Rethinking Liquidity Regulation

Research Note

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By Samim Ghamami

Vice President and Senior Economist

Financial Services Forum

Introduction

Banks generate returns, in part, by creating assets that are less liquid than liabilities. This function is often called liquidity transformation. Financial intermediaries also profit from creating assets that are longer term than liabilities. This is called maturity transformation. For instance, we can think of a commercial bank taking short-term deposits and making multi-year loans, or a bank funding its inventory of multi-year interest rate swaps with short-term repurchase agreements (repos). Excessive liquidity and maturity transformations can create adverse impacts on the economy. Liquidity regulation aims to guide banks' liquidity and maturity transformations towards socially optimal levels.

In this note, we will discuss the role of liquidity regulation and some subtleties associated with its design. Using existing research, we highlight the importance of considering liquidity rules jointly with other post-crisis bank balance sheet constraints. We will also discuss some of the potential adverse consequences of the existing liquidity rules.

Liquidity Regulation

Banks may not hold socially optimal levels of liquid assets on their balance sheet to handle sudden cash outflows as they are for-profit companies and cannot monetize all benefits of reducing risks to financial stability.

Suppose that a bank is solvent in the long run due to the presence of capital regulation but can face liquidity-driven crises in the short run. This can happen, for instance, when the bank holds mostly long-term or illiquid assets on its balance sheet, and a number of depositors abruptly start withdrawing their deposits. Since the bank cannot liquidate sufficient amounts of its assets in the short run to pay the depositors, a liquidity crisis follows. In the long run, however, the bank can remain solvent because after liquidating a sufficient amount of assets, it can ultimately fulfill its payment obligations. We know from the work of Diamond and Dybvig (1983) that central bank liquidity provision or deposit insurance can, under certain conditions, fully eliminate the run risk and thus any liquidity-driven crisis. Is then liquidity regulation needed?

In practice, it is very difficult to differentiate between liquidity-driven and solvency-driven crises. Consequently, when the central bank acts as a lender of last resort (LOLR), it may take some credit risk, which ultimately exposes taxpayers to banks' default risk. Also, there are moral hazard problems with the use of LOLR and deposit insurance -- banks can be imprudent *ex ante* under LOLR and deposit insurance. These are all well-known and common-sense arguments in favor of having some form of liquidity regulation in parallel with capital regulation, the LOLR capacity, deposit insurance, and resolution procedures.

Quantitative liquidity regulation has been a new addition to the post-crisis international reform program. Its design and cost-and-benefit analysis are more complex than capital regulation. Its impact on the economic system is still not well-understood, and research on liquidity regulation is evolving and not conclusive.

Basel Liquidity Rules

In response to the financial crisis of 2007-2009, the Basel Committee on Banking Supervision (BCBS) has introduced a new global framework for liquidity regulation. The Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) are two essential components of this framework.

LCR intends to promote short-term resilience of a bank's liquidity risk profile by ensuring that it has sufficient high-quality liquid assets (HQLA) to survive a significant stress scenario lasting for one month, BCBS (2013). To satisfy the LCR requirement, liquid assets should cover outflows in a 30-day stress scenario.

NSFR aims to promote resilience over a longer time horizon by creating additional incentives for banks to fund their activities with more stable sources of funding on an ongoing basis. NSFR aims to supplement the LCR and has a time horizon of one year, BCBS (2014). NSFR requires that a bank's available stable funding cover its required stable funding. LCR constrains liquidity transformation, and NSFR, depending on its calibration, can constrain maturity transformation.

While the focus of this note is on Basel liquidity rules, we should mention that in the U.S., liquidity requirements of global systemically important banks' (GSIBs) resolution plans can be viewed as variations of Basel liquidity rules, particularly LCR, for different legal entities of GSIBs prior to, during, and after bankruptcy and resolution procedures.[1] In fact, there can be instances where resolution liquidity requirements become binding constraints (or concerns) as opposed to LCR or NSFR. Our discussions and arguments in this note similarly apply to resolution liquidity requirements.

HQLA Usability

A well-known concern with quantitative liquidity rules, particularly LCR, is that banks might be reluctant to use their HQLA and so let the LCR fall below the Basel requirement in stress scenarios. Banks might be unwilling to do so despite the fact that regulators allow LCR to fall below the minimum during periods of stress. This is reminiscent of the well-known *discount window stigma*.[2] Armantier, Ghysels, Sarkar, and Shrader (2011) show that banks were reluctant to borrow from the Federal Reserve's discount window during the financial crisis.[3]

Under quantitative liquidity rules, an important factor that can influence the usability of HQLA is their supply and demand at any point in time, as noted by Stein (2013). For instance, initial margin

[1] More specifically, under the *Resolution Liquidity Adequacy and Positioning* (*RLAP*), a GSIB should ensure that its parent holding company holds sufficient HQLA to cover the sum of all its stand-alone material entities' liquidity deficits. Each material entity's liquidity position is measured by subtracting its stressed net outflows from its HQLA. And, under the *Resolution Liquidity Execution Need (RLEN),* a GSIB should estimate the required liquidity after the parent's bankruptcy filing to allow surviving entities to operate post-bankruptcy, (see the Federal Reserve Board and Federal Deposit Insurance Corporation (FDIC) 2019 Guidance and Davis Polk (2019)).

[2] This similarity has also been noted by Carlson, Duygan-Bump, and Nelson (2015).

[3] In fact, BCBS (2016) voices potential concerns about the usability of almost all Basel III *buffers*, e.g. the capital conservation buffer, the G-SIB buffer, and the countercyclical buffer.

requirements in over-the-counter (OTC) markets can impact the supply of HQLA.[4] In contrast with capital rules, liquidity rules can be highly dependent on market-equilibrium considerations. This factor complicates their design and cost-and-benefit analysis.

Joint Capital and Liquidity Regulations

Risk-based capital (RC) requirements state that banks should maintain equity capital equal to at least some minimal fraction of their risk-weighted assets. The leverage ratio (LR) requirement can be viewed as a simplified version of RC, where all risk weights are equal to 1. That is, LR states that a bank's equity capital must be at least some minimal fraction of its total unweighted assets. Using simple approximations, Cecchetti and Kashyap (2018) show that it is very unlikely that LCR, NSFR, RC, and LR all hold at the same time. Overlapping and redundant rules may harm the economic system. Kashyap, Tsomocos, and Vardoulakis (2017) modify the work of Diamond and Dybvig (1983) to jointly study capital and liquidity regulation under run and credit risk. Their model-based results indicate that:

- In the absence of regulation, banks may tilt their assets towards less liquid and longer-term assets, and their liabilities towards lower levels of equity funding. The socially optimal regulatory mix consists of a single capital rule, e.g. either RC or LR, and a single liquidity rule, e.g. either LCR or NSFR, and these rules should be jointly binding.
- The total balance sheet grows, lending rises, and run risk falls when RC requirements increase. Since LR is risk-insensitive, increasing LR leads to higher levels of lending compared to the above RC impact. However, increasing LR can increase run risk.
- LCR reduces credit extension, bank profitability, and equity financing. It also decreases run risk. The effect of NSFR can be similar to LCR. Varying its calibration, NSFR can behave similar to LCR or RC.

Potential Adverse Consequences

We will first discuss the potential role of liquidity rules in repo disintermediation given the recent U.S. repo market excess volatility. We will then briefly outline how LCR can complicate the conduct of monetary policy. Repo disintermediation and monetary policy complications are two instances of the potential role of liquidity rules in some of the observed post-crisis market fragilities and inefficiencies.

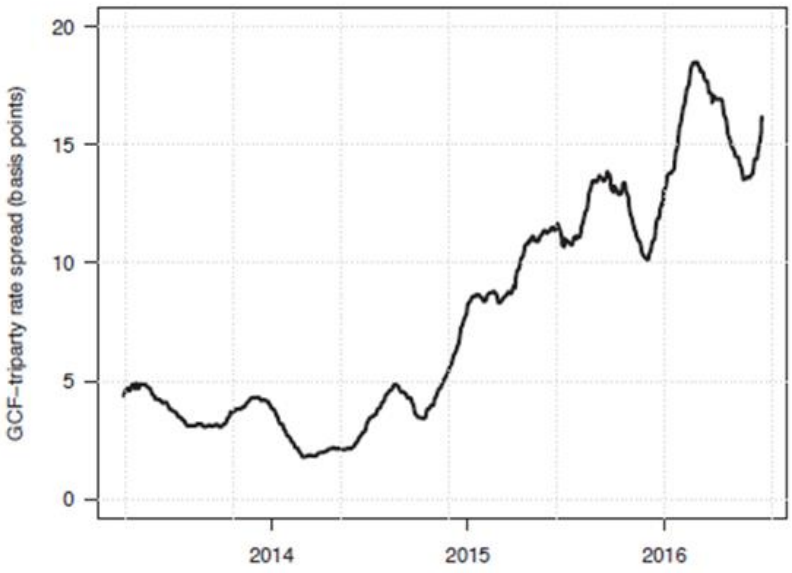
Repo Disintermediation

Repo markets enable the efficient flow of cash and securities in the financial system. Repos are mainly intermediated by dealer banks. The passthrough efficiency of the U.S. monetary policy depends on repo intermediation. Policy rates impact longer-term bond yields through repo rates as bond market-makers finance their positions in repo markets.

[4] See Ghamami (2019) for background on initial margin requirements in OTC derivatives markets and their impact on these markets.

Repo bid-ask spreads, i.e. the cost of repo intermediation, have increased since 2013 as noted by the Committee on the Global Financial System, CGFS (2017), and Duffie and Krishnamurthy (2016). This can be seen from the spread between rates in the general collateral finance (GCF) repo and the tri-party repo markets in Figure 1.

Figure 1: Rolling 90-day average of the spread in basis points between the overnight GCF repo rate and the overnight tri-party repo rate.



Source: Duffie and Krishnamurthy (2016), p.39

Liquidity regulation plays a role in repo disintermediation. If a dealer is a net cash borrower using repos to finance its inventory of securities, repo transactions below 30 days decreases its LCR. Banks' reverse repo transactions impact their LCR if cash is lent against non-HQLA or Level 2 assets. Cash lent against other HQLA assets, e.g. Treasury securities, will not impact LCR. So, one may think that liquidity regulation should not have played a considerable role in the recent U.S. repo market turmoil. However, as noted by Covas and Nelson (2019), banks may have preferred cash to Treasury reverse repos because of bank examiners' apparent preference for central bank excess reserves over Treasury securities.[5] Policy makers are aware of the adverse impact of NSFR on matched-book repo

[5] See also footnote 1, banks may have been reluctant to take on reverse repo transactions due to binding resolution liquidity constraints.

intermediation -- NSFR introduces an asymmetry between reverse repos and repos disincentivizing matched-book repo provision CGFS (2017).[6]

Monetary Policy Complications

Liquidity rules can intensify the link between monetary policy and bank regulation. In the U.S., the Federal Reserve achieves its short-term interest rate target range, in part, by managing the supply of reserves that the banks hold at the Fed. These reserves are an important component of LCR's HQLA. Varying the level of reserves changes LCR. Also, when LCR changes due to cash outflow variations, banks need to manage their LCR by adjusting their HQLA.

When LCR becomes a binding constraint, or when the Fed reduces bank reserves below certain levels, monetary policy passthrough frictions can increase and its implementation can become complicated. That is, it can become more complicated for the Fed to efficiently set and manage its short-term interest rate target. Also, excessive dispersion among different interest rates reduces the effectiveness of the conduct of monetary policy. For instance, under binding LCR, Bech and Keister (2017) show how a central bank's short-term interest rate target and longer-term rates can diverge under different monetary policy implementation schemes, see their Figures 2-3.

Concluding Remarks

Sound liquidity regulation can guide banks' liquidity and maturity transformations towards socially optimal levels. Liquidity rules, however, should not be designed in isolation, they should be considered along with capital rules, the central bank's conduct of monetary policy, its LOLR capacity, and resolution procedures. The impact of liquidity rules on the economic system is not yet well-understood.

Overlapping balance sheet constraints may harm the economic system. In light of the analysis of Kashyap et al. (2017), it is worth revisiting liquidity and capital rules jointly and thinking about the combination of an improved liquidity rule with an improved capital regime.[7] Quantitative liquidity rules may lead to bank disintermediation and may cause fragilities in different markets. For instance, it is not difficult to identify their potential role in repo disintermediation. Also, when liquidity rules become binding constraints, they can lead to monetary policy inefficiencies.

[6] Suppose that a bank uses a reverse repo in the GCF market to lend cash to a hedge fund. The bank finances this transaction through a repo with the same maturity with a pension fund in the tri-party market. This is a stylized example of a bank's matched-book repo.

[7] See Campbell (2019) for potential shortcomings with the current capital regime.

About the Author

Samim Ghamami is the Senior Economist and Vice President at the Financial Services Forum. He joined the Forum in August 2019 from Goldman Sachs, where he was a senior financial economist and a senior vice president. Ghamami is also an adjunct professor of finance at New York University, an adjunct associate professor of economics at Columbia University, and a senior researcher at UC Berkeley Center for Risk Management Research.

Dr. Ghamami has also been an acting associate director and a senior economist at the Office of Financial Research at the U.S. Department of the Treasury, and an economist at the Federal Reserve Board. Ghamami's research has broadly focused on financial economics and more recently on the interplay between finance and macroeconomics. His work on banking and central clearing has been presented and discussed at central banks. Ghamami has been an advisor to the Bank for International Settlements and has also worked as an expert with the Financial Stability Board on post-financial crisis reforms. He served on the National Science Foundation's panel on Financial Mathematics in 2017 and 2018.

Ghamami has also been a visiting scholar at the Department of Economics at UC Berkeley, a quantitative researcher at Barclays Capital, an adjunct professor at the University of Southern California, and a post-doctoral researcher at CREATE Homeland Security Center.

Ghamami received his Ph.D. in Mathematical Finance and Operations Research from the University of Southern California in 2009. His publications have appeared in different journals including the Journal of Financial Intermediation, Management Science, the Journal of Derivatives, Quantitative Finance, Mathematics of Operations Research, and the Journal of Applied Probability.

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