which declined more steeply than the corresponding ratio for Germany. While the 2004–2007 credit expansion associated with the housing boom probably accelerated the decline in the insured-deposit ratio more in the United States than in Europe, other factors, such as fiscal or monetary policy effects, likely contributed as well.[6] In addition, the FDIC insurance coverage for depository institutions has changed several times since its inception in 1933. The most recent change happened in 2008,

Figure 2: U.S. and German banks' core deposits 1992-2013
as a share of total liabilities



Note: German banks include commercial banks and savings banks. U.S. banks include FDIC-insured commercial banks and savings institutions. For Germany, core deposits include deposits of households, nonprofit institutions, and nonfinancial businesses. For the U.S., core deposits are taken to be FDIC-insured deposits.

Source: Federal Reserve Board (Haver Analytics), Deutsche Bundesbank

[4] Due to the ongoing enlargement of the euro area, Germany is used as the euro area example for comparison with the United States.

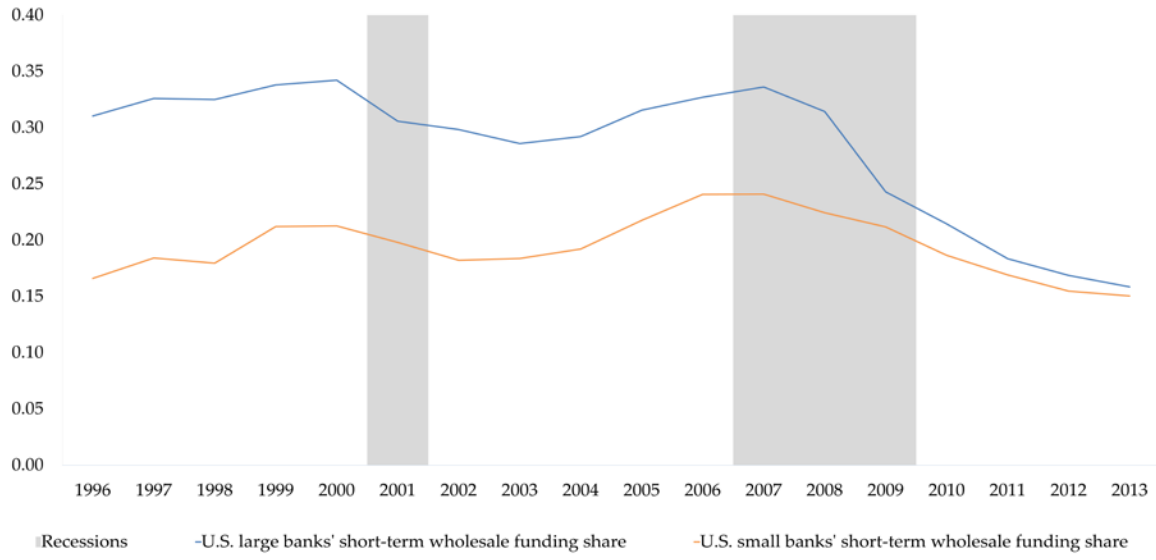
[5] Core deposits refer to the most stable bank deposits, such as customer deposits made by households, nonprofit institutions, and nonfinancial corporations.

[6] In Germany, for example, a number of developments, including taxation of interest income in 1992, a deregulatory measure in 1993 that allowed banks to offer any investment products under the designation of savings deposits, the authorization of MMFs in 1994, the adoption of the euro as the single currency in 1999, and the subsequent introduction of euro bank notes, are all factors that may have had an influence on German banks' funding (Deutsche Bundesbank (BBk) 1997 and 2003). Banking legislation, fiscal policy, and monetary policy effects also played a crucial role in the United States. For example, the Omnibus Budget Reconciliation Act of 1993 included a national depositor preference clause. The Deposit Insurance Fund Act in 1996 provided for the capitalization of the Savings Association Insurance Fund and required the merger of the bank and thrift insurance funds (Marino and Bennett 1992; and FDIC 1998).

when the Emergency Economic Stabilization Act of 2008 allowed a temporary increase in maximum coverage to $250,000, a change made permanent by the Dodd-Frank Wall Street Reform and Consumer Protection Act (DFA) in 2010 (FDIC 2013).

Figure 3 compares the short-term funding structure of the largest U.S. commercial and savings banks with the funding structure of smaller U.S. banks since 1996. The comparison shows that, leading up to the financial crisis, the largest U.S. commercial and savings banks made greater use of short-term wholesale funding. Short-term foreign deposits held by large, internationally active banks account for much of the difference. In addition, for both larger and smaller banks, reliance on short-term wholesale funding reflects a cyclical element, declining around recessions. Such a pattern is consistent with short-term wholesale funding being used by banks

Figure 3: Large vs. small U.S. banks' short-term wholesale funding (1996-2013)
as a share of total liabilities



Notes: U.S. large (small) banks include all U.S. commercial and savings banks with real assets (constant 2013 dollars) larger (less) than $10 billion. Short-term wholesale funding includes short-term foreign deposits, federal funds purchased, securities sold under agreements to repurchase, time deposits (greater than $100,000 and less than one-year maturity), brokered deposits (less than $100,000 and less than one-year maturity), and other borrowed money (less than one-year maturity). Short-term foreign deposits have been reported separately only since 1996.

Sources: Federal Reserve Board (Haver Analytics), FDIC

as a marginal source of funds, relied upon less when domestic depositors, in a flight to safety, shift from riskier assets to insured bank deposits and when the need for bank funding weakens as loan demand abates during recessions.

For both large and smaller banks, however, the share of unstable short-term funding sources has declined sharply since early 2008, replaced in part by core deposits and other long-term funding sources. While the shift in banks' funding strategies prior to the financial crisis can be attributed to many factors, such as deregulation, innovation (for example, in the form of securitization), and the evolution of the shadow banking system, another main driver of wholesale funding growth has been the repurchase agreement (repo) market (Financial Stability Oversight Council (FSOC) 2013).[7] Since 2002, repo markets have expanded rapidly, primarily because repos are attractive financial instruments for investors in terms of their accessibility and the collateral involved, and they offer financial intermediaries an inexpensive way to finance their securities portfolios. However, repo markets have also benefited from other developments, like Basel I and Basel II, which favor repos as a funding instrument (see International Monetary Fund (IMF) 2010). Euro area banks relied on short-term funding to an even greater extent than their international peers prior to the 2007–2009 financial crisis (Le Leslé 2012).[8] This is attributable to several factors (IMF 2010): (1) the need by banks in Europe for U.S. dollar funding to roll over short-term funding of longer-term U.S. dollar assets; (2) the requirement for European banks to hold the majority of mortgages and public sector loans on bank balance sheets or securitized in covered bonds;[9] and (3) differences in accounting principles, which make U.S. bank balance sheets leaner than those of their European peers.[10]

[7] A repurchase agreement is the sale of securities for cash with an agreement to repurchase the securities at a specified price and date.

[8] However, euro area banks continued to reduce their dependence on wholesale funding in 2013 (European Central Bank (ECB) 2014).

[9] In the United States, these assets are either held by Government Sponsored Enterprises or are funded directly from capital markets.

[10] U.S. banks follow the U.S. Generally Accepted Accounting Principles, while most European banks have used International Financial Reporting Standards since 2005 (Regulation (EC) No. 1606/2002 of the European Parliament and of the Council of July 19, 2002).

2. The emergence of liquidity regulation

Prior to the 2007–2009 financial crisis, banking supervision tended to focus primarily on the individual bank level (microprudential regulation) rather than on the financial system as a whole (macroprudential regulation), and to emphasize capital ratios and credit risk rather than liquidity risk considerations. Still, liquidity risks were not ignored entirely. For example, in November 1979, the U.S. Federal Financial Institutions Examination Council (FFIEC) developed, as part of the regulators' Uniform Financial Institutions Rating System (U.S. Federal Register 1997), the CAMEL rating system, which was expanded to CAMELS ratings in January 1997, to be used when evaluating a banking institution's overall condition. The "L" in CAMELS refers to liquidity. Previous methods used internally by banks to assess their exposure to stress events provided the basis for the new liquidity regulation (Bech and Keister 2012). However, critical voices were raised early on about the shortcomings of these bank balance sheet ratios, such as the liquid asset ratio,[11] noting that they would at best present point-in-time measures and that they would not be able to capture expected funding needs or commitments (Gulde et al. 1997 and Office of the Comptroller of the Currency (OCC) 2001).

In addition, dramatic changes were taking place within the financial industry in the United States and in Europe, especially in the 1980s and 1990s. In the United States, the banking industry experienced a dramatic consolidation, and significant legislation was passed, including the Gramm-Leach-Bliley Act in 1999, which allowed the combination of commercial banking, investment banking, and insurance activities to exist within a single financial services holding company. In Europe, the (still ongoing) evolution of the euro area and initiatives such as the Second Banking Directive and the Single Rulebook strongly influenced the integration of financial markets. The Second Banking Directive, which dates back to 1989, established the principle of a single banking license and a regime of common rules for admission and supervision (Vives 1999). The Single Rulebook was a response by the European Commission

[11] The liquid asset ratio requirement states that commercial banks must maintain a predetermined percentage of total deposits and certain liabilities in the form of liquid assets.

(EC) to the 2007–2009 financial crisis and introduced uniform regulatory standards for banks across all EU member states (EC 2014a and EC 2014d).

Although regulators put substantial effort into strengthening and harmonizing capital regulation, they behaved more reluctantly toward liquidity regulation. Bonner and Hilbers (2015) pursue the question of why it took so long for regulators to finally come up with liquidity regulation and find that various attempts were actually made as early as 1975, but that these efforts failed due to the lack of support for harmonizing liquidity principles. According to their analysis, three related factors were most responsible for hindering liquidity harmonization: (1) the fact that central bank eligibility of financial assets (that is, assets that are eligible to be pledged to the central bank as security for central bank credit) was seen as the most important determinant of an asset's liquidity, (2) the common misunderstanding that capital regulation also addresses liquidity risks, and (3) the lack of supervisory momentum to push for liquidity harmonization, resulting from the view that the host country supervisor was responsible for liquidity regulation.

Because of these obstacles, several countries started unilaterally implementing liquidity requirements for banks, even before the BCBS published the new liquidity framework as a part of the Basel III framework (Committee of European Banking Supervisors (CEBS) 2007). The Netherlands was a frontrunner in implementing a quantitative liquidity requirement (liquidity balance) in 2003 (De Haan and van den End 2013). Also, Germany modernized its quantitative liquidity rules by creating a more risk-oriented and principles-based prudential supervisory regime in 2007 (BBk 2006). Individual Liquidity Guidance was introduced in 2010 by the U.K. Financial Services Authority, requiring banks to hold a minimum quantity of high-quality liquid assets to cover net outflows of liabilities under specific stress scenarios (Banerjee and Mio 2014). Sweden introduced a liquidity regulation in 2013 very similar to the U.K.'s version, with both being comparable to the new liquidity regulation published by the BCBS. In the United States, an interagency policy statement on funding and liquidity risk management was issued by the OCC, the Board of Governors of the Federal Reserve (FRB), the FDIC, the Office of Thrift Supervision (OTS), and the National Credit Union Administration in conjunction with the

Conference of State Bank Supervisors in March 2010.[12] The policy guidance provided an outline of the consistent interagency expectations on sound practices for managing funding and liquidity risk (USFRB 2010). Furthermore, it summarized the principles of sound liquidity risk management that U.S. regulatory agencies had issued in the past and harmonized them with the BCBS's principles, issued in 2008.[13]

Despite these actions, or perhaps because of them, the BCBS continued to raise awareness on the matter of supervising liquidity, emphasizing several key principles for managing liquidity (BCBS 1992, BCBS 2000, BCBS 2008a, and BCBS 2008b). However, it took a global financial and economic crisis to achieve global liquidity standards for banks. Until then, it was believed that the deposit insurance system, money markets, and central bank liquidity, in combination with capital requirements, provided adequate resilience (Tarullo 2014a). Basel III provides new capital requirements (including countercyclical buffers, leverage ratios, and minimum capital standards), risk coverage (counterparty credit risk), and reliance on external credit ratings, as well as new liquidity standards (the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR)) for which no explicit requirements existed in the Basel II framework. In addition to the LCR and the NSFR, the BCBS also developed a set of liquidity risk monitoring tools to measure other dimensions of a bank's liquidity and funding risk profile to ensure global consistency in the supervision of banks' liquidity and funding risk exposures (BCBS 2010a).

2.1. The liquidity coverage ratio as developed by the BCBS

> In the children's game of musical chairs, when the music stops, only one child will be left without a seat. However if the children are confused about the rules and each is convinced that he will be the one left without a seat, chaos may erupt. Kids may start grabbing on to chairs, running backwards.
>
> Caballero and Krishnamurthy (2008)

This scenario explains in a nutshell what happened during the 2007–2009 financial crisis: as long as market participants were certain about the solvency of their counterparties, funding liquidity

[12] As mandated by the DFA in 2010, all functions of the OTS related to federal savings associations and the rule-making authority of the OTS related to all savings associations were transferred to the OCC on July 21, 2011.
[13] https://www.fdic.gov/regulations/laws/rules/5000-5230.html#fdicfoot8_2.

was easy to obtain for banks and other financial intermediaries. However, as soon as several institutions were perceived to be encountering financial difficulties, investors pulled their money out, higher collateral requirements were imposed, liquidity hoarding occurred, and the funding problem was amplified. While most banks that got into trouble during the recent financial crisis appear to have met the regulatory capital requirements prior to, and even during, the crisis, many did not have sufficient liquid assets that, together with anticipated cash inflows, would prove sufficient to compensate for the rapid outflows that characterize financial crises (see, for example, Demirgüç-Kunt et al. 2010). The result was capital erosion, liquidity pressure, and limited access to market funding (Pedersen 2008, Bouwman 2015, and Bonner and Hilbers 2015).

2.1.1 More about the LCR

In December 2010, the BCBS introduced the LCR as a central component of the Basel III framework. In January 2013, the Group of Governors and Heads of Supervision (GHOS), which is the BCBS oversight body, agreed on the final form of the LCR. Because the LCR is very technical in its calculation, it is difficult for market participants to assess a bank's liquidity risk position by using the LCR. For this reason, the GHOS asked the BCBS to carry out additional work in the context of the LCR, such as developing liquidity disclosure standards, conducting additional qualitative discussions about the LCR and the concentration of funding sources, and providing guidance for supervisors on the use of market-based indicators of liquidity. This package was completed in January 2014 and should help to improve the transparency of regulatory liquidity requirements and assist supervisors in evaluating the banks' liquidity profile (BCBS 2014b, BCBS 2014c, and BCBS 2014d).

The LCR applies to internationally active banks, with compliance required from the date of the first reporting period following January 1, 2015. A phase-in period over four years (starting at 60 percent in 2015 and reaching 100 percent in 2019) should help to prevent disruptions in the ongoing financial intermediation role of banks.

The numerator of the LCR is the liquidity buffer, consisting of *high-quality liquid assets* (HQLA). This buffer ensures that banks have enough liquid assets to cover future payment obligations (projected net cash outflows). This scenario envisions a 30-day period of financial stress in which various shocks can apply, such as increased market volatility or the run-off of a proportion of retail deposits (BCBS 2013a). However, the BCBS allows only certain HQLA to be included in the liquidity buffer. These assets need to have specific fundamental and market-related characteristics. They are, for example, less risky, less volatile, unencumbered, central bank eligible (if possible), and liquid in markets even during a time of stress.[14]

To account for differences in the liquidity properties of assets, the BCBS establishes three categories of assets: Level 1, Level 2A, and Level 2B.[15] Assets with the highest quality and liquidity can be included fully (with a 0 percent haircut) in the Level 1 asset group. Examples include cash, central bank reserves, and certain marketable securities backed by sovereign governments and central banks. Level 2A assets are still relatively stable, but are not associated with the same degree of liquidity as Level 1 assets. Therefore, the BCBS suggests applying a 15 percent haircut to the current market value of each Level 2A asset that is held in the liquidity buffer. Examples include certain government securities, corporate debt securities (including commercial paper), and covered bonds that satisfy certain criteria. Level 2B assets, which are viewed as less liquid and more volatile than Level 2A assets, can be included only under certain restrictions and with larger haircuts (between 25 and 50 percent). More importantly, the value of Level 2B assets may not make up more than 15 percent of the total HQLA buffer. Examples include residential mortgage-backed securities (RMBS), which are subject to a 25 percent haircut; corporate debt securities (including commercial paper) to which a 50 percent haircut applies; and common equity shares, also subject to a 50 percent haircut. The BCBS emphasizes that the value of Level 2 assets (the sum of Level 2A and 2B) may not comprise more than 40 percent of the overall liquidity buffer (BCBS 2013a).

[14] "Unencumbered" means that the asset is free of legal, regulatory, contractual, or other restrictions on the ability of the bank to liquidate, sell, transfer, or assign the asset.
[15] For the exact calculation of the total HQLA amount, see BCBS (2013a).

The denominator of the LCR, *total net cash outflows* (TNCO), is calculated by subtracting total expected inflows from total expected outflows for the specific stress scenario and horizon. To generate the aggregate inflows, the outstanding balances of various categories of contractual receivables are multiplied by the rates at which they are expected to flow in. The same applies for the total expected cash outflows (generated by multiplying the outstanding balances of various categories of liabilities and off-balance-sheet commitments by their expected run-off or draw-down rates). The rates are harmonized across jurisdictions; however, a few parameters are left to national supervisors' discretion. For example, retail deposits are divided into "stable" and "less stable" deposits. According to the stability of an asset, supervisors may choose to apply a run-off rate of 3 to 5 percent (or even higher). However, before subtracting total expected inflows from total expected outflows, the BCBS requires one more step: choosing the minimum amount between (a) the calculated aggregated inflows or (b) a cap of 75 percent of total expected cash outflows. By taking this step, a bank always maintains a stock of liquid assets with a cushion of at least 25 percent of the expected cash outflows for the next 30 calendar days, which ensures that banks are not overly reliant on future inflows, and thereby takes into account possible timing differences between inflows and outflows (BCBS 2013a).

Banking organizations are expected to calculate the LCR on an ongoing basis and inform supervisors about the value of the LCR and their liquidity profile at least monthly. If the LCR falls below 100 percent, banks must notify the responsible supervisory authorities immediately. The LCR offers banks protection in the event of a creditor run, but also provides some time for bank management or supervisors to react. The LCR will apply to all internationally active banking organizations on a consolidated basis, but may also be used for individual banks and for any subset of entities of internationally active banks. The LCR will ensure that banks have a stable funding structure and are less vulnerable to fluctuations in the timing of cash inflows and outflows than they have been in the past. A bank is required to maintain an HQLA amount that is no less than 100 percent of its TNCO (BCBS 2013a).

As discussed in the following subsections, each jurisdiction will make its own determination about HQLA qualifications and their application to the supervised banking organizations.

Therefore, the BCBS notes that supervisors are expected to work within the existing framework of categorized asset levels and should use the associated haircuts and maximum composition limits (BCBS 2014b, BCBS 2014c, and BCBS 2014d).

2.1.2. LCR implementation in the United States[16]

U.S. federal banking regulators approved the final rule to implement the LCR in the United States in September 2014. While the U.S. LCR (U.S. Federal Register 2014) corresponds with the BCBS's version for the most part, the LCR needed to be adjusted to existing U.S. financial market regulations, such as Section 165 of the DFA, which is a comprehensive regulatory reform that overhauled the U.S. financial regulatory and supervisory system after the 2007–2009 financial crisis. According to the DFA, regulatory requirements of Section 165 apply to banking organizations differently depending on their complexity, funding profiles, and potential risk to the financial system. Section 165 entails enhanced prudential standards that are being applied to all BHCs with at least $50 billion in assets, including those of foreign banking organizations. These enhanced prudential standards are more stringent than generally applicable standards and are based on a variety of factors related to the systemic importance of these institutions (Tarullo 2014b). Regulatory standards cover capital, liquidity, risk management, resolution planning, and concentration limits.

Large and interconnected banking organizations with at least $250 billion in total consolidated assets or $10 billion in on-balance-sheet foreign exposure (and consolidated subsidiary depository institutions of these banking organizations with $10 billion or more in total consolidated assets) are subject to the *full* LCR requirement (Tarullo 2014a). However, the Federal Reserve has added a less stringent *modified* form of the LCR for smaller institutions. This distinction affects, for example, the calculation frequency: banking organizations under the full LCR requirement are required to calculate the LCR daily, while banking organizations under the modified LCR are required to calculate it only monthly. Accordingly, depending on when a banking organization's asset threshold is met, the effective date, transition periods, and

[16] See the table in the appendix for an overview of the implementation of the LCR in the United States and in Europe.

calculation requirements differ for banking organizations under the full and the modified LCR approach (U.S. Federal Register 2014). However, in general, the effective date is January 1, 2015, for those banking organizations that are covered by the full LCR requirement. The LCR requirement should be equal to 80 percent at that time and then gradually build to 100 percent on January 1, 2017. This means that the U.S. banking organizations under the full LCR requirement will be compliant two years earlier (2017) than under the BCBS version (2019).[17]

Differences with respect to calculating the HQLA (the numerator of the LCR) result from U.S. financial market institutional specifics. For example, vault cash is not included in Level 1 assets. As specified in the U.S. final rule (U.S. Federal Register 2014), the reason is that such cash is deemed necessary to meet daily business transactions. Other assets excluded from the final rule are municipal securities, covered bonds, asset-backed securities (ABS), RMBS, mortgage loans, and investment company shares (mutual funds and money market mutual funds).[18] The reason for this decision is that specific issues of ABS, RMBS, or covered bonds do not meet the liquidity and readily marketable standard in U.S. markets, even though these assets may have some liquidity characteristics that are similar to assets that are included in HQLA. This conclusion is supported by evidence from the 2007–2009 financial crisis, in which the market demand for a variety of securities, for example, certain ABS linked to subprime mortgages, declined rapidly. A further special feature of the U.S. LCR is the recognition of certain securities issued by government sponsored enterprises (GSEs) as Level 2A liquid assets.[19] However, U.S. GSE securities included in the Level 2A classification are in general subject to a 15 percent haircut and are included in the 40 percent limitation for Level 2 assets within total HQLA assets, even though they have consistently traded in very large volumes and have remained highly liquid during times of stress.

[17] For more detailed information on the differences between the full LCR and the modified LCR requirements, see U.S. Federal Register (2014).

[18] No final decision with regard to municipal securities has been made yet by U.S. authorities, as some criteria still might be developed. For that purpose, the Federal Reserve published a proposed rule on May 21, 2015, to further determine whether some municipal bonds qualify as safe assets and can be added to HQLA (U.S. Federal Reserve Board 2015).

[19] These include investment grade GSE securities that are consistent with the OCC's investment securities regulation and that are readily marketable and liquid.

In addition, banking organizations subject to the full LCR requirement must calculate the TNCO amount in a slightly different way than under the BCBS version. The U.S. final rule emphasizes the ability of a bank to withstand the largest liquidity demands within the 30-day stress period rather than focusing only on the cumulative net cash outflows at the end of the 30-day stress period. The final rule requires banks to calculate a *maturity mismatch add-on* as the difference between the net cumulative peak-day amount and the net cumulative outflow amount at the end of the 30-day stress period that is added to the TNCO. The add-on approach might require some U.S. banking organizations to hold more HQLA than the BCBS version (U.S. Federal Register 2014). By applying these rigorous measures and complex calculations, the U.S. federal banking agencies want to ensure that the LCR in the United States has a major impact on banking organizations' liquidity resiliency. With regard to the LCR disclosure standards, the BCBS states in its eighth progress report that the U.S. agencies are developing a proposal to implement LCR disclosure standards for public comment during 2015 (BCBS 2015b).

2.1.3. LCR implementation in Europe

In Europe, there are three main institutions involved in producing EU legislation through the so-called "Ordinary Legislative Procedure." The EC represents the interests of the European Union as a whole. The European Parliament (EP) is directly elected by EU citizens and represents them. The Council of the European Union represents the governments of the 28 EU member countries. In principle, the EC drafts and initiates legislation, and the EP and the Council approve (or reject/propose amendments to) legislative proposals. Together, the three institutions produce the policies and laws that apply throughout the European Union. The EC and the EU member states then implement them, and the EC ensures that the laws are properly applied.[20] Hence, the LCR was drafted by the EC and adopted by a Delegated Act in October 2014.[21] The LCR Delegated Act was necessary to account for EU institutional specifics. After the Delegated Act was reviewed and adopted by the EP and the Council in January 2015 without

[20] See http://europa.eu/about-eu/institutions-bodies/.
[21] See http://europa.eu/legislation_summaries/institutional_affairs/treaties/lisbon_treaty/ai0032_en.htm.

objections, the LCR was published in the Official Journal of the European Union in January 2015 and takes effect in October 2015 (EC 2014b and Official Journal of the European Union 2015).

To implement the complete Basel III framework, and thus the LCR requirement, into EU law, further preliminary work by the EU institutions was necessary. More precisely, the three EU co-legislators first needed to agree on the Capital Requirements Directive IV (CRD IV). This move was taken in February 2013, and the CRD IV legislation became effective in January 2014. It was necessary to revise the existing Capital Requirements Directive (CRD) package, which entails two important legislative instruments related to Basel III: (1) the CRD and (2) the Capital Requirements Regulation (CRR) (EC 2013a and EC 2013b). The CRD addresses access to deposit-taking activities according to the new Basel III requirements. And by including the CRR in the CRD IV package, a new single set of harmonized prudential rules for institutions throughout the EU will be applicable, and thus close existing regulatory gaps among EU member states. According to Article 460 of the Official Journal of the European Union (2013), the CRR also specifies the requirements for banks and investment firms operating in the European Union, which need to respect a general liquidity coverage requirement. However, Article 460 empowers the EC to specify the LCR for credit institutions only, and excludes investment firms for the time being. The grace period applies until December 2015. By then, the EC will have to provide a report and possibly draft legislation concerning whether (and how) investment firms must comply with the LCR.

EU institutional specifics, as they were considered by the LCR Delegated Act, played a role in, for example, defining the HQLA in the liquidity buffer. For this purpose, the European Banking Authority (EBA) supported the EC with impact assessments (EBA 2013b).[22] Although the same three categories of asset classes (Level 1, Level 2A, and Level 2B) apply, the EC decided to broaden the pool of assets eligible within these asset classes to allow for the different asset liquidity properties. While the EBA recommended treating covered bonds as level 2A assets to align with BCBS standards, the EC decided to allow covered bonds as acceptable Level 1 assets

[22] The EBA was established in January 2011 as part of a new financial supervisory and regulatory framework known as the European System of Financial Supervision.

under very strict conditions. For example, only those covered bonds that meet certain criteria (credit quality step one and other conditions, such as a certain issue size) can be included in Level 1 assets.[23] If covered bonds are included in the Level 1 asset group, they are subject to a haircut of 7 percent and can be included only to a maximum of 70 percent of the overall liquidity buffer. As soon as covered bonds experience a downgrade of their credit quality (for example, to a credit quality step two), these covered bonds can be included only in Level 2A assets.[24] The EC's decision to treat certain covered bonds in the Level 1 or Level 2A asset classes was driven mainly by the good liquidity performance of these assets and their role in the EU funding markets, even during the 2007–2009 financial crisis (for more details, see Official Journal of the European Union 2015).

Level 2A assets can include marketable securities representing claims on, or guaranteed by, sovereign governments, corporate debt securities (including commercial paper), and thus covered bonds (of credit quality step two) under certain requirements. As previously mentioned, Level 2A assets are subject to a 15 percent haircut. The EBA also recommended recognizing only those RMBS of credit quality step 1 as Level 2B assets. However, the EC decided to deviate here from the EBA's recommendation and to expand Level 2B eligibility to certain ABSs backed by other assets. While this sounds surprising at first, as it is well known that certain ABS were involved in triggering the 2007–2009 financial crisis, the EC based its decision on the evidence that many smaller securities classes, such as auto-loan ABS, consumer-loan ABS, and RMBS, demonstrated a good liquidity performance and credit track record during the recent financial crisis. In addition, these instruments play a vital role in financing lending, especially for small and medium-sized enterprises (SMEs) in Europe. All ABS should be subject to the overall cap of 15 percent and to the diversification requirement.[25] Other Level 2B assets, such as corporate debt securities and shares, also can be included up to a maximum of

[23] Credit quality step one corresponds to a rating of AAA to AA by Fitch and S&P, and a rating of Aaa to Aa3 by Moody's.
[24] Credit quality step two corresponds to a rating of A+ to A- by Fitch and S&P, and A1 to A3 by Moody's.
[25] To account for the lower liquidity observed in consumer credit and SME-loan ABS relative to RMBS and auto-loan ABS, the final EU legislation states that the former should be subject to a larger haircut (35 percent).

15 percent and are subject to different minimum haircuts (for more details, see Official Journal of the European Union 2015).

As far as the calculation of the LCR's denominator (TNCO), which is referred to as net liquidity outflows in the Official Journal of the EU (2015), is concerned, net liquidity inflows and outflows should be assessed over a 30-day stress period under the same assumptions (potential capped inflows) as made by the BCBS. However, certain specialized credit institutions may be exempted from the cap or need to apply an even tighter cap. Furthermore, EU member states' supervisory authorities are called upon to submit to the EBA the types of products or services for which they have determined outflows on the basis of the reports from credit institutions, and shall include in that report an explanation of the methods applied to determine the outflows (Official Journal of the European Union 2015).

The LCR will become operational on October 1, 2015. So far, more than 8,000 EU banks at the individual level and the consolidated level are subject to the EU LCR and will need to reach the 60 percent threshold in October 2015, and then step up gradually to 100 percent by January 2018 (BCBS 2013b and BBk 2013). This implies that EU banks will be compliant one year earlier (2018) than under the BCBS (2019). As far as the LCR disclosure requirements are concerned, the BCBS indicated in its eighth progress report that the EBA will develop guidelines for the LCR disclosure, and the publication is expected in April 2016 (BCBS 2015b).

2.2. Net Stable Funding Ratio as developed by the BCBS

The NSFR is the second liquidity ratio included under the liquidity requirements of the Basel III framework. Since the first draft publication in 2010, it was revised in January 2014 before the BCBS issued the final version as endorsed by the GHOS in October 2014. Internationally active banks (on a consolidated basis) need to have a minimum funding amount in place that is expected to be stable over a relevant (one-year) horizon, as indicated by an NSFR equal to at

least 100 percent on an ongoing basis, starting in January 2018.[26] This implies that banks will have to decrease their dependence on short-term wholesale funding and better assess funding risk across all on- and off-balance-sheet items (BCBS 2014a). The goal of the NSFR requirement is to ensure that banks are less vulnerable to future disruptions in the funding market and have better access to liquidity in times of stress to the financial system.

2.2.1 More about the NSFR

The BCBS calculates the NSFR as a ratio, with the *available amount of stable funding* (ASF) as the numerator and the *required amount of stable funding* (RSF) as the denominator. The amounts of each component are calibrated to reflect the anticipated degree of stability of liabilities and the liquidity of assets. Thus, the NSFR takes into account two factors: (1) the funding maturity (to reflect the fact that longer-term liabilities are in general more stable than short-term liabilities), and (2) the funding type and counterparty, such as stable retail customer deposits versus unstable wholesale funding (BCBS 2014a). These factors are particularly significant because the banks' dependence on unstable, short-term funding propagated and amplified the initial shocks in the 2007–2009 financial crisis.

According to the BCBS, the ASF is measured based on several characteristics reflecting the relative stability of a bank's funding sources, such as contractual maturity. The calculation procedure for the ASF is as follows: Step one requires assigning the carrying value of a bank's capital and liabilities to one of five categories.[27] The amount that is assigned to each category is then multiplied by an ASF factor in the second step. The factors range from 100 to 0 percent. For example, liabilities receiving a 100 percent factor are the total amount of regulatory capital (before the application of any capital deductions). And liabilities without a stated maturity are subject to a 0 percent ASF factor. The total ASF is calculated by adding up these (weighted) components.

[26] The BCBS emphasizes that in order to ensure greater consistency and a level playing field between domestic and cross-border banks, the NSFR could also be used for individual banks and on any subset of entities of internationally active banks.

[27] The carrying value is the value of a liability or equity position before the application of any regulations or adjustments.

The amount of RSF is measured by considering the asset liquidity risk profile and off-balance-sheet exposures of the bank. The calculation steps are similar to those mentioned above for the ASF (BCBS 2014a). The assigned RSF factors should approximate the amount of a specific asset that would have been funded, because it will be rolled over or used as collateral. For example, assets assigned a 0 percent RSF factor include central bank reserves. Assets with a 100 percent factor are all assets that are encumbered for a period of one year or more. Thus, a higher ASF weight is linked to more stable funding, and a lower RSF factor is attached to more liquid assets.

While the NSFR is primarily composed of internationally agreed definitions and calibrations, some elements still remain subject to the discretion of national supervisors. The BCBS requires banks to consistently meet the NSFR, but it should be reported at least quarterly (BCBS 2014a). In addition to the NSFR, the BCBS issued NSFR disclosure standards (consultative document) in December 2014, with an updated version in June 2015 (BCBS 2015c). Disclosure standards reinforce the transparency of regulatory funding, enhance market discipline, and reduce uncertainty in the market. Banks are required to disclose quantitative information about the NSFR in a common template developed by the BCBS. In addition, banks should provide a qualitative discussion around the NSFR, such as the drivers of their NSFR results or the composition of the bank's independent assets and liabilities (for more details, see BCBS 2014e).

2.2.2. Implementation Status of the NSFR in the United States and in Europe

It is expected that U.S. federal banking regulators will follow with their NSFR proposed rule by mid-2015, and have a final rule adopted by the end of 2015. In the meantime, U.S. federal banking agencies are working on three sets of initiatives in the context of short-term wholesale funding risks and intend to incorporate the use of short-term wholesale funding into the risk-based capital surcharge applicable to U.S.-based, global, systemically important banks (G-SIBs) as the second initiative, while the third will provide a floor for collateral haircuts in securities financing transactions (Tarullo 2014b).[28]

[28] The BCBS developed an assessment method for the systemic importance of G-SIBs in 2011 (BCBS 2011).

To implement the NSFR within the European Union, the procedural steps are similar to those described for the LCR. It is again the CRR that empowers the EC to propose legislation for the NSFR. However, there is no "automatic presumption" that the EC will make such a proposal. Before that, the EBA would need to provide another assessment and would report on methods and definitions for implementing the NSFR. Based on this evaluation, the EC may then submit a proposal to the Council and the EP by the end of December 2016 in order to introduce the requirement by 2018 (EC 2014b).

2.3. Differences between U.S. and European banking structure, funding models, and political processes

The introduction of the new liquidity standards is expected to significantly improve the resilience of the global banking system, as long as prudential liquidity risk management is applied and transparent information is adequately accessible to supervisors and market participants. To ensure a common level playing field, the new Basel III framework needs to be implemented consistently. The United States and the European Union have designed similar processes for implementing the LCR in 2014 (for progress in other jurisdictions, see BCBS 2014f). Nevertheless, when transforming the LCR into national law, certain specifics need to be considered, such as legal frameworks, political processes, and the structure and funding patterns of the banking sector. We review some of the differences in these institutional specifics in this section because they help to explain the reasoning behind the LCR modifications in each jurisdiction.

The weaknesses of the financial supervisory and regulatory structure in the United States and in Europe became particularly evident in the wake of the 2007–2009 financial crisis. As a consequence, the Dodd-Frank Act was passed by the U.S. Congress in the United States and the European System of Financial Supervision was adopted in the form of regulations agreed by the EP and the Council in 2010. While both legislative packages contain a variety of changes concerning the way individual financial institutions are regulated and supervised (microprudential approaches), they both aim at establishing a macroprudential framework that should prevent or mitigate systemic financial stability risk in light of macroeconomic

developments. Macroprudential tools are particularly important when it comes to resolving an international cross-border banking group, for example, and explain why international cooperation and the convergence of international standards play such a significant role in today's global financial system.

In establishing an LCR standard in the United States, U.S. federal banking regulators tailored the application of the requirement according to Section 165 of the DFA and therefore provided for two different LCR versions. The full LCR requirement applies to large and interconnected U.S. banking organizations with at least $250 billion in total consolidated assets or $10 billion in on-balance-sheet foreign exposure. The reason for this provision is that these banking organizations have a riskier liquidity profile than smaller firms, based on the scope of their activities and interconnectedness with the financial sector. The same applies to the foreign exposure threshold that identifies a banking organization with a significant international presence (U.S. Federal Register 2014). Banking organizations with $50 billion or more in total consolidated assets, but that are not internationally active, are subject to the modified LCR version. Their balance sheets are simpler and therefore require less time for bank management and supervisors to take corrective actions in a stressed scenario (U.S. Federal Register 2014).

In Europe, the LCR standard will be applied equally to all banks (on an individual and consolidated level). When comparing bank assets, euro area bank assets totaled around 290 percent of GDP in 2012, while the corresponding figure in the United States is just under 100 percent of GDP, even though the assets were held by a similar number of banks in both jurisdictions (IMF 2014a and Association for Financial Markets in Europe (AFME) 2014).[29] This is primarily because in Europe banks play a much larger role in financing the economy. In Europe, corporate financing is provided primarily by banks, while in the United States capital market intermediation is far more prevalent. Bank loans, for example, account for only 12 percent of total corporate debt in the United States, compared with 60 percent in the euro area (IMF 2014b). However, available data show that European corporations are lowering their

[29] It is important to note that large EU banks continued to reduce their assets, with assets falling by $2.4 trillion over the two years to 2013:Q3 (IMF 2014a).

dependence on banks and increasingly issue corporate bonds as an alternative to bank loans (Deutsche Bank (DB) 2013). In fact, in 2009 nonfinancial corporate bond issuance in Europe temporarily surpassed U.S. issuance before falling back somewhat. More recently, nonfinancial corporate bond issuance in both Europe and the United States has rebounded strongly (DB 2014). Despite the upsurge in securities issued by nonfinancial firms since 2008, the decline in bank lending in some euro area countries could not be offset by securities issuance. Here, too, it is the regulatory framework that plays a role in the regional differences in the use of nonbank credit. In the United States, for example, insurance companies and pension funds also provide direct lending to borrowers. In some European countries, however, insurance companies may not extend credit to the corporate sector. Similar considerations apply to mutual funds, which are prohibited from purchasing loans in Europe, due to a regulatory constraint, while they are permitted to do so in the United States (IMF 2014b).[30] Those who suffer the most from the banks' reduction in lending are the SMEs in Europe, which account for 99 percent of enterprises by number. SMEs rely heavily (80 percent) on debt finance for their funding needs. And due to their small balance sheets and opacity, SMEs tend to lack direct access to financial markets (AFME 2014).

One important reason that capital-market-based funding is better developed in the United States than in Europe is the long history of securities market regulation and the establishment of the two specialized GSEs, Fannie Mae and Freddie Mac. Fannie Mae and Freddie Mac took a leading role during the housing boom before the outbreak of the 2007–2009 financial crisis, which was fueled by the so-called originate-to-distribute model. This explains in large part why loans to households on banks' balance sheets accounted for only 30 percent of total household debt in the United States, but 85 percent in the euro area in 2013:Q1 (ECB 2013). It provides a justification for the decision by U.S. federal banking regulators to recognize some securities issued and guaranteed by GSEs as Level 2A assets under the liquidity buffer for the LCR requirement. In Europe, the main issuers of securitized products are in the United Kingdom, the

[30] The Undertakings for the Collective Investment in Transferable Securities Directive, adopted in July 2014, covers investment funds regulated at the European Union level. These investment funds were created to provide small investors a vehicle to invest in a professionally managed and diversified basket of assets, now accounting for around 75 percent of all collective investments by small investors in Europe (Official Journal of the European Union 2014).

Netherlands, Spain, and Italy. While the EU regulatory treatment of securitization is rather complex, these countries have a regulatory structure in place that allows for a securitization process that is more transparent and simpler (ECB 2011) than the U.S. process. Although issuance of securitized loans in Europe has been declining sharply since the 2007–2009 financial crisis, RMBS register by far the highest volume of issuance per asset class. According to the AFME (2014), the issuance of RMBS amounted to €6.5 billion in 2014:Q1, followed by automotive sector originations at €2.7 billion. Therefore, given the fundamental importance of RMBS (and auto, SME, and consumer loans) in several European member states, the EC decided to include these assets as Level 2B assets with appropriate haircuts (for liquidity characteristics, see EBA 2013a). U.S. federal banking authorities did not warrant such treatment due to lower trading volumes and lower demand for such securities in the United States.

Covered bonds are another source of funding that has gained ground in several European countries. According to the European Covered Bond Council (ECBC 2014), the covered bond market has developed into the most important segment of privately issued bonds in Europe's capital markets over the past 20 years, with a volume outstanding at the end of 2013 of €2.6 trillion. While the use of covered bonds dates back to ancient Greek mortgages and Italian and Dutch bonds, this financial instrument has experienced a boom with the introduction of the euro and a subsequent low-interest-rate environment. Covered bond legislation in Europe provides an attractive framework for issuers and investors, including a strict legal and supervisory framework, asset segregation, and a dynamic pool to maintain the quality of collateral (ECBC 2014). Moreover, the euro system launched two covered bond purchase programs in 2010 and 2011 in order to ensure liquidity and stability in the European covered bond market. This illustrates that covered bonds have enjoyed a public safety net in the past (Beirne et al. 2011). Based on these facts, the EC decided to include high-quality covered bonds as Level 2A or Level 2B assets (for the requirements, see EC 2014b). The United States currently has no covered bond legislation in place. Although the FDIC published a Covered Bond Policy Statement in 2008 (U.S. Federal Register 2008), which was supplemented by the U.S. Treasury's Best Practices for Residential Covered Bonds (U.S. Department of the Treasury 2008), the U.S.

covered bond market seems not to be very established (Surti 2010 and ECBC 2014). As a consequence, covered bonds are not included among the HQLA for the U.S. LCR.

This general overview of the differences in legal frameworks and historical developments in banking in the United States and in Europe elucidates the significance of having in place a harmonized legal framework for financial instruments. In recent decades, Europe has made significant efforts to eliminate the fragmentation of its capital markets by removing earlier flaws in the securitization market and implementing several financial regulations and other initiatives (Bank of England and ECB 2014).[31] However, the challenge is to integrate historical and cultural aspects of 28 different EU capital markets into a single capital market.[32] To achieve this goal, the European Union needs to move from the existing bank-based funding model to a more U.S.-like capital-markets-based funding model. This process was launched by the issuance of a consultative green paper (EC 2015) in February 2015, in which the EC calls for the implementation of a Capital Markets Union (CMU). The CMU is intended to establish a single market for capital that will help to boost investment and improve access to finance, particularly for SMEs and startups. The CMU will complement the EU's new Banking Union by expanding the agenda to the nonbank part of Europe's financial system (Hill 2015).[33] The EC will unveil an Action Plan on the CMU during the third quarter of 2015, and intends to address three areas: (1) regulation for standardizing the European securitization market, (2) insolvency rules for securitized products across the European Union, and (3) payment and settlement systems for the securitization market (Mersch 2014). In short, the CMU addresses the diversification and extension of funding sources through capital markets by regulating the nonbank market segments (EC 2014d).

[31] The debate about harmonizing capital markets in Europe dates back to the early 1980s with the harmonization of public offerings and listing particulars. For more details, see Lannoo (2015).

[32] See http://www.wsj.com/articles/the-riddle-of-europes-capital-markets-union-1412538629.

[33] The EU member states agreed in 2012 on the Banking Union to implement common harmonized rules (for more details, see Huertas 2014, EC 2013a, EC 2014d, EC 2014e, EC 2014f, and EC 2014g).

3. Additional U.S. liquidity regulations

The United States has gone beyond the LCR and NSFR regulations on U.S. banking organizations by supplementing these regulations with the Comprehensive Liquidity Analysis and Review (CLAR) for the largest banking organizations. In addition, the largest foreign banking organizations (FBOs) operating in the United States also must meet liquidity standards and undertake internal liquidity stress testing.

3.1 CLAR

Much like the Comprehensive Capital Analysis and Review (CCAR), which produces annual stress tests related to capital adequacy for the largest banking organizations, the CLAR incorporates annual liquidity stress tests, although only for the more-limited set of the largest banking organizations included in the Large Institution Supervisory Coordinating Committee portfolio. The CLAR was first implemented in late 2012 and includes both quantitative and qualitative evaluations. The CLAR stress tests are more flexible than the LCR and NSFR in that they can maintain their effectiveness by responding quickly to changes in the nature and degree of liquidity risks as bank behavior, financial markets, and the liquidity characteristics of specific financial instruments evolve over time. Such changes could arise, for example, through regulatory arbitrage behavior by banking organizations in response to financial innovation or regulatory changes.

Unlike the CCAR, the CLAR does not require banking organizations to include in their stress tests a common standardized stress scenario. Instead, each banking organization will determine its own scenario, intended to reflect the banking organization's own specific characteristics based on such factors as its business lines, counterparties, and funding model. Because the stress tests use the banking organization's own assumptions and models, the results are not directly comparable across organizations. Thus, unlike CCAR, CLAR does not have standard quantitative thresholds for post-stress outcomes. Moreover, the CLAR results are not made public, but instead are used internally by bank supervisors to provide guidance to bank management and to evaluate the ability of banking organizations to weather a liquidity crisis.

However, banking organizations do not have complete freedom to determine the quantity and quality of their liquidity buffer and risk-management standards. The Federal Reserve provides guidance for the stress tests and then reviews the banking organization's assessment of its liquidity risk profile and processes for addressing a liquidity crisis (Tarullo 2014a). Based on this analysis, bank supervisors can make judgments about the quality and reliability of the banking organization's risk-measurement and risk-management procedures and then address any perceived shortcomings with bank management.

3.2 Liquidity regulations for FBOs in the United States

Liquidity regulations applied to FBOs with large U.S. operations differ based on the size and composition of their U.S. operations. FBOs with $50 billion or more in total (global) assets but less than $50 billion in combined U.S. assets must report results from annual internal liquidity stress tests. FBOs with combined U.S. assets of $50 billion or more must meet additional liquidity requirements. If an FBO has combined assets of $50 billion or more, excluding its U.S. foreign branch or agency operations, it is required to form a U.S. intermediate holding company (IHC). The FBO must then maintain separate liquidity buffers for its combined U.S. branch and agency operations and for its IHC.

While IHCs face the same LCR and NSFR liquidity requirements as top-tier domestic bank holding companies, foreign branches and agencies come under less-strict U.S. liquidity regulations. The reason for the lighter touch is that foreign branches and agencies are not separate legal entities, and home country, rather than host country, regulators are their primary supervisors. An example of this lighter touch is the fact that U.S. branches and agencies of an FBO must maintain a liquidity buffer to cover liquidity needs for the first 14 days of the 30-day liquidity stress scenario rather than for the full 30-day liquidity stress scenario required of an IHC. Importantly, the required liquidity buffers for both the IHCs and the foreign branch and agency operations must be maintained in the United States.

4. Interactions with capital regulations

The Basel III approach essentially determines capital and liquidity requirements separately. However, when liquidity risks arise, they typically emerge not in isolation, but rather in combination with solvency risks. A solvent financial intermediary suffering from illiquidity can become insolvent if it has to absorb large capital losses from being forced to liquidate its assets rapidly in a fire sale because of its inability to access funding. On the other hand, when counterparties come to question the solvency of a financial intermediary, they tend to run, imposing substantial liquidity pressure on the institution. Thus, solvency risks and liquidity risk are not only intertwined, but they tend to set in motion feedback loops with each risk intensifying the other—especially in periods of financial instability.

Because it can be difficult to disentangle insolvency risks from illiquidity risks, it makes sense to link required capital levels to the liquidity of a financial intermediary's balance sheet rather than viewing the risks as independent. In fact, the U.S. Federal Reserve has recently linked the capital surcharge for U.S. global systemically important banking organizations to the institution's reliance on short-term wholesale funding (Tarullo 2014a). By maintaining higher capital ratios, these banking organizations should be able to mitigate liquidity pressures during stressful periods because the added capital buffer reduces the solvency concerns of their counterparties.

5. Conclusion

Finally, we touch on possible implications of the new liquidity regulations. The particularly interesting question from a policy perspective is: what potential consequences might the new liquidity regulations have? Will banks shift their business models or refrain from lending? While several studies cover liquidity regulation and its possible consequences (CEBS 2010, BCBS 2010c, Giordana and Schumacher 2011, and BCBS 2012), we refer to the most recent studies conducted by the European Banking Authority and the Basel Committee on Banking Supervision in 2015 (EBA 2015 and BCBS 2015a). According to EBA's evaluation (EBA 2015), banks will shift toward more deposits, reduce reliance on short-term funding, and have an

increased incentive to hold high-quality liquid assets. The BCBS also monitors the effects and dynamics of the Basel III reforms on an ongoing basis (BCBS 2015a).[34]

In its seventh publication from the Basel III monitoring exercise (2015) in which a sample of 224 banks participated, 80 percent reported a LCR that already met or exceeded 100 percent. In addition, the results confirm that the majority of banks' holdings (in aggregate) comprise Level 1 assets (almost 90 percent). The majority of Level 2A assets were 20 percent risk-weighted securities issued or guaranteed by sovereign governments, central banks, or public sector entities. And within the Level 2B assets, the majority of holdings were eligible nonfinancial common equity shares.[35] When looking at these results, one might ask about a possible concentration risk (for government securities, for example) and its effect on maturity transformation, given the incentives to hold more government bonds.

According to Article 509(1) of the Official Journal of the European Union (2013), the EBA will annually assess whether the LCR has adverse effects on the business and risk profiles of banking organizations, or on financial stability (see also EBA 2014). Other implications stemming from the incentive to hold more Level 1 assets could occur as a result of the inflexibility in defining the eligible assets and the allowed composition of the liquidity buffer. This might entice banks to provide Level 1 assets through securities financing transactions. In other words, Level 2 assets could be swapped for Level 1 assets. By borrowing Level 1 assets, banks could use them in their buffers without actually owning them. Such activity would reduce the quality of the regulatory buffer because the assets constituting the buffer would effectively be composed of assets that are less liquid than Level 1 assets (Kowalik 2013).

As far as banks' business models are concerned, the EBA (EBA 2015) found that retail banks might securitize illiquid assets (possibly into RMBS) to generate cash inflows and remove these assets from their balance sheet in order to meet the LCR requirement. Investment banks, on the other hand, might come under increasing pressure to hold enough HQLA on one side of their balance sheet and to post collateral for possible margin calls on the other side. Regarding the

[34] For the results of previous exercises, see http://www.bis.org/bcbs/publ/d312.htm.
[35] The BCBS could only use data as of the June 2014 reporting period, which is prior to the revised NSFR.

NSFR requirement, the same EBA report found that those banks taking deposits, such as universal and retail banks, will find it easier to satisfy the NSFR, while banks that are relying on wholesale funding (such as investment banks) might find it more challenging to meet the NSFR requirements. Therefore, maintaining a high liquidity buffer could put some pressure on banks' earnings, which could encourage riskier behavior (known as "reaching for yield") (EBA 2015). However, in general, it will be easier for banks with a diversified business model to comply than for specialized banks.

The EBA also looked into a potential detrimental consequence of the LCR that might be an anticipated response of banks: cutting back on lending. According to the EBA impact assessment (EBA 2014), individual banks may experience temporary loan supply constraints while they are adjusting to the new LCR requirements. Further analysis shows, however, that these constraints would be small or that excess demand could be met by other banks. The same is true at a macro level; no consistent spillover effect (for example, from a large LCR shortfall) would likely be noticeable. Hesse and Schmitz (2014) also conclude that neither the analysis presented in the EBA reports, nor the experience of countries that recently introduced LCR-like regulation (see, for example, Banerjee and Mio 2014), nor the evidence in the literature provides evidence that the LCR is likely to reduce lending to the real economy of the European Union.

Although the new liquidity regulation will most likely reduce the occurrence of liquidity crises in the future, its effect on the money markets cannot be easily predicted. Current developments already confirm that some of the larger U.S. banking organizations are imposing fees to encourage their largest depositors to withdraw their cash. In particular, the LCR assigns a 100 percent run-off rate for the nonoperational deposits of financial firms, so that each dollar of such deposits requires a matching dollar of HQLA.[36] In addition, by increasing the bank demand for high-quality liquid assets, the new liquidity regulation may have the effect of impairing the repo market by inducing a shortage of high-quality collateral available for repo transactions. Moreover, in combination with recently increased capital requirements, the

[36] See http://www.ft.com/intl/cms/s/0/b7dd15e6-bc49-11e4-b6ec-00144feab7de.html#axzz3TH1xpkFS and http://www.wsj.com/articles/j-p-morgan-to-start-charging-some-big-clients-deposit-fees-1424743293.

increased cost of holding bonds by market makers could potentially impair liquidity in the bond markets.

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Appendix: The implementation of the LCR in the United States and in the European Union (as of May 2015)

For more detailed information, see U.S. Federal Register (2014) and Official Journal of the European Union (2015)

	United States	European Union
Legislative Framework:	The LCR establishes an enhanced prudential liquidity standard consistent with section 165 of DFA.	The Capital Requirements Directive IV (CRD IV including the CRR) builds the foundation for implementing the LCR in the European Union.
Approval Date:	The Federal Reserve Board, the OCC and the FDIC approved the LCR final rule on September 3, 2014.	The EC adopted the LCR Delegated Act on October 10, 2014. The EP and the Council approved the LCR Delegated Act on January 17, 2015.
Transition Periods and Effective Date:	January 2015: 80 percent LCR requirement (full version) January 2016: 90 percent LCR requirement (modified version) **January 2017: 100 percent LCR requirement (effective date)**	October 2015: 60 percent LCR requirement January 2016: 70 percent LCR requirement January 2017: 80 percent LCR requirement **January 2018: 100 percent LCR requirement (effective date)**
Scope of Application:	Full LCR: all large and internationally active banking organizations with $250 billion or more in total consolidated assets or $10 billion or more in on-balance-sheet foreign exposure and these banking organizations' subsidiary depository institutions that have assets of $10 billion or more are required to calculate their LCR on a daily or monthly basis. Modified LCR: Bank holding companies and savings and loan holding companies that have $50 billion or more in total assets are required to calculate their LCR on a monthly basis.	The LCR applies to all credit institutions that are supervised under Directive 2013/36/EU (more than 8,000 banks) both on an individual and consolidated basis. Investment firms are not covered by the final EU legislation. The EC must report to co-legislators by no later than December 31, 2015, on whether and how the LCR should apply to investment firms. Until then, investment firms remain subject to the national law of the EU member states. However, investment firms should be subject to the LCR on a consolidated basis when they form banking groups.
High Quality Liquid Assets (HQLAs):	Level 1 assets (no haircut): Reserve Bank balances, foreign withdrawable reserves, securities issued by the U.S. government, certain sovereigns and multilateral organizations' securities. Excluded HQLAs: cash, covered bonds, RMBS. State and municipal bonds are part of a separate rulemaking (http://www.federalreserve.gov/newsevents/press/bcreg/20150521a.htm) Level 2A assets (15 percent haircut): claims on or guaranteed by a U.S. GSE, certain sovereigns and multilateral organizations' securities. When level 2A assets are combined with level 2B assets, level 2 (A and B) assets cannot exceed 40 percent of the HQLAs. Level 2B assets (50 percent haircut, 15 percent cap): for example, under certain requirements, corporate debt securities and publicly traded shares.	Level 1 assets: No haircut for coins, banknotes, exposures to central banks, assets representing claims on or guaranteed by: certain central or regional governments/local authorities or public sector entities; by the central government or central bank of a third country (certain conditions); by the multilateral development banks/international organizations; also certain assets issued by credit institutions and exposures of extremely high-quality covered bonds (->70 percent cap and 7 percent haircut applies). Level 2A assets (15 percent haircut): 20 percent risk-weighted marketable securities representing claims on or guaranteed by certain sovereigns, high-quality covered bonds and certain corporate bonds. When level 2A assets are combined with level 2B assets, level 2 assets cannot exceed 40 percent of the HQLAs. Level 2B assets (25 to 50 percent haircut and 15 percent cap): high-quality securitized assets for RMBS, auto, SME and consumer loans, restricted committed liquidity facilities by the ECB, corporate debt securities, shares, restricted ECB facilities and certain liquid bonds.
Total Net Cash Outflows (TNCO):	TNCO = cumulative cash outflows – capped cumulative cash inflows + maturity mismatch add-on	TNCO = cumulative cash outflows – capped cumulative cash inflows (TNCO corresponds to net liquidity outflows in the EU LCR)