

Law and Macro-Finance:

How Law Affects Liquidity

and Monetary Policy

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JOB MARKET PAPER

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Abstract

Can the law distort the transmission of monetary policy? The effective transmission of monetary policy depends on the policymakers' ability to regulate liquidity in the financial system. The Federal Reserve seeks to regulate liquidity by influencing the price of money and certain money-like instruments, such as repurchase agreements, or repo in the money market. The price of those instruments is also a function of the strength of the legal protections of their creditors. Under a standard Law and Finance framing, their price will be lower if those protections are strong. In this article, I consider the macro-financial effects of such protections by which I mean their impact on liquidity and the effectiveness of transmission of monetary policy. I argue that strong legal protections of repo (1) exacerbate the effects of expansionary monetary policy by incentivizing creditors to oversupply liquidity, but (2) can also support the effective transmission of contractionary monetary policy by incentivizing creditors to supply liquidity when it is scarcer. I refer to the claim as the Law and Macro-Finance thesis. On the policy side, the thesis implies that, in the absence of other appropriately calibrated measures aimed at regulating liquidity, repo creditors should (1) enjoy stronger rights during periods of liquidity scarcity but (2) weaker rights during periods of liquidity abundance, in each case to support the effective transmission of monetary policy. On the theoretical side, my analysis shows the relevance of macro-financial considerations, particularly liquidity, in studying the economic effects of legal institutions.

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INTRODUCTION

How does the law affect the transmission of monetary policy? Monetary policy operates, in part, through credit markets.¹ Over two decades ago, the influential literature on Law and Finance established empirically that the law is among the key determinants of their development.² The law facilitates credit market development mainly by protecting creditors.³ For example, the U.S. Bankruptcy Code provides for “safe harbors” that exempt the creditors of repurchase agreement or repo⁴ from the basic rules that halt creditor collection efforts when the bankruptcy begins.⁵ How (if at all) do

¹ Arturo Estrella, *Securitization and the efficacy of monetary policy*, 8 FED. RES. BANK OF N.Y. ECON. POL'Y REV. (2002) (“While there is no single prevailing view of the monetary policy transmission mechanism, the credit markets are important in practically every mainstream view. The central bank is seen to influence the economy by affecting the pricing or the volume of credit instruments, or of financial assets more generally.”).

² Rafael La Porta et al., *Legal Determinants of External Finance*, 52 J. FIN. 1131–1150 (1997) (showing that countries with poorer investor protections, measured by both the character of legal rules and the quality of enforcement, have smaller and narrower capital markets—both equity and debt markets).

³ Rafael La Porta, et al., *Law and Finance*, 106 J. POLIT. ECON. 1113–1155 (1998) (examining legal rules covering protection of corporate shareholders and creditors). The focus on decision rights followed from the embrace by Law and Finance of the property rights strand of economic literature pioneered in the 1980s by Grossman and Hart. See Sanford J. Grossman & Oliver D. Hart, *One share-one vote and the market for corporate control*, 20 J. FIN. ECON. 175–202 (1988). The property rights literature's principal contribution was to suggest that decision rights matter as much as if not more than cash flow rights. Decision rights help address agency costs and, hence, the inference of Law and Finance, that, if decision rights are protected more effectively, we could expect greater availability of credit.

⁴ While the safe harbors cover several types of contracts, in this article, I focus on as repos the central instrument of the money market.

⁵ The rule is known as ‘automatic stay’ and can be found in 11 U.S. Code § 362. The safe harbors were codified in 11 U.S. Code § 546. For a discussion of the evolution of that provision, see Edward R. Morrison & Joerg Riegel, *Financial Contracts and the New Bankruptcy Code: Insulating Markets from Bankrupt Debtors and Bankruptcy Judges*, 13 AM. BANKR. INST. L. REV. 641, 644–45 (2005). The rule is among the proxies used by La Porta et al. to determine the relative

those protections affect the transmission of monetary policy?

In the U.S., monetary policy is set by the Board of Governors of the Federal Reserve System. The effective transmission of monetary policy depends on the policymakers' ability to regulate liquidity in the financial system. The Federal Reserve seeks to regulate liquidity by influencing the price of money and certain money-like instruments, such as repo. Tobias Adrian and Hyun Song Shin, the leading figures in the emerging strand of macroeconomics referred to as macro-finance,⁶ define liquidity as the rate of growth of repo.⁷ Their research shows that the growth of repo is a function of the prevailing monetary policy stance.⁸ Liquidity increases when the stance is expansionary but decreases when the stance turns contractionary.

What is the implication of this finding for our understanding of the economic effects of the exemptions afforded under the US Bankruptcy Code to repo creditors? In this article, I argue that the safe harbors have different economic effects under different monetary policy stances. I distinguish between (1) an expansionary stance when the policy rate is low and liquidity abundant and (2) a

strength of creditor protection in a given jurisdiction—jurisdictions with higher incidences of no automatic stay are considered more friendly towards creditors.

⁶ According to the Columbia economic historian Adam Tooze, the “macrofinancial” approach to economics is owed to a group of economists led by members of Princeton’s economics department, the Federal Reserve Bank of New York and the Bank of International Settlement. Adam Tooze, *Framing Crashed II: 2008, the Crisis of the National Macroeconomics and the “Revolution” of Macrofinance* (2018), <https://adamtooze.com/2018/07/05/framing-crashed-ii-2008-the-crisis-of-the-national-macroeconomics-and-the-revolution-of-macrofinance/> (last visited May 5, 2021).

⁷ Tobias Adrian & Hyun Song Shin, *Liquidity, Monetary Policy, and Financial Cycles*, 14 CURRENT ISSUES IN ECON. & FIN. 7 (2008) (“Our discussion of financial institution behavior suggests a natural definition of liquidity as the *rate of growth of aggregate balance sheets*. In more concrete terms, we can define liquidity as the rate of growth of repos, since repos and other forms of collateralized borrowing are the tool that financial institutions use to adjust their balance sheets.”).

⁸ *Id.*

contractionary stance when the rate is high and liquidity scarce. I argue that repo safe harbors exacerbate the effects of expansionary monetary policy by incentivizing creditors to oversupply liquidity. However, such the safe harbors can also support the effective transmission of contractionary monetary policy by incentivizing creditors to supply liquidity when it is scarcer. In other words, the impact of the safe harbors on the transmission of monetary policy is different under different monetary policy stances. I refer to this claim as the Law and Macro-Finance Thesis (LMFT). The central intuition behind the LMFT is that we cannot analyze the economic effects of the protection of reop creditors unless we consider how they operate under different macro-financial conditions. Liquidity will grow in a low policy rate environment but it will grow even more if repo creditors benefit from strong protections under the law in that policy environment. That macro-financial effect must be considered when discussing the (i) normative justification for and (ii) proper scope of safe harbors.

Legal scholars have in the past examined the economic effects of the safe harbors within macroeconomic frameworks.⁹ Their analyses were focused on the incentives that those protections create for reliance on repo, the net result of which could be the creation of excess liquidity. The reform proposals revolved around "rolling back" the safe harbors through restriction on (1) what types of institutions can rely on them to obtain funding and (2) the type of collateral eligible for the exemptions. All of those proposals were skeptical of the inclusion of assets derived from the capital market as collateral eligible for the exemptions.

Implicit in all the proposals was the goal of separating the money market from the capital market in the spirit of the macroeconomic theory of Milton Friedman. In the 1960s and 1970s, he famously promoted a restrictive account of monetary policy, at odds with the current views in macroeconomic theory and central bank practice.

⁹ See Part I(E) *infra* for discussion.

Perhaps because of their implicit reliance on that theory, the proposals for reform of the safe harbors articulated in the past by legal scholars have not influenced policy circles.

By proposing the LMFT, my first goal is to contribute to the policy debate about their scope by relying on a different set of macroeconomic or rather macro-financial arguments derived from the work of economists closely affiliated with central banks, like Adrian and Shin.¹⁰ Their research does not discuss the role of law, but I rely on it to revisit the claim that the safe harbors result in the creation of excess liquidity. In my macro-financial account, their impact on liquidity has to be analyzed in conjunction with the prevailing monetary policy stance. Their legal treatment should accordingly reflect the overarching policy objectives of liquidity regulation and effective monetary policy transmission.

On the policy side, I propose that, in the absence of other appropriately calibrated regulatory measures, repo creditors should only enjoy stronger rights during periods of liquidity scarcity but weaker rights during periods of liquidity abundance, determined mainly by the prevailing policy and repo rates.¹¹ In other words, the extraordinary protections of repo creditors should only be afforded when that is strictly necessary for the achievement of monetary policy objectives. For example, when monetary policy is contractionary, and the repo rate is increasing, to address the decline in the collateral value and incentivize market participants to continue the provision of liquidity.

However, when monetary policy is expansionary, and the repo rate is low, like it was through much of the period following the Great Financial Crisis of 2008 (GFC), there is no need for such support. When monetary policy is expanding, policymakers should

¹⁰ They developed a theoretical account of the relationships between liquidity and leverage in their later research. See Tobias Adrian & Hyun Song Shin, *Liquidity and leverage*, 19 J. FIN. INTERMEDIATION 418–437 (2010).

¹¹ See Part IV(D) *infra*.

seek to weaken the rights of repo creditors in the sense of extending protections only to transactions involving short-term Treasury bills to support the normal operation of the money market, but not long-term Treasury notes or other types of assets. Otherwise, the safe harbors, can distort the transmission of monetary policy by facilitating the rise of excess liquidity.

In the article, I acknowledge practical problems with implementing a countercyclical design of the safe harbors.¹² As an alternative, I suggest that the safe harbors are removed, and market participants rely on the true sales concept with appropriate collateral haircuts set by the Federal Reserve.¹³ In either case, and this is the crucial point, the U.S. Bankruptcy Code should be amended, and legislative history should clearly state that the goal of safe harbors is to facilitate the implementation of liquidity management and the implementation of monetary policy.

On the theoretical side, my analysis shows the relevance of macro-financial considerations, particularly liquidity, in the study of legal institutions. It shows how the law affects the flow of liquidity through the various segments of the money and capital markets. Law can support it and thereby the transmission of monetary policy, but it can also distort it with profound implications for the economy. Unlike conventionally assumed in Law and Finance analyses based on the neoclassical macroeconomic framework, the economy does not trend towards equilibrium. Instead, it is constantly driven towards disequilibrium, including by the operation of the law, which tends to have different effects under macroeconomic conditions, as shown in Katharina Pistor's *Legal Theory of Finance*, and Yair Listokin's work on *Law and Macroeconomics*.¹⁴

¹² See Part IV(E) *infra*.

¹³ See Part IV(D) *infra*.

¹⁴ Katharina Pistor, *A legal theory of finance*, 41 J. COMP. ECON. 315–330 (2013); YAIR LISTOKIN, *LAW AND MACROECONOMICS: LEGAL REMEDIES TO RECESSIONS* (2019). See also the contributions in Volume 83 (1) (2000) of *Law and Contemporary Problems* edited by Anna Gelpern and Adam Levitin.

This article is organized into four parts.

Part I describes the central role of repo in the money market and the jurisprudential evolution of the repo safe harbors. Because repo played a central role in the GFC, the normative justification for the safe harbors has been questioned in its immediate aftermath. In developing their analyses of the economic effects of the safe harbors, legal scholars resorted to macroeconomic theories. The main macroeconomic theory they relied on was that of monetarism, which advocates a strict separation of the money and capital markets. While such separation can be viewed as beneficial from the standpoint of financial stability, it could undermine the effective transmission of monetary policy, as suggested by research in macro-finance.

Research in macro-finance reveals the central role of liquidity as a channel of transmission of monetary policy. In line with existing literature in macro-finance, I distinguish between market and funding liquidity. Part II and III discuss these standard conceptions of, respectively, market and funding liquidity, in more detail, as well as their importance, and drivers, stressing the role of the law. Under the standard Law and Finance view, the law facilitates the liquidity of assets by reducing transaction costs, in particular the cost of information.

However, the Law and Finance literature has failed to consider the role of the law in shaping funding liquidity. Central banks and monetary policy are the main source of funding liquidity. Funding liquidity is channeled through the money market the structure of which has undergone important institutional transformation. The strengthening of the rights of repo creditors in the years leading up to the GFC, exacerbated the effects of expansionary monetary policy by increasing liquidity decreasing long-term rates and increasing asset prices in capital markets.

The policymakers' failure to regulate liquidity in the years leading up to the GFC, prompted the emergence of a new paradigm of liquidity regulation post-GFC. The paradigm revolves around banks. Part IV critically discusses the emerging paradigm of liquidity

regulation and its limitations, particularly in view of its failure to prevent the September 2019 and March 2020 liquidity crises. I discuss the mechanism through which the regulation exacerbated the crises. I propose a new paradigm of liquidity regulation revolving around a countercyclical design of the rights of repo creditors. The paradigm addresses some of the limitations of the existing proposals for the reform of the safe harbors, in particular the effects of those proposals on the transmission of monetary policy.

I. WHAT DOES THE LAW HAVE TO DO WITH MONETARY POLICY?

A. *Monetary policy and repurchase agreements*

In the U.S., the Board of Governors of the Federal Reserve System (the Board) was entrusted with the task of

maintaining long-run growth of the monetary and credit aggregates commensurate with the economy's long-run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates. 12 U.S. Code § 225a.

The Board has a variety of tools at its disposal, most importantly, the policy rate. The rate is set by the Federal Open Market Committee and implemented through the open market operations of Trading Desk at the Federal Reserve Bank of New York. The Desk conducts its operations in a market sometimes referred to as the money market. The money market is a market for money in the sense that the Federal Reserve relies on it to introduce or remove money in the form of banks reserves from the financial system. Under the current framework, banks must maintain a certain level of reserves, a high-powered form of money, with banks of the Federal Reserve System to continue to be chartered as a bank.¹⁵ The

¹⁵ The Federal Reserve Act authorizes the Board to establish reserve requirements within specified ranges for purposes of implementing monetary policy on certain types of deposits and other liabilities of depository institutions. The dollar amount of a depository institution's reserve requirement is determined by

reserve requirement gives the Board tremendous leverage over the banking system and implements its monetary policy.

Suppose the Board wants to relax monetary policy. In that case, it relaxes the reserve requirement by allowing the Desk to lend reserves to banks in exchange for Treasury notes. An increase in the holding of reserve, in turn, allows banks to lend more money to the economy. The Desk will accept bids for loans at a price representing the Board's target rate or the rate at which the Board would like to see the banks lend reserves to each other, also referred to as the federal funds rate. If the rate is 2%, the Desk will offer loans to banks at 2%.

For a technical legal reason, to which I will return shortly, Dealers will not be borrowing money from the Desk but rather selling Treasury notes to the Desk and agreeing to repurchase them at a pre-agreed time and price. For example, a Dealer might propose to sell \$10,100,000 worth of Treasury notes to the Desk for \$10,000,000 of reserves with an agreement to repurchase the Treasuries back for \$10,200,000 at maturity.¹⁶ Figure 1 below illustrates the structure of

applying the reserve requirement ratios specified in the Board's Regulation D (Reserve Requirements of Depository Institutions, 12 CFR Part 204) to an institution's reservable liabilities (see table of reserve requirements). The Federal Reserve Act authorizes the Board to impose reserve requirements on transaction accounts, nonpersonal time deposits, and Eurocurrency liabilities. Federal Reserve Board - Reserve Requirements, BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM, <https://www.federalreserve.gov/monetarypolicy/reservereq.htm> (last visited Jul 16, 2021).

¹⁶ Primary dealers are trading counterparties of the New York Fed in its implementation of monetary policy. They are also expected to make markets for the New York Fed on behalf of its official accountholders as needed, and to bid on a pro-rata basis in all Treasury auctions at reasonably competitive prices. Federal Reserve Bank of New York, *Primary Dealers*, available at <https://www.newyorkfed.org/markets/primarydealers> (last visited Jul 16, 2021). Effective November 9, 2016, the relationships between the New York Fed and primary dealers is governed by the Federal Reserve Bank of New York Policy on Counterparties for Market Operations.

this repurchase or repo transaction graphically.

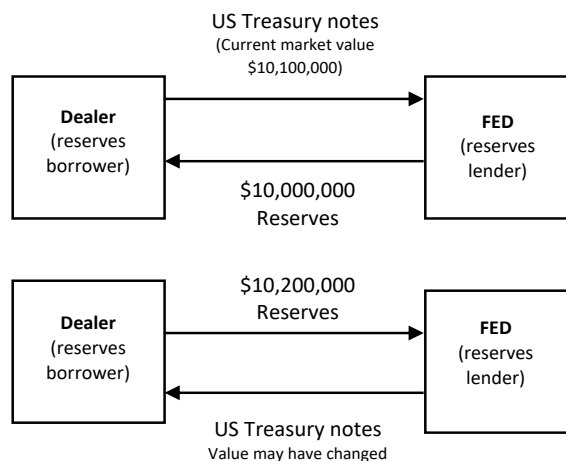


Figure 1 Repo between a dealer and central bank

Note, first, the 200,000 represents the effective 2% cost or price of the transaction for Dealer; and, second, the value of the Treasuries (\$10,101,010) did not matter for the economics of the transaction because the transaction was, in effect a *secured loan*, in which the Treasuries acted as collateral. The phrase "money printing" that often appears in popular commentary of the Federal Reserve's activities in essence refers to those secured loans.

The Federal Reserve could in fact be usefully understood as the proximate (secured) lender to the economy. As Ben Bernanke, the former Chair of the Board, once put it, "[a]ll the Fed can do is to make loans against collateral.¹⁷ The motivation of the Federal Reserve to lend money is different from that of a commercial bank. The Federal Reserve does it to implement monetary policy, not to make money (even though it sometimes makes money in that way

¹⁷ Ben Bernanke, *Ben Bernanke's Greatest Challenge* (2009), <https://www.cbsnews.com/news/ben-bernankes-greatest-challenge/> (last visited Aug 14, 2019).

too). That motivation of the Federal Reserve determines its collateral policy or what kind of assets it will accept in exchange for reserves and from whom.¹⁸

¹⁸ When the Federal Reserve was established in 1913, it was assumed that all state-chartered banks would join to have access. Nevertheless, as Ricks notes, "as of 1922 only 15% of eligible state banks had joined—and the trend was toward withdrawal." MORGAN RICKS, *THE MONEY PROBLEM: RETHINKING FINANCIAL REGULATION* (1 edition ed. 2016). This was mainly because membership required compliance with cash reserve requirements. Indeed, as Tippetts noted, "[m]any [banks] regard the loss as payment for insurance, and cheap insurance at that. But many member banks . . . claim that the protection given is charged for at too high a rate." Charles Sanford Tippetts, *State Bank Withdrawals from the Federal Reserve System*, 13 AM. ECON. REV. 402–410, 404–405 (1923). However, that trend has reverse over time because, in economic terms, that access constitutes a massive subsidy by making it cheaper for banks with access to Federal Reserve to access funding in private markets. "The size of the funding subsidy depends on money-claimants' judgments about the likelihood that the government will intervene to support the firm in the event of a run." RICKS at 186. Access to Federal Reserve liquidity has also grown over time. The Wall Street Crash of 1929 and the Great Depression was a big catalyst for that. The Emergency Relief and Construction Act of 1932 added section 13(3) to the Federal Reserve Act of 1913, providing that in "unusual and exigent circumstances," the Federal Reserve may lend to non-banks as well. Emergency Relief and Construction Act of 1932, Ch. 520, § 210, 47 Stat. 709, 715. Ricks further points out that the ability of the Federal Reserve to do that was also limited concerning the scope of collateral that could be used—the only collateral that the Federal Reserve would accept from non-banks comprised Treasury securities. Few Wall Street Firms had a sufficient supply of such securities. Therefore, they lobbied for the collateral limits to be removed and were successful. "In 1991 Congress did away with the long-standing collateral limits on Federal Reserve loans to nonbanks. The change was tucked into the Federal Deposit Insurance Corporation Improvement Act, where it was barely noticed." RICKS, *supra* note at 197. As Ricks points out, the one person that noticed was the macroeconomist, Anna Schwartz, a co-author of Milton Friedman. She wrote "As interpreted by Sullivan & Cromwell, a New York law firm, for its clients in a memorandum of December 2, 1991, this provision enables the Fed to lend directly to security firms in emergency situations. . . . In my view, the provision in the FDIC Improvement Act of 1991 portends expanded misuse of the discount window."). Ricks notes that one of the unintended consequences of the 1991 amendment was an incentive for securities firms, in particular hedge funds, to grow.

The Federal Reserve is not the only repo lender in the money market. Other institutions include pension funds, insurance companies, money market fund (MMF), exchange-traded funds, sovereign wealth funds, and even corporations. Why do they do that? Because it is safer to do that than keep cash at a bank as a deposit.¹⁹ Under the Federal Deposit Insurance Act, bank deposits are only insured up to \$250,000.²⁰ Lending through a repo is deemed to be a preferable alternative to deposits because repo (1) has a short maturity and (2) is overcollateralized through haircuts. To understand the role of haircuts in a repo, consider a modified version of the repo transaction from the example above, now with a Dealer as a cash borrower and a MMF as a cash lender. In the example above, I noted that the Treasuries' value did not matter for the transaction cost because the transaction was, in effect, a collateralized loan, in which the Treasuries acted as collateral.

Nevertheless, a change in the value of the Treasuries could have changed the economics of the transaction. The difference between the market value of the collateral and the cash received by the borrower represented a 'haircut,' the purpose of which is to provide the lender with greater security. If the Treasuries' value decreased during the transaction, Dealer would have to post additional collateral to meet

¹⁹ As Singh and Pozsar note, asset managers are the managers of the long-term savings of (primarily) households. Manmohan Singh & Zoltan Pozsar, *The Non-Bank-Bank Nexus and the Shadow Banking System*, Int'l Monetary Fund, Working Paper No. 11 (2011). Asset managers invest these savings in long-term instruments, such as equities, bonds and asset-backed securities. Asset managers, however, do not just invest long-term. Because of, inter alia, portfolio allocation decisions (the day-to-day management and return mandates effectively requires them to make some profits) asset managers routinely lend securities for use as collateral. Asset managers lend their securities to dealer banks against cash. This gives rise to large cash pools in the 'asset management complex.' The traditional banking system is not well fit to handle these cash pools. No risk manager would sign off on significant unsecured bank exposures via uninsured deposits. Instead, asset managers prefer alternatives such as short-term publicly guaranteed debt (such as Treasury bills).

²⁰ Pub. L. 81-797, 64 Stat. 873 (1950).

the pre-determined haircut requirement.

A repo claim is therefore like a bank deposit, which itself, together with reserves and cash, is one of the principal forms of money. The label 'money markets' should make even more sense now. The money market is a market for money because (1) the Federal Reserve uses it to implement monetary policy through repos and (2) repos are like money.

B. Repo safe harbors for all (types of collateral)!

Why are repos structured as sales? The principal benefit of structuring the transaction as such was to achieve bankruptcy remoteness of the repo claim. Put simply, should the repo borrower fail, the repo creditor would have a priority claim over secured creditors of the borrower. At least that was the assumption under which market participants operated in the money market in the early 1980s. Around that time, their assumption was unexpectedly challenged by a ruling in a proceeding concerning the demise of Lombard-Wall, Inc., a small investment firm, due to its inability to return cash it had obtained in overvalued long-term repos.²¹

In the proceedings before the United States Bankruptcy Court for the Southern District of New York (SDNY), Judge Edward J. Ryan initially froze all securities that Lombard-Wall had sold under repos. After permitting several counterparties to sell off their securities, he ruled in September 1982 that the repo agreements Lombard-Wall had negotiated with a particular bank were secured loans and, therefore, subject to the automatic stay provisions of the Bankruptcy Code, which block any efforts of a creditor to make collections or to enforce a lien against the property of a bankrupt estate. According to this interpretation, even if the lender had acquired actual title to the securities, the borrower would be deemed under the law to have an equitable interest in the securities. Although this last ruling dealt specifically with only one bank, it was viewed as a precedent. It

²¹ In re Lombard-Wall, Inc., 44 B.R. 928 (Bankr.S.D.N.Y.1984).

“scared the hell out of the industry.”²²

At the urging of primary government securities dealers and some prompting by the Federal Reserve Bank of New York, Congress amended Title 11 of the U.S. Code to exempt certain repos from the automatic stay provisions of the Bankruptcy Code when it enacted the Bankruptcy Amendments Act of 1984 in June of that year.²³ Coverage was limited to overnight repos and term agreements up to a year in Treasury and agency securities. As Lumpkin notes, the legislation did not resolve whether a repo agreement is a secured lending arrangement or a purchase and sale transaction.²⁴ However, it enabled lenders to liquidate any repo securities in their possession under either interpretation.

Even though only repos backed by Treasury and agency securities benefited from the safe harbors, beginning in the mid-1990s, repo financing was extended to this riskier, non-traditional collateral. As Maclachlan notes, “[r]epo desks at the broker-dealers found that that making repo loans with non-traditional collateral was profitable, and seemed to be low risk. It helped the securitization part of the firm’s business to be able to offer repo financing to buyers.”²⁵ Examples of non-traditional collateral included higher tranches of residential mortgage-backed securities (RMBS). Like repos prior to 1984, the mortgages backing RMBS were also sold pursuant to true sale opinions and divided into tranches according to their credit rating.

²² MARCIA L. STIGUM, *THE REPO AND REVERSE REPO MARKETS* 219 (1989) (quoted in Fiona Maclachlan, *Repurchase Agreements and the Law: How Legislative Changes Fueled the Housing Bubble*, 48 J. ECON. ISSUES 515–522, 517 (2014)).

²³ The Treasury department did not endorse the change to the code, expressing the opinion that the exemption from automatic stay would reduce the incentive of repo lenders to lend only to sound institution. Mark J. Roe, *The Derivatives Market’s Payment Priorities as Financial Crisis Accelerator*, 63 STAN. L. REV. 539–590 (2011) (quoted in Maclachlan, *Repurchase Agreements*, *supra* note 17).

²⁴ Stephen A. Lumpkin, *Repurchase and reverse repurchase agreements*, 73 FED. RES. BANK RICH. ECON. REV. (1987).

²⁵ *Id.* at 517.

The higher tranches tended to be, like repo, overcollateralized, making them, in principle, a safe form of collateral.

In 2000, a court ruling in the bankruptcy of Criimi Mae, a publicly held commercial mortgage real estate investment trust relying on RMBS as collateral in its repo transactions, took market participants by surprise, creating a disturbance in the repo market.²⁶ Against the market's expectations, the court ruled that the repo Criimi Mae was using to finance its assets was equivalent to a secured loan and that the automatic stay should be applied to the collateral.

Almost immediately following the ruling, the industry began to lobby for expansion of the scope of the safe harbors to assets other than Treasury bills. As Maclachlan notes, the principal argument articulated by the industry in favor of the safe harbor was that a vast volume of cash flows is facilitated by repo markets every day. "If the flow is stopped at any point, the whole system could seize up. Managing cash inflows and outflows is challenging in the best circumstances. The position was that if collateral was tied up in bankruptcy proceedings, a systemic crisis could ensue"²⁷ The lobbying was successful. In 2005, Congress enacted the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA), which exempted 'non-traditional collateral' from the automatic stay.²⁸

By allowing RMBS to be used as collateral in a repo, the new safe harbors effectively facilitated the integration of the money and

²⁶ In re Criimi Mae, Inc. Securities Litigation, 94 F. Supp. 2d 652 (D. Md. 2000).

²⁷ Maclachlan, *Repurchase Agreements*, *supra* note 17 at 518.

²⁸ As she further notes, "[i]n contrast to the period twenty years earlier when changes to the bankruptcy code relating to repo collateral were debated, the argument made by market participants for an expansion of the safe harbor from automatic stay went largely unnoticed. For example, in the dissenting and minority views represented in the Report of the Committee of the Judiciary House of Representatives that accompanied BAPCPA, there was no mention of the automatic stay exemptions."

capital markets. Mortgages originated in the capital market could now be packaged, securitized, and be, together with pools of other mortgages, used as collateral in the money market. Indeed, reliance on collateral derived from capital markets became increasingly common in repo transactions. Financial economists Gary Gorton and Andrew Metrick documented the wide variety of assets used as collateral in repo markets in the period immediately before the crisis. These included triple-A-rated RMBS, but also triple-A-rated auto loans and even triple B+ rated corporate securities.²⁹ As the authors note, "the categories themselves show how far the repo market has evolved from simply being a market related to U.S. Treasuries."³⁰

C. Repo safe harbors in the literature

As RMBS was becoming an increasingly popular class of collateral, prices of real estate, which ultimately backed RMBS, started falling. The Real Home Price Index developed by the Nobel-winning economist Robert Shiller shows them falling beginning in 2006. As a result of the falling housing prices, the price of RMBS also began to fall, prompting what Gorton and Metrick called a run on repo, by which they mean margin calls on repo transactions.³¹ The haircut index rose from zero in early 2007 to nearly 50 percent at the peak of the GFC in late 2008. Several classes of assets stopped entirely from being used as collateral during this period, an unprecedented event equivalent to a haircut of 100 percent.

The central role of the run on repo in the GFC prompted scholars in finance and law to examine the economic effects of the safe harbors. Gorton and Metrick weighed the various economic benefits of the safe harbors, such as their role in creating a money-like instrument, against their role in integrating the money and capital

²⁹ GARY B GORTON & ANDREW METRICK, *Securitized Banking and the Run on Repo*, Nat'l Bureau Econ. Res., Working Paper 15223 (2009), Panel D, available at <http://www.nber.org/papers/w15223> (last visited Apr 27, 2020).

³⁰ *Id.* p. 17.

³¹ *Id.*

markets.³² They proposed that regulators use access to this safe harbor as the lever to enforce minimum repo haircuts and control leverage. More specifically, they argued that regulations should distinguish between repos entered by banks and other institutions. The first type would capture the monetary function of repo and include “eligible” collateral consisting of U.S. Treasury securities, liabilities of certain types of regulated financial institutions, and such other asset classes as the regulator deem appropriate. The second type would be regulated as to be more expensive than the first type because it would entail minimum haircuts. The extent of use of the second type would also be limited.

Financial economist Darell Duffie and bankruptcy law scholar David Skeel also analyzed the benefits and costs of the safe harbors.³³ On the costs side, they noted (1) lowering the incentives of counterparties to monitor the firm; (2) increasing the ability of, or incentive for, the firm to become too big to fail, with the attendant moral hazard of relying on bailouts; (3) inefficient substitution away from more traditional forms of financing; (4) increasing the market impact of collateral fire sales; and (5) lowering the incentives of a distressed firm to file for bankruptcy in a timely manner.

On the benefits side, (1) reduction of the incentives of repo and derivatives counterparties to “run” as soon as the debtor’s financial condition is suspect, accelerating a default or even causing a self-fulfilling expectation of default that need not otherwise occur; (2) increase in the ability of a firm to rely on critical hedge; (3) reduction of the risk of costly delivery gridlocks in securities markets that could otherwise occur at the failure of one or more systemically important financial institutions.

³² Gary Gorton & Andrew Metrick, “Regulating the Shadow Banking System,” *in* REGULATING THE SHADOW BANKING SYSTEM (WITH COMMENTS AND DISCUSSION) 261–312 (GARY GORTON ET AL. EDS., 2010).

³³ Darrell Duffie & David A. Skeel, “A Dialogue on the Costs and Benefits of Automatic Stays for Derivatives and Repurchase Agreements,” *in* BANKRUPTCY NOT BAILOUT (KENNETH E. SCOTT & JOHN B. TAYLOR EDS., 2012).

Duffie, the economist, and Skeel, the bankruptcy law scholar, gave somewhat different weights to the costs and benefits. Still, they agreed that the treatment of repos turns on the distinction between repos that are collateralized by highly ‘liquid’ securities, on the one hand, and repos that are collateralized by less ‘liquid’ kinds of assets. That is because the more liquid is the market for a class of securities, the greater is the expected efficiency gain of that market’s continued reliance for liquidity on repo and securities lending safe harbors, and the lower is the likely benefit to failing debtors of a potential stay on repos backed by that class of securities.

Legal scholars Edward Morrison, Mark Roe, and Judge Sontchi of the SDNY also considered the impact of safe harbors on ‘liquidity.’³⁴ First, they say that the safe harbors “move liquidity around” towards unstable short-term funding. Second, they recognize that the argument assumes that the safe harbors merely “move” liquidity around, favoring some markets (repos) and not others (longer-term financing). The net “liquidity effect” of the safe harbors might not be zero. The safe harbors could have a net positive effect, increasing liquidity overall and lowering the cost of capital of institutions that rely on repo financing.

Their reform proposal revolves around "rolling back" the safe harbors for repos other than for repo transactions, in which safe assets are used as collateral. They argue that bankruptcy law should not be used to regulate financial markets.³⁵

The extensive debate about safe harbors prompted the interest of policymakers, but it has not led to changes in policy. Economists at the Federal Reserve Bank of New York observed that the adoption of those proposals would result in regulatory arbitrage, which would be difficult to monitor.³⁶ The Financial Stability Board noted that

³⁴ Edward R Morrison, Mark J Roe & Christopher S Sontchi, *Rolling Back the Repo Safe Harbors*, 69 BUS. LAW. 34 (2014).

³⁵ Id. at 1017.

³⁶ Victoria Baklanova, Adam Copeland & Rebecca Mccaughrin, *Reference*

"changes to bankruptcy law treatment [or repos]. . . may be viable theoretical options but should not be prioritized for further work at this stage due to significant difficulties in implementation."³⁷

D. Repo safe harbors and macroeconomics

There are many similarities between the policy proposals put forward by economists and lawyers. The most salient, evident in their specific regulatory prescriptions, is their implicit adherence to a macroeconomic theory of Milton Friedman, sometimes referred to as monetarism.³⁸ In the 1960s and 1970s, Friedman famously argued for a *quantitative* limit on the amount of money, specifically reserves as the most effective tool of implementation of monetary policy.³⁹ Today, money exists in other than reserve forms, such as repo, making the quantity of money much greater and more challenging to control for the Federal Reserve. The scholars referred to above call for a *qualitative* limit on the types of money, or rather US-dollar denominated money claims that can be made in the economy, with the view to restore the ability of the Federal Reserve to exercise control over money.

Guide to U.S. Repo and Securities Lending Markets 40 (2015), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr740.pdf (last visited Mar 25, 2020).

³⁷ Financial Stability Board, *Strengthening Oversight and Regulation of Shadow Banking-Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos* 18 (2013), https://www.fsb.org/wp-content/uploads/r_130829b.pdf (last visited Aug 15, 2019).

³⁸ Friedman famously argued that the quantity of money in circulation is the most important driver of the economic cycle. See generally MILTON FRIEDMAN & ANNA SCHWARTZ, *MONETARY STATISTICS OF THE UNITED STATES: ESTIMATES, SOURCES, METHODS* (1970).

³⁹ Friedman proposed a fixed monetary rule, called Friedman's k-percent rule, where the money supply would be automatically increased by a fixed percentage per year. Under this rule, there would be no leeway for the central reserve bank, as money supply increases could be determined "by a computer", and business could anticipate all money supply changes. With other monetarists he believed that the active manipulation of the money supply or its growth rate is more likely to destabilize than stabilize the economy.

In his 2016 book, *The Money Problem*, Morgan Ricks also makes that argument.⁴⁰ At the core of his criticism of the current institutional design of the monetary system is a recognition that the short-term debt, such as repo, performs the function of cash equivalents in the form of deposits. Nevertheless, Ricks observes,

[i]ssuing deposits (the predominant medium of exchange) is a privileged activity. You need a special charter to do it, and chartered entities are surrounded by an elaborate institutional apparatus. Issuing cash equivalents, by contrast, is not a legal privilege but a legal right. Cash equivalents have no legal-institutional status as such; their issuance is a matter of property and contract.⁴¹

Ricks suggests no respectable policy rationale exists for the stark institutional dichotomy between deposits and (non-deposit) cash equivalents and argues that the issuance of the latter, including repo, should be the exclusive legal privilege of chartered banks.

He supplements his argument with an extensive discussion of the history of the money market. Gorton and Metrick do that too, which show just how old is the debate about the institutional design of the monetary system and its relationship with the financial system. Even in neoclassical macroeconomics, against which Friedman formulated his theoretical position, there exists a well-known trade-off between stability and efficiency. The separation of the money and capital markets is at the very heart of that trade-off. As the neoclassical macroeconomist, Thomas Sargent, noted, historically, it has been difficult for American policymakers to agree about how to draw those lines.⁴²

⁴⁰ MORGAN RICKS, *THE MONEY PROBLEM* (2016).

⁴¹ *Id.* at 32.

⁴² Thomas J. Sargent, *Where to Draw Lines: Stability Versus Efficiency: Stability versus efficiency*, 78 *ECONOMICA* 197–214 (2011). (“The names of the liabilities (bank notes and bills of exchange in the 18th century, bank notes and

Sometime in the 1980s, as discussed in Part I(C) of this article, policymakers in the U.S. concluded under considerable influence of the private sector that the balance should be tipped towards efficiency. As a result, money and capital markets in the U.S. became integrated. Securitization and repos were all manifestations of that process of integration of money and capital markets. Repos increased the money supply, and volatile RMBS was used as collateral. The financial nearly collapsed as a result.

It is easy to understand why, in the wake of the GFC, legal scholars were focused on restoring stability. Through their proposal, they essentially advocated a return to a period when money markets and capital markets were separated—effectively the period before the 1980s. If regulatory frameworks for capital and money markets remain fragmented, such structural solutions may be appropriate. However, they need not be fragmented if policymakers share a common conceptual and analytical framework as well as a policy goal.

My goal in this article is to contribute to the debate on the proper scope of safe harbors by departing from the rigid monetarist framework in favor of a more flexible one, emphasizing the role of the safe harbors in a general framework for liquidity regulation. Monetary policy is a crucial component of that framework, but the extant literature has failed to identify the link between the safe harbors and monetary policy.

deposits in the 19th and 20th centuries, claims on money market mutual funds and maybe even credit default derivatives in the 21st century), and the names of the assets (self-liquidating commercial loans in the 18th and 19th centuries, sovereign debt in the 20th, and mortgage backed securities in the 21st century) have changed, but the underlying theoretical issues endure. What kinds of assets should financial intermediaries be permitted to hold, and what kinds of liabilities should they issue? Regulating banks' portfolios can foster a stable price level and stable monetary (narrow) aggregates, but at the cost of creating rate-of-return wedges (i.e., situations in which different people face different rates of return on assets carrying the same risks). These rate-of-return wedges open incentives for evasion and impose costs in terms of economic efficiency." *Id.* at 5).

For example, despite linking safe harbors to liquidity, Morrison, Roe, and Sontchi fail to consider the crucial role of monetary policy in determining liquidity. The massive influx of liquidity into the RMBS asset class came on the back of the expansionary monetary policy of the early 2000s. That policy shifted to a contractionary mode in 2005, as illustrated in Figure 2, in response to concerns about the housing market, which is also when prices started falling. Is it plausible to suggest that the safe harbors exacerbated the intended effects of expansionary monetary policy of the early 2000s?

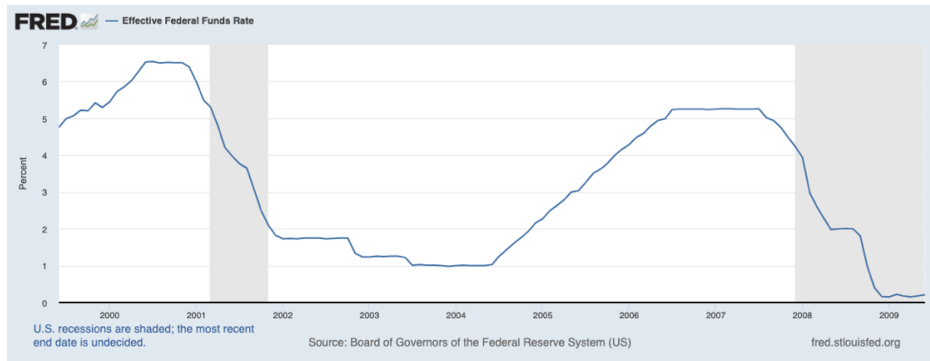


Figure 2 Federal funds rate (1998-2010)

E. Repo safe harbors and macro-finance

The effective transmission of monetary policy depends on the policymakers' ability to regulate liquidity in the financial system. As noted earlier, in the U.S., the Board seeks to regulate the availability of liquidity in the financial system by setting the price of money and certain money-like instruments, such as repo. Tobias Adrian and Hyun Song Shin even define liquidity as the rate of growth of repo. They also analyzed how monetary policy affects overall liquidity conditions.⁴³ When monetary policy is “loose” relative to macroeconomic fundamentals, financial institutions expand their balance sheets through collateralized borrowing; as a consequence, the supply of liquidity increases. Conversely, when monetary policy is

⁴³ Adrian and Shin, *supra* note 8.

“tight,” institutions shrink their balance sheets, reducing the stock of repos and the overall supply of liquidity.

What is the implication of this finding for our understanding of the economic effects of the safe harbors? Recall that Morrison, Roe, and Sontchi's main concerns were that the safe harbors (i) move liquidity around towards unstable short-term funding and (ii) possibly could have a net positive effect, increasing liquidity overall and lowering the cost of capital of institutions that rely on repo financing. From a macro-financial standpoint, those concerns are more justified during a period of expansionary monetary policy when the repo safe harbors could exacerbate the effects of expansionary monetary policy by overincentivizing creditors to lend.

Consider a stylized description of the operation of the money market and its impact on the capital market during a period of expansionary monetary policy presented by Perry Mehrling, another leading figure of macro-finance.⁴⁴ During a period of monetary expansion, the Federal Reserve seeks to decrease the federal funds rate through its operations in the Treasury repo markets. The Federal Reserve starts offering reserves to primary dealers in the repo markets in exchange for (Treasury) collateral. In the absence of restrictions on the use of reserves acquired through the repo operations, dealers start buying or, more commonly, funding (through repos) financial assets originating in capital markets, such as corporate bonds, loans, and RMBS. The price of those assets increases immediately. There may be an impact on the greater availability of credit, but that comes later when investment bankers start underwriting new debt for their corporate clients, and commercial bankers start underwriting loans for households.

When the price of those assets goes up, the yields on those assets go down. By anticipating the demand for those assets, including their demand as collateral, their sellers, or providers, such as investment

⁴⁴ PERRY MEHRLING, *THE NEW LOMBARD STREET* (2010).

banks, will offer lower yields when underwriting bonds, loans, or RMBS for their clients. One of the crucial and often overlooked impacts of expansionary monetary policy is on draining the system of valuable collateral, particularly Treasuries. The gap left by the open market operations is a problem because the Fed is not the only source of the money supply. Dealers also engage in repo operations with each other, as discussed earlier. In the absence of Treasury collateral, other types of assets, such as RMBS will have to fill the gap. Furthermore, the underwriters of those assets, particularly investment banks, will be incentivized to create more of them because of the increase in demand and rising asset prices. Figure 3 below represents a simplified scheme of the relationship between money markets and capital markets.

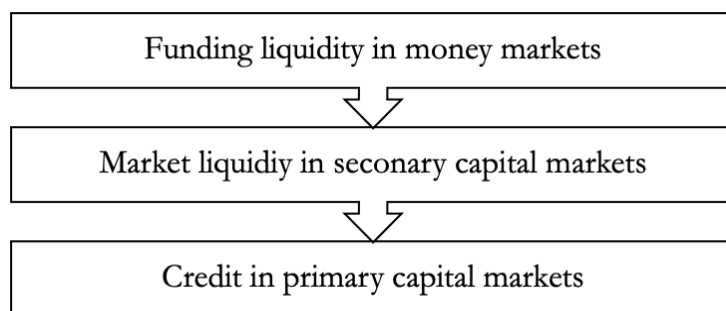


Figure 3 Money market funding of capital market lending

What (if anything) does the above ‘top-to-bottom’ description of the impact of expansionary monetary policy on liquidity tell us about the economic effects of the safe harbors? It does not undermine the claim that the safe harbors can have a net positive effect, increasing liquidity overall and lowering the cost of capital of institutions. But it does suggest that the effect could be much more pronounced during a period of expansionary monetary policy. In the years leading up to the GFC, the safe harbors facilitated a large influx of liquidity to mortgage markets *on the back of* expansionary monetary policy.⁴⁵

⁴⁵ Compare Maclachlan, *supra* note 18 (“The Fed’s low interest rate policy in the early 2000s created an incentive for money market funds to venture into riskier

That influx was supported by government policies promoting home ownership. More liquid mortgage markets were necessary for the successful achievement of those policies' objectives.

Because that liquidity remained inadequately managed throughout the financial system, it flooded it in the mid-2000s contributing to the creation of a mortgage credit boom, an asset bubble in residential real estate, and making the money market vulnerable to violent disruptions by way of a liquidity crisis. The GFC was, at its core, a liquidity crisis. As a consequence of falling asset prices, particularly RMBS prices, dealers could not make markets in those assets and banks did not have sufficient capital.

On the theoretical side, the GFC proved to be a catalyst for research in liquidity. While liquidity has been the subject matter of economic literature, including one of the central themes of the influential work of John Maynard Keynes on the verge of WWII, the focus that work was mainly on liquidity of assets and its determinants. The GFC has prompted a resurgence of interest in liquidity and a shift in focus from liquidity of assets, or *market liquidity*, to liquidity of institutions, or *funding liquidity*.⁴⁶

In the discussion that follows, I review the classical and more contemporary conceptual accounts of market and funding liquidity,

repo, as a means of generating enough revenue to cover their operating costs. Still another factor responsible for the growing use of nontraditional collateral was the shortage of traditional collateral that was emerging as a result of the demand for it in derivatives transactions and in payments systems." *Id.* at 517-18). Compare also Kandarp Srinivasan, *The Securitization Flash Flood* (2019), <https://papers.ssrn.com/abstract=2814717> (last visited Sep 29, 2020) (showing that demand for safe collateral in repo markets made it attractive for financial institutions to issue securitized products. Using the 2005 BAPCPA as a natural experiment that shocked the demand for collateral in repo markets, it establishes collateralized borrowing in short-term debt markets as a contributing factor to the rise of mortgage securitization.)

⁴⁶ Markus K. Brunnermeier & Lasse Heje Pedersen, *Market Liquidity and Funding Liquidity*, 22 REV. FIN. STUD. 2201-2238 (2009).

their importance and drivers. To my knowledge, my review of the literature is one of the most comprehensive reviews of the literature on liquidity, in general, not just in legal scholarship. A law review article may seem like an odd choice for such a review. Still, a comprehensive review of the economic understandings of liquidity is necessary to foster conceptual clarity in the use of the term 'liquidity' by legal scholars. It will also point to the theoretical frameworks that are most relevant for our understanding of how the law affects liquidity, and through liquidity, monetary policy.

II. LAW, MARKET LIQUIDITY, AND MONETARY POLICY

A. *Standard conceptions of market liquidity*

The standard definition of market liquidity comes from the macroeconomists Keynes whose *Treatise on Money* published in 1931 contains the famous definition of an asset more liquid than another if it is "more certainly realizable at short notice without loss."⁴⁷ In his 1962 Presidential Address to the Royal Economic Society, John Hicks offers several interpretations of Keynes' definition of liquidity.⁴⁸ The first, which he flatly rejects, focuses on the 'without loss' element of the definition. Under this interpretation, the liquidity of an asset can be determined by looking at the difference between the price of the asset reflected on the books of the seller and the market price of the asset. Book entries are updated periodically, so there would be nothing illiquid about an asset that sold at a discount to a price at which it has been entered in the book several months prior. It could be that the valuation of the asset has changed during that period without the asset's liquidity being impacted.

The second interpretation of Keynes' definition of liquidity put forward by Keynes revolves around as 'marketability' or 'tradability'. Hicks defines a security as marketable if it is sold just as well after negotiation, search and advertising as it is without it. That is, we

⁴⁷ 2 JOHN MAYNARD KEYNES, *TREATISE ON MONEY* 67 (1931).

⁴⁸ J. R. Hicks, *Liquidity*, 72 *ECON. J.* 787–802 (1962).

can compare the liquidity of two assets by the relative sacrifice one makes from a rapid sale. "An asset may be 'realizable at short notice without loss' in the sense that the price at which it is realizable at short notice is much the same as that at which it is realizable at longer notice."⁴⁹ For example, consider an asset that the seller carries on its book for \$100 even though the only counterparty interested in the asset is willing to pay \$90 for it. If the counterparty is willing to pay \$90 today as well as in a week, that would suggest that the asset is liquid. Hicks claims this interpretation is "more appealing" but still not what Keynes meant.

Third, he understands Keynes's definition of liquidity to require perfect marketability. Here in distinguishing a more and less liquid asset the focus is on the "more certainly" realizable aspect of Keynes' definition. Hicks suggests that, among marketable financial assets, we can regard them as more or less liquid by using a utility function to manage the trade-offs between maximizing the desirable odd moments (e.g., positive mean and skew) and minimizing undesirable even moments (e.g., variance) of asset returns. We can see clearly that this last interpretation has been informed by the emerging literature on financial economics, and in particular the work of Harry Markowitz on portfolio selection.⁵⁰

Elements of the early view of Keynesian liquidity can be identified in the later literature on market liquidity in financial economics. The work of Hirshleifer is a good example of the literature emphasizing minimal loss as a crucial feature of a liquid asset.⁵¹ In Hirshleifer's account, investors in debt instruments apply a discount to the purchase price, which is a function of the period to maturity of the asset. For example, a corporate bond has a maturity period, which can range from anything from 1 to 10 years or even beyond.

⁴⁹ *Id.* at 790.

⁵⁰ Harry Markowitz, *Portfolio Selection*, 7 J. FIN. 77–91 (1952).

⁵¹ Jack Hirshleifer, "Liquidity, Uncertainty and the Accumulation of Information," in *UNCERTAINTY AND EXPECTATIONS IN ECONOMICS: ESSAYS IN HONOUR OF G. L. S. SHACKLE* (1972).

The maturity period, in principle, guarantees a certain rate of return over the life of the bond reflected in the interest coupon payable periodically to the investors. For example, a 10-year bond paying a 5% coupon will yield 5% annually for 10 years. After the expiry of the 10 years, or at the bond's maturity date, the bond's principal will be payable too.

If the investor holding the bond wanted to sell it before its maturity, for example, in year two or three, the prospective purchasers of the bonds would likely apply a discount to the price reflecting the risk that the rate of return over the life of the bond will be lower than expected, for example, as a result of a default of the issuer. Under this conception, shorter-term bonds, or bonds closer to maturity, would be more liquid than longer-term bonds or bonds further away from maturity.

Lippman and McCall focus on the marketability aspect of Keynes' definition.⁵² They define liquidity as "the optimal expected time to transform the asset into money." From that point of view, the critical dimension of the environment in which the liquidity of an asset is being measured is search costs. The search costs, a species of transaction costs, determine the asset's liquidity. Stocks would be more liquid than bonds, with sell time closer to 0, largely because of the efficiency of the centralized microstructure of stock markets. Bonds, as well as repos, typically trade in a decentralized microstructure, where parties interact with each other directly rather than through a centralized intermediary, such as an exchange. Search costs tend to be higher in such market and we could expect the liquidity of instruments trading in such markets to also be lower.

The third conception of liquidity involves the uncertainty of an asset's value. Proponents of this definition argue that it is of little importance to sell an asset on short notice and with a small loss if the asset itself is worth little when one needs it. In that sense, liquid

⁵² Steven A. Lippman & John J. McCall, *An Operational Measure of Liquidity*, 76 AM. ECON. REV. 43-55 (1986).

assets are more effective in moving income through time. Holmström and Tirole explore this meaning of liquidity and distinguish between assets (such as stocks) that are generally correlated with the market, and therefore may experience dilution and assets (such as government bonds), which are generally negatively correlated with market risk.⁵³ These safe assets are the ultimate liquid assets. In their later work, they develop a liquidity asset pricing model revolving around perfect marketability.⁵⁴ Such instruments are sometimes referred to as information insensitive.⁵⁵

B. Why market liquidity matters?

In standard financial economics, liquidity matters because it helps eliminate risks associated with holding an asset. As noted by Levine, the standard link between liquidity and economic development arises because some high-return projects require a long-run commitment of capital, but savers do not like to relinquish control of their savings for long periods.⁵⁶ Thus, if the financial system does not augment the liquidity of long-term investments, less investment is likely to occur in high-return projects. Indeed, Hicks argues that the products manufactured during the first decades of the Industrial Revolution had been invented much earlier.⁵⁷ Instead, the critical innovation that ignited growth in the 18th century England was capital market liquidity. With liquid capital markets, savers can hold liquid assets -- like equity, bonds, or demand deposits -- that they can quickly and easily sell if they seek access to their savings. Simultaneously, capital

⁵³ Bengt Holmstrom & Jean Tirole, *Private and Public Supply of Liquidity*, 106 J. POLIT. ECON. 1–40 (1998).

⁵⁴ BENGT HOLMSTRÖM & JEAN TIROLE, *INSIDE AND OUTSIDE LIQUIDITY* (2011), <https://direct.mit.edu/books/book/2141/inside-and-outside-liquidity> (last visited Jan 13, 2020).

⁵⁵ Gary Gorton & George Pennacchi, *Financial Intermediaries and Liquidity Creation*, 45 J. FIN. 49–71 (1990).

⁵⁶ Ross Levine, "Chapter 12 Finance and Growth: Theory and Evidence," in *HANDBOOK OF ECONOMIC GROWTH* 865–934 (PHILIPPE AGHION & STEVEN N. DURLAUF EDS., 2005).

⁵⁷ *Id.* (referring to J. R. HICKS, *A THEORY OF ECONOMIC HISTORY* 149 (1969)).

markets transform these liquid financial instruments into long-term capital investments. Thus, the industrial revolution required a financial revolution to make large capital commitments for an extended period.⁵⁸

Market liquidity can also be instrumental to the implementation of governmental policies. In Part I(D), I alluded to the central role of market liquidity in RMBS in the pursuit of housing policies by the U.S. government. The importance of market liquidity in Treasuries is crucial for the implementation of monetary policy. Repo markets have a history as a market, in which dealers effectively resale to the Federal Reserve the Treasuries they are expected to buy on period auctions organized by the U.S. Treasury.⁵⁹ The markets existed to support monetary policy, which also explains why participants traditionally relied on Treasuries as collateral. We can also imagine that market liquidity in the so-called ‘green assets’ will, in the future, be central to the achievement of objectives associated with the mitigation of climate change.

C. What drives market liquidity?

Considering the importance of market liquidity for financial and economic development, we may also want to ask what are the drivers of the availability of liquidity? In the literature discussed above, liquidity is a feature of assets. Each of the above accounts makes the point that some assets may be more liquid than others, but the

⁵⁸ *Id.* (referring to Valerie R. Bencivenga, Bruce D. Smith & Ross M. Starr, *Equity Markets, Transactions Costs, and Capital Accumulation: An Illustration*, 10 WORLD BANK ECON. REV. 241–265 (1996)). More recently, Dari-Mattiacci et al. make a similar claim in the context of the emergence of the Dutch East India Company. Giuseppe Dari-Mattiacci et al., *The Emergence of the Corporate Form*, 33 J L., ECON. & ORG. 193–236 (2017).

⁵⁹ [The New York Fed may take action against any primary dealer that does not comply with the standards set forth in this policy. That action will vary depending upon the type of non-compliance, but may range, for instance, from suspension from any or all operations for a period of time to termination as a primary dealer.]

liquidity of all can be measured in terms of the relative difficulty of transforming them into cash without a significant discount. What would be the obstacles to making that happen?

Information is the principal driver in virtually all the above accounts of market liquidity.⁶⁰ The market liquidity problem is an extension of the information problem or a matter of market efficiency. As Stiglitz puts it, in a thick market with a little divergence of beliefs (a lot of information), agents can sell an asset even at times of market stress.⁶¹ Hence these assets can be considered liquid. But at times of stress, agents have large divergences of beliefs, and hence it will be costlier to convert assets, i.e., they will be less liquid. It follows that those assets are liquid because they are information *sensitive*, which is to say their value depends on information. If information is available, traders will adapt the price, and there will be no obstacles for trading.

What we have said so far would suggest that the primary way in which law could increase market liquidity would be by reducing information, or more generally, transaction costs, including search costs. Under this view, assets trading in more efficient markets should be more liquid. La Porta, Lopez-de-Silanes, and Shleifer showed that regulations and supervisory practices that force accurate information disclosure boost the overall level of stock market

⁶⁰As Hirshleifer notes, "[t]he great advantage of short-term assets, given risk-aversion and an uncertain world, is that they facilitate the utilization of new information about the environment as it becomes available over time." Hirshleifer, *supra* note 52. Lippman's and McCall's emphasis on search costs also covers information. "Illiquid asset is one that can't be sold . . . This can occur when there are informational asymmetries . . . that induce the potential buyers to undervalue the asset." Lippman and McCall, *supra* note 53 at 49.

⁶¹ Joseph E. Stiglitz, *Tapping the Brakes: Are Less Active Markets Safer and Better for the Economy?* (2014), Paper presented at the Federal Reserve Bank of Atlanta 2014 Financial Markets Conference, Atlanta, Georgia, April 15, 2014, <https://www.atlantafed.org/-/media/Documents/news/conferences/2014/-fmc/Stiglitz.pdf> (last visited Aug 13, 2019).

liquidity.⁶² In other words, the law can increase liquidity by reducing information costs.

Does the above claim apply equally to debt markets? Recent theoretical research suggested not because debt is different and its economic properties are only slowly becoming understood.⁶³ Recent empirical research confirms that. For example, in a recent study, economists examined the liquidity effects of a European regulation that requires banks to provide detailed disclosures about the individual loans underlying their RMBS.⁶⁴ They found that the liquidity of treated RMBSs declined by 14% post-regulation. How to explain that?

The results confirm that many investors, mostly money market investors, do not particularly care about information but just want or need to allocate their money safely. They seek debt because debt, particularly overcollateralized debt, can be designed as information-insensitive.⁶⁵ When presented with additional information about such asset, investors decided to withdraw their money altogether, not necessarily because the quality of the asset has deteriorated but because of the cost of processing the additional information about the assets.

RMBS is an information-insensitive asset in a low-information regime, but that is no longer the case in a high-information regime like the one introduced by the new regulation. Information production is costly, and investors may not be willing to always incur that cost, even though various information intermediaries, such as banks and credit rating agencies, can help reduce the cost of

⁶² Rafael La Porta, Florencio Lopez-De-Silanes & Andrei Shleifer, *What Works in Securities Laws?*, 61 J FIN 1–32 (2006).

⁶³ See in particular Bengt Holmstrom, *Understanding the role of debt in the financial system*, 2015 BIS WORKING PAPERS 42 (2015).

⁶⁴ Karthik Balakrishnan, Aytakin Ertan & Yun Lee, *(When) Does Transparency Hurt Liquidity?* (2020), <https://papers.ssrn.com/abstract=3447412> (last visited Jul 16, 2021).

⁶⁵ Gorton and Pennacchi, *supra* note 55.

information production. That said, information production is costly for them too. As Holmstrom notes

People often assume that liquidity requires transparency, but this is a misunderstanding. What is required for liquidity is symmetric information about the payoff of the security that is being traded so that adverse selection does not impair the market. Without symmetric information adverse selection may prevent trade from taking place or in other ways impair the market. Trading in debt that is sufficiently over-collateralized is a cheap way to avoid adverse selection. When both parties know that there is enough collateral, more precise private information about the collateral becomes irrelevant and will not impair liquidity.⁶⁶

These findings suggest an interesting, somewhat counterintuitive dynamic, namely, transparency does not necessarily increase market liquidity of assets secured by collateral, such as repo and RMBS. Instead, transparency in debt markets can contribute to a *decrease* in market liquidity. This is not an argument against improving market infrastructure. On the contrary, it supports the case for better infrastructure. Market liquidity sometimes is not an option even for the safest assets, not even for Treasuries.⁶⁷

For example, in March 2020, we saw a problem with Treasuries market liquidity. As shown in Figure 4 below, bid-ask spreads widened sharply in March, peaking March 13 (ten-and thirty-year)

⁶⁶ Holmstrom, *supra* note 6 at 5.

⁶⁷ Andreas Schrimpf, Hyun Song Shin & Vladyslav Sushko, *Leverage and margin spirals in fixed income markets during the Covid-19 crisis*, BIS BULLETIN 8 (2020) (showing that even though government bonds are safe assets, large holdings by leveraged investors may detract from orderly market functioning and may necessitate interventions by the central bank.).

and March 16 (five-year). Interestingly, as Fleming and Ruela⁶⁸ note, the illiquidity was accompanied by high trading volumes.⁶⁹

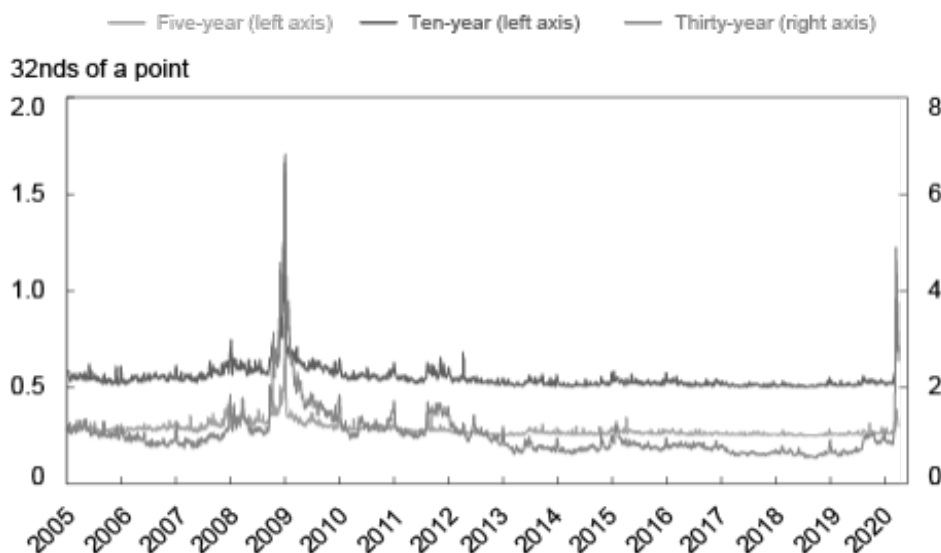


Figure 4 Bid-ask spreads

To address the problem of Treasuries market illiquidity, the Federal Reserve increased its repo operations and conducted large-scale purchases, which serves to show that market liquidity ultimately rests on funding liquidity, and that is sometimes scarce. As captured in the famous adage of Keynes, "[o]f the maxims of orthodox finance none, surely, is more anti-social than the fetish of

⁶⁸ Michael Fleming & Francisco Ruela, *Treasury Market Liquidity during the COVID-19 Crisis -Liberty Street Economics*, FEDERAL RESERVE BANK OF NEW YORK, LIBERTY STREET ECONOMICS (2020), <https://libtystreeteconomics.newyorkfed.org/2020/04/treasury-market-liquidity-during-the-covid-19-crisis.html> (last visited Feb 23, 2021).

⁶⁹ *Id.* ("High trading volume amid high illiquidity is common in the Treasury market, and was also observed during the market turmoil around the near-failure of Long-Term Capital Management and during the GFC. Periods of high uncertainty are associated with high volatility and illiquidity but also high trading demand.")

liquidity, the doctrine that it is a positive virtue on the part of the investment institutions to concentrate their resources upon the holding of 'liquid' securities. It forgets that there is no such thing as liquidity of investment for the community as a whole."⁷⁰

III. LAW, FUNDING LIQUIDITY, AND MONETARY POLICY

A. *Standard conceptions of funding liquidity*

Market liquidity ultimately rests on funding liquidity because banks, and investors, need to get their money from somewhere—it is rare for them to rely on own capital. To my knowledge, the first paper to introduce the concept of funding liquidity was James Pierce's "Commercial Bank Liquidity."⁷¹ Pierce explored the issue of liquidity management by banks focusing on its impact on the availability of credit. What did Pierce understand as funding liquidity (or, as he called it, 'commercial bank liquidity')?

On the funding side, his focus was on demand deposits and loans from the Federal Reserve. He observed that liquidity is an essential determinant in decisions to make loans. In his model, commercial loans are assumed to be illiquid (as they were at that time because banks would originate them and hold them on their balance sheet), and the only other asset that banks can hold consists of 'liquid assets.' The latter serves as a buffer for unexpected deposit withdrawals.

He distinguishes an institutional approach to bank management from a portfolio approach. Under the first one, which has prevailed for a long time, banks prioritized liquidity. By contrast, under the second approach, inspired by developments in theories of portfolio management, which were starting to gain prominence in the 1960s, banks will maximize their profits.

⁷⁰ VII JOHN MAYNARD KEYNES, *THE GENERAL THEORY OF EMPLOYMENT, INTEREST AND MONEY* 155 (1936).

⁷¹ James L. Pierce, *Commercial bank liquidity*, *FEDERAL RESERVE BULLETIN* 1093–1101 (1966).

An increase in the expected return on loans relative to liquid assets encourages banks to shift funds into loans in this approach. Even though this shift of funds reduces the liquidity of the asset portfolio, a bank is willing to accept an increased probability of either unforeseen asset sales or borrowing from its Reserve Bank if it is sufficiently compensated by an increased rate of return on loans.⁷²

He later introduces certificates of deposits (CDs)—an instrument akin to commercial paper used to borrow on a short term by firms—as an alternative source of funding liquidity. Pierce argues that "the ability of banks to market their liabilities induces them to desire a higher loan-to-deposit ratio for every value of the terms on new loans."⁷³ This leads him to conclude that "when endogenous liabilities are introduced, asset liquidity loses much of its crucial importance. Markets for CD's and other endogenous liabilities bear part of the burden of adjustment to exogenous deposit losses."⁷⁴ [The paper by Pierce is perhaps the first to suggest that funding liquidity can effectively act as a replacement for market liquidity.]

The focus of the later literature on funding liquidity is on the interbank market, which is the primary source of funding for banks in many contemporary financial systems. This strand of literature has its origins in a 1987 paper by Douglas Gale and S. Bhattacharya.⁷⁵ The focus of their analysis is on liquidity shocks arising because of deposit withdrawals. Because these withdrawals are imperfectly correlated across banks, banks can essentially provide insurance to each other through interbank lending markets.

Indeed, interbank lending markets have become an essential source of funding for banks in the 1980s. Historically, banks have

⁷² *Id.* at 1098.

⁷³ *Id.* at 1100.

⁷⁴ *Id.* at 1101.

⁷⁵ Douglas Gale & S. Bhattacharya, "Preference shocks, liquidity and central bank policy," *in* NEW APPROACHES TO MONETARY ECONOMICS (1987).

borrowed from each other in the federal funds market or the market for bank reserves held at the Federal Reserve. Beginning in the 1960s, the Eurodollar market became an important source of funding for banks as well as corporations and governments.⁷⁶ As they note, banks can also borrow from each other through repos. They find that the Eurodollar and repo markets have replaced the fed funds market as the go-to-market for interbank loans for banks.

Franklin Allen and Douglas Gale develop a more sophisticated account of interbank markets revolving around hedging as a form of financial innovation.⁷⁷ Credit default swaps are a common form of hedging, but banks use other types of swaps, in particular foreign exchange swaps and interest rate swaps. The use of these instruments has transformed the role of banks in the U.S.⁷⁸

Financial intermediaries use markets to hedge themselves against liquidity shocks. They can only do that efficiently if markets are complete, i.e., provide a hedge for all possible types of liquidity shocks. Allen and Gale argue that while markets can provide insurance against liquidity shocks that are imperfectly correlated across banks, they cannot provide insurance against perfectly correlated aggregate liquidity shocks. Market incompleteness could give rise to financial intermediaries resorting to (fire) asset sales.⁷⁹

Allen, Carletti, and Gale analyze how the central bank should intervene to complete markets and effectively restore efficiency.⁸⁰ Using open market operations to fix the short-term interest rate, the

⁷⁶ Selva Demiralp, Brian Preslopsky & William C. Whitesell, *Overnight interbank loan markets* (2004), <https://econpapers.repec.org/paper/fipfedgfe/2004-29.htm> (last visited Apr 2, 2020).

⁷⁷ Franklin Allen & Douglas Gale, *Financial Intermediaries and Markets*, 72 *ECONOMETRICA* 1023–1061 (2004).

⁷⁸ Franklin Allen & Anthony M Santomero, *What do financial intermediaries do?*, 25 *J. BANKING & FIN.* 24 (2001).

⁷⁹ Jean Tirole, *Illiquidity and All Its Friends*, 49 *J. ECON. LIT.* 287–325 (2011).

⁸⁰ Franklin Allen, Elena Carletti & Douglas Gale, *Interbank market liquidity and central bank intervention*, 56 *J. MONETARY ECON.* 639–652 (2009).

central bank can prevent price volatility and implement an efficient solution. These models get further extended by incorporating the provision of liquidity by central banks through the issuance of money.⁸¹ This means that central banks are replacing private banks in repo markets or employing quantitative easing.

B. Why does funding liquidity matter?

Financial institutions manage funding liquidity through the interbank lending market as well as by employing various hedging strategies. The Federal Reserve monitors the availability of funding liquidity in the money market and seeks to address distortions in the availability of liquidity through direct interventions in that market. Its actions are dependent on how [ineffective] the money market is in supplying liquidity.

Most of the time, the market is effective, which allows for the effective transmission of monetary policy and efficient operation of the money and capital markets. When that is the case, we will observe continuous markets at the various prices of money. The distinction between, on the one hand, a repo backed by Treasuries and, on the other, a repo backed by RMBS will appear as merely a quantitative differentiation between the prices of various financial assets even though the two are qualitatively different. As Mehrling notes, this transformation from quality to quantity makes it possible to construct theories of economics and finance that abstract from the hierarchical character of the system (as most do).⁸² These theories have had a considerable impact on legal scholarship, in particular the emergence of the influential literature on Law and Finance.

However, as Mehrling further notes, the hierarchical character remains, and shows itself from time to time, especially when the market makers are not doing their job well, or when they are

⁸¹ Franklin Allen, Elena Carletti & Douglas Gale, *Money, financial stability and efficiency*, 149 J ECON THEORY 100–127 (2014).

⁸² MEHRLING, *supra* note 45.

overwhelmed by the task at hand, such as under the extreme stress of war finance or during periods of a financial crisis . . .

Even in less extreme times, the normal fluctuation of the hierarchy regularly puts strain on market making institutions. In expansion mode, it is an easy business. But a contraction of credit, or steeping of the hierarchy, means an increased qualitative differentiation between credit and money, which is to say between the instruments the market maker holds as assets and the instruments it holds as liabilities.⁸³

Funding liquidity matters because it constitutes the foundation of market liquidity. The monetary and financial systems are closely linked, but that link, or relationship, is hierarchical as described in Part I(E). What the Federal Reserve and dealers do in the money market has direct implications for capital market creditors, but also debtors. Monetary policy is the key driver of funding liquidity, and thereby market liquidity. It can even replace market liquidity altogether, as it has for RMBS during the GFC.

C. What drives funding liquidity?

Monetary policy is the central drive of funding liquidity but the law can affect it too. Following the GFC, influential research by macro-financial economists at the International Monetary Fund (IMF) showed the impact of the rules for collateral rehypothecation or re-use on funding liquidity.⁸⁴ A simple example of a scenario in which collateral is rehypothecated is when a primer broker uses the collateral provided by its client, e.g., a hedge fund, to fund its activity.⁸⁵ The primer broker can use that to obtain its

⁸³ *Id.*

⁸⁴ Manmohan Singh & James Aitken, *The (sizable) Role of Rehypothecation in the Shadow Banking System*, Int'l Monetary Fund, Working Paper No. 10 (2010).

⁸⁵ *Id.* at 3 ("Every Customer Account Agreement or Prime Brokerage Agreement with a prime brokerage client will include blanket consent to this

funding. Note that the dynamic here—the prime broker has money, and the hedge fund has collateral. The hedge fund uses the collateral to obtain money, which it can now invest. The prime broker uses the same collateral also to obtain money. The limits to the size of rehypothecation are primarily practical, not legal.

As Manmohan Singh and James Aitken, the researchers at the IMF, note, this was certainly the case in the U.K. They provide a fascinating account of the differences in rehypothecation rules in the U.K. and the U.S. The fundamental difference is that, in the U.K., an unlimited amount of the customer's assets can be rehypothecated, and there are no customer protection rules. By contrast, in the U.S., Rule 15c3–3 of the Securities Act limits a broker-dealer from using its customer's securities to finance its proprietary activities. Under Regulation T, the broker-dealer may use/rehypothecate an amount up to 140 percent of the customer's debit balance.

Furthermore, the U.S. also has a dedicated investor protection regime for borrowers whose collateral had been rehypothecated. In 1970, the U.S. created the Securities Investor Protection Corporation (SIPC) through the Securities Investor Protection Act. The SIPC had been designed to return funds to investors who have been harmed by a troubled brokerage firm's activities. As they note,

this difference between the United States and the United Kingdom meant that when Lehman Brothers International Europe (LBIE, U.K.) filed for insolvency, there was little statutory protection available to those customers who allowed re-use of their collateral. In the United States, however, SIPA provides for certain procedures that will apply in the event of the insolvency of a broker-dealer.⁸⁶

practice unless stated otherwise. In general, hedge funds pay less for the services of the prime broker if their collateral is allowed to be rehypothecated.").

⁸⁶ *Id.* at 4.

The consequences were striking in the case of Lehman. Lehman's administrators, PricewaterhouseCoopers, confirmed in October 2008 that certain assets provided to LBIE were rehypothecated and no longer held for the customer on a segregated basis. As a result, the client may no longer have a proprietary interest in the assets. LBIE investors (e.g., hedge funds) fell within the general body of unsecured creditors. Consequently, hedge fund assets with LBIE have remained frozen in the U.K., whereas this was not the case in the United States thanks to SIPA. Disentangling hedge fund assets from the broker-dealer/banks' proprietary assets that have been rehypothecated together has been an onerous task in the U.K.⁸⁷

The repeated use of source collateral facilitates system-lubrication but also the build-up of leverage-like collateral chains between banks and asset managers.⁸⁸ As Singh and Pozsar note, the re-use of collateral has implications for the analysis of financial institutions' balance sheets and the measurement of financial and monetary aggregates.⁸⁹ Singh further notes that post-Lehman, two effects have occurred: overall collateral availability has declined, and the intermediation chains have become much shorter.⁹⁰ He notes that this decline in leverage and re-use of collateral may be viewed positively from a financial stability perspective. However, from a monetary policy perspective, the lubrication in the global financial markets is now lower as the velocity of money-type instruments has declined.⁹¹

We could expect the reform proposals of the safe harbors discussed in Part I(D) to have a similar effect on liquidity and the

⁸⁷ *Id.* at 5.

⁸⁸ Manmohan Singh, *Velocity of Pledged Collateral: Analysis and Implications*, Int'l Monetary Fund, Working Paper No. 11 (2011) at 1.

⁸⁹ Singh and Pozsar, *supra* note 20. These items are importantly not covered by traditional accounting concepts and financial analyses nor directly addressed by Basel III at the individual financial institution level.

⁹⁰ Singh, *supra* note 89.

⁹¹ *Id.* at 3.

transmission of monetary policy. The reform proposals revolved around "rolling back" were motivated by the incentives that those protections create for reliance on repo, the net result of which could be the creation of excess liquidity. I argued that effect is likely, but it is more likely during a period of expansionary monetary policy. I made that claim building on the work of Adrian and Shin who analyzed how monetary policy affects overall liquidity conditions. When monetary policy is "loose" relative to macroeconomic fundamentals, financial institutions expand their balance sheets through collateralized borrowing; as a consequence, the supply of liquidity increases. Conversely, when monetary policy is "tight," institutions shrink their balance sheets, reducing the stock of repos and the overall supply of liquidity.

The concerns that the safe harbors (i) move liquidity around towards unstable short-term funding and (ii) possibly could have a net positive effect, increasing liquidity overall and lowering the cost of capital of institutions that rely on repo financing are more justified during a period of expansionary monetary policy. During such a period, repo safe harbours are likely to exacerbate the effects of expansionary monetary policy by incentivizing creditors to oversupply liquidity. Borrowers will be able to borrow money more cheaply, and more of it, when the policy rate is low; but the cost of money will be even lower if repo creditors benefit from the exemptions.

However, those concerns are not as relevant during a period of expansionary monetary policy. On the contrary, such periods are normally characterized by liquidity scarcity, meaning asset prices are also lower, contributing to liquidity spirals. In other words, during such as period there is insufficient liquidity, so policymakers should want liquidity to move towards short-term funding have a net positive effect, increasing liquidity overall and lowering the cost of capital of institutions that rely on repo financing.

Repo safe harbours will have a different impact on liquidity under different monetary policy stances, a claim I refereed to earlier as

LMFT. Central bankers should play a greater role in guiding legal policy makers with respect to the optimal macro-financial design of the rules that have a considerable effect on liquidity, such as the rules on rehypothecation or the safe harbors. That has not been the case so far. For example, concerning rules on rehypothecation, the focus of existing discussions is on the harmonization of rules.⁹² Such harmonization efforts can further exacerbate the effects of monetary policy and distort its transmission globally thereby undermining the productive capacity of the world's economy. The restrictive proposals for the reform of the safe harbors could have a similar effect.

IV. LIQUIDITY REGULATION

The GFC dramatically showcased the need for liquidity regulation. Nevertheless, liquidity regulation has generally lagged other regulatory reforms prompted by the crisis. In a 2014 speech, Daniel Tarullo, a former member of the Board, identified two key reasons why liquidity regulation has fallen behind.⁹³ First, before the GFC, there was little, if any, regulation of liquidity and hence little experience to draw on. Second, liquidity regulation complements and depends on other important financial policies—notably capital regulation, resolution procedures, and lender-of-last-resort practice. As he notes, "work on liquidity regulation has built on reforms in these other areas and occasioned some consideration of the interaction among these various policies."⁹⁴

The central theme of this article is that consideration of the interactions between the different policies that affect liquidity,

⁹² FINANCIAL STABILITY BOARD, *Rehypothecation and collateral reuse* (2017), [https://www.fsb.org/wp-content/uploads/Re-hypothecation-and-collateral-re-use.pdf](https://www.fsb.org/wp-content/uploads/Re-hypothecation-and-collateral-reuse.pdf) (last visited Feb 27, 2020).

⁹³ Daniel K. Tarullo, *Liquidity Regulation*, Speech at the Clearing House 2014 Annual Conference, New York, New York, September 20, 2014, available at <https://www.federalreserve.gov/newsevents/speech/tarullo20141120a%20.htm> (last visited Aug 15, 2019).

⁹⁴ *Id.*

including monetary, prudential, and legal policies, is crucial to effective liquidity regulation. For example, it is apparent that prior to the GFC, banking regulation had procyclical effects, which monetary policy did not account for.⁹⁵ Following the GFC, banking regulations have been adapted to account for changes in the macroeconomic environment. Still, their specific design has in recent years continued to interfere with the transmission of monetary policy, as discussed in more detail below. The effects of the repo safe harbors captured in the LMFT presented in this article further complicate the task of coordination of monetary and prudential policies

Below, I discuss the emerging paradigm of liquidity regulation and its limitations. I argue that while banking regulation is crucial to effective liquidity regulation, it is insufficient under the current institutional setup of the monetary and financial system. Effective liquidity regulation also needs to consider how the current design of the repo safe harbors affects liquidity, and thereby the transmission of monetary policy.

A. *Banking regulation as liquidity regulation*

The focus of the emerging paradigm of liquidity regulation that Tarullo talks about is on banks. In the aftermath of the GFC, banks

⁹⁵ Claudio Borio, Craig Furfine & Philip Lowe, *Procyclicality of the financial system and financial stability: issues and policy options*, Bank of International Settlements, Working Paper No 1 57 (2001)(arguing that risk models relied on by banks allow them to lower capital requirements in moments when the probability of crisis increases). Adrian and Shin showed that during booms, banks increase their liabilities by more than their assets have risen, thus raising their leverage. Adrian and Shin, *supra* note 11. "During troughs, they reduce their liabilities more sharply than their assets have declined, thus lowering their leverage." As they further note, the actions of the investment banks are guided by the banks' models of risk and economic capital dictate active management of their overall value at risk—the risk of loss on banks' asset portfolios—through adjustments of their balance sheets. As Erik Gerding notes, these procyclical effects occurred in the normal operation of those rules. ERIK F. GERDING, LAW, BUBBLES, AND FINANCIAL REGULATION (2016).

have been made subject to stricter capital requirements under the third iteration of the Basel Accords (Basel III).⁹⁶ But Basel III went further. For the first time, it required banks to comply with a liquidity ratio, which dictates that banks hold a certain amount of assets characterized by market liquidity, also referred to as high-quality liquid assets.⁹⁷ It also introduced an element of countercyclicality to banking regulation through the countercyclical capital buffer, which aims to ensure that banking sector capital requirements account for the macro-financial environment in which banks operate.⁹⁸ All the above measures have implications for liquidity, even though it is difficult, at this time, to say what the impact of their adoption was on liquidity.⁹⁹

⁹⁶ By 1988, most large multinational banks were held to the Basel I standard, the first internationally harmonized capital standard developed by the Basel Committee for Banking Supervision at the Bank of International Settlements. Basel I imposed on banks an obligation to maintain a specified level of capital or own funds against certain categories of assets they hold. The capital requirement was risk-weighted in the sense that banks had to hold more capital against riskier assets. Basel I allowed a certain amount of discretion for banks in determining how to evaluate the riskiness of assets. Basel II, published in 2004, allowed for even greater discretion through reliance on increasingly sophisticated internal risk models the banks adopted.

⁹⁷ Bank for International Settlements, Financial Stability Institute, Liquidity Coverage Ratio (LCR)—Executive Summary (2018), available at <https://www.bis.org/fsi/fsisummaries/lcr.htm> (last visited Jul 13, 2021).

⁹⁸ As the Basel Committee noted, "Its primary objective is to use a buffer of capital to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the build-up of system-wide risk. Due to its countercyclical nature, the countercyclical capital buffer regime may also help to lean against the build-up phase of the credit cycle in the first place. In downturns, the regime should help to reduce the risk that the supply of credit will be constrained by regulatory capital requirements that could undermine the performance of the real economy and result in additional credit losses in the banking system." Basel Committee on Banking Supervision, *Countercyclical capital buffer (CCyB)* (2015), available at <https://www.bis.org/bcbs/ccyb/index.htm> (last visited Jan 24, 2020).

⁹⁹ Orderly bank resolution rules that been put in place are also a crucial part of

Basel III also required banks to comply with a leverage ratio designed to prevent banks from incurring too much debt.¹⁰⁰ In 2014, the Federal Reserve, together with the Office of the Comptroller of Currency and the Federal Deposit Insurance Corporation, introduced the leverage ratio requirement of Basel III by way of the SLR. The SLR captures on- and off-balance sheet exposures as well as derivatives and, crucially, repo-style exposures. US global systematically important banks (G-SIBs) are subject to higher minimum ratios. In the US, the SLR for G-SIBs is also higher than in other countries. The leverage ratio is believed to have had a considerable and somewhat unintended effect on liquidity.

Two recent instances of a liquidity crisis are commonly attributed, in part, to the SLR. First, in mid-September 2019, overnight money market rates spiked and exhibited significant volatility amid a large drop in reserves due to the corporate tax date and increases in net Treasury issuance.¹⁰¹ In response to elevated money market rates, especially with the fed funds rate printing at the top of the target range on September 16, the Federal Reserve offered up to \$75 billion against Treasury, agency, and agency MBS collateral. This operation provided \$53 billion in additional reserves and led to an immediate decline in rates. The Federal Reserve continued to offer up to \$75 billion in overnight repo each morning for the rest of that week, with all three operations fully subscribed. With subsequent announcements of further repo operations, overnight rates stabilized over the remainder of the week and federal

the emerging paradigm of liquidity regulation. *See generally* Stephen J. Lubben, *Resolution, Orderly and Otherwise: B of A in OLA Twenty-Fifth Annual Corporate Law Symposium: Implementing Dodd-Frank Wall Street Reform and Consumer Protection Act*, 81 U. CIN. L. REV. 485–520 (2012).

¹⁰⁰ Bank for International Settlements, Financial Stability Institute, Basel III leverage ratio framework - Executive summary (2017), available at https://www.bis.org/fsi/fsisummaries/b3_lrf.htm (last visited Jul 13, 2021).

¹⁰¹ Anbil, Sriya, Alyssa Anderson, and Zeynep Senyuz, "What Happened in Money Markets in September 2019?" FEDS Notes, February 27, 2020, <https://doi.org/10.17016/2380-7172.2527> (last visited Jul 13, 2021).

funds returned to well within the target range.

A more recent liquidity crisis occurred in March 2020, in the early days of the Covid pandemic. Despite a deteriorating economy, the yield on 10-year Treasuries increased by 64 bps from March 9 to 18. As Vissing-Jorgensen notes, this was not due to higher expected inflation or increased default risk for government debt—factors that would ordinarily explain such a move.¹⁰² In response, the Federal Reserve purchased over \$1 trillion of Treasuries in the first quarter of 2020, more than in either the first, second or third quantitative easing program of the Federal Reserve.

Furthermore, in March 2020, the Federal Reserve also temporarily suspended the operation of the SLR by excluding U.S. Treasury securities and deposits at Federal Reserve Banks from the calculation of the rule. The press release from 2020 said,

Liquidity conditions in Treasury markets have deteriorated rapidly, and financial institutions are receiving significant inflows of customer deposits along with increased reserve levels. The regulatory restrictions that accompany this balance sheet growth may constrain the firms' ability to continue to serve as financial intermediaries and to provide credit to households and businesses. The change to the supplementary leverage ratio will mitigate the effects of those restrictions and better enable firms to support the economy.¹⁰³

¹⁰² Annette Vissing-Jorgensen, *What Happened in Money Markets in September 2019?* (2020), available at http://faculty.haas.berkeley.edu/vissing-jorgensen_bonds2020.pdf (last visited Jun 18, 2021).

¹⁰³ Federal Reserve Board, Federal Reserve Board announces temporary change to its supplementary leverage ratio rule to ease strains in the Treasury market resulting from the coronavirus and increase banking organizations' ability to provide credit to households and businesses, April 1, 2020, available at <https://www.federalreserve.gov/newsevents/pressreleases/bcreg20200401a.htm> (last visited July 22, 2021).

In anticipation of the expiry debate of the suspension, a heated debate took place among the proponents of an extension of the suspension and the advocates of putting an end to it. The industry was overwhelmingly in favor of an extension,¹⁰⁴ but many commentators pointed out the self-serving nature of that position.¹⁰⁵ In March 2021, the Federal Reserve announced that it would not extend the suspension.

The liquidity crises of 2019 and 2020 showcased new challenges for the existing bank-centered paradigm of liquidity regulation. Banking regulation has changed considerably following the GFC, in large part, to incentivize financial institutions to manage liquidity more conservatively. Banks started doing just that, but that had the unintended consequences of affecting liquidity and monetary policy transmission.

The Federal Reserve addressed the 2019 liquidity crisis through a significant direct intervention. In March 2020, it adopted the same ad hoc tool, but it also went further by suspending the SLR. Several commentators pointed out that move potentially undermined the capital adequacy of the banking system.¹⁰⁶ In other words, there are good reasons why the SLR should not be used in this way for liquidity regulation.

¹⁰⁴ Francisco Covas and Anna Harrington, Bank Policy Institute, *Regulators Need To Revisit the Calibration of Leverage Ratios*, available at <https://bpi.com/regulators-need-to-revisit-the-calibration-of-leverage-ratios> (last visited July 10, 2021).

¹⁰⁵ See e.g., Jeanna Smialek, *Fed Lets Break for Banks Expire but Opens Door to Future Changes*, THE NEW YORK TIMES, March 19, 2021, <https://www.nytimes.com/2021/03/19/business/economy/federal-reserve-bank-leverage.html> (last visited Jul 23, 2021); Colby Smith & James Politi, *Democratic senators call for tougher capital requirements for US banks*, FINANCIAL TIMES, March 2, 2021, <https://www.ft.com/content/44792b80-c331-44e3-b02c-41a151f4cb6c> (last visited Jul 23, 2021).

¹⁰⁶ James Politi, *Federal Reserve debates tougher regulation to prevent asset bubbles*, FINANCIAL TIMES (2020), <https://www.ft.com/content/5c2b7d15-7e37-475a-8d42-1e8e0a3b8708> (last visited Oct 17, 2020).

More importantly, even those who blamed the SLR for the 2019 and 2020 liquidity crises acknowledge that the SLR was only part of the problem. Some recalibration of the SLR may be warranted. Still, it is implausible to argue that it will be sufficient to manage liquidity on a system-wide basis. The current institutional setup of the money market makes the task of liquidity regulation far more challenging.

B. The collateral supply effect

Carolyn Sissoko is one of the leading figures in macro-financial economics identifying those challenges. She recently put forward a provoking argument on why liquidity regulation is more challenging in the current institutional setup of the money market.¹⁰⁷ In her view, the liquidity crises of 2019 and 2020 demonstrated that liquidity in the money market is now a function of *collateral supply*. Put simply, vanks can only access funding in the money market if they provide adequate collateral. Sissoko identifies three specific problems that dynamic creates for liquidity regulation.

First, a sufficient supply of collateral of sufficient quality is necessary for the expansion of liquidity. Treasuries are the highest quality of collateral available. It would seem that the issuance of more Treasuries would be desirable and increase liquidity. However, as pointed out by Sissoko, government debt issues now affect the money market not just due to the need to settle payment for the debt but also due to the ongoing need to fund the carry of the debt. As she notes, building on the work of Zoltan Pozsar,¹⁰⁸ the leading authority on the money market,

the market for repo loans sees an increase in demand due to the increase in collateral supply, the fact that the supply of reserves and of deposits is unchanged

¹⁰⁷ Carolyn Sissoko, *The Collateral Supply Effect on Central Bank Policy* (2020), <https://papers.ssrn.com/abstract=3545546> (last visited Feb 18, 2021).

¹⁰⁸ Zoltan Pozsar, *Global Money Notes #22: Collateral Supply and o/n Rates* (2019).

implies that this fiscal policy will put pressure on the repo interest rate as the demand for money market loans increases without a corresponding increase in the supply of funds on the money market. In short, fiscal policy can be expected to have a direct effect on quantity and price of the short-term credit available in the repo market – even when the reserve position of the banking system does not change.

There is a clear interaction between fiscal and monetary policy, which cannot be ignored in a framework for liquidity regulation. Large Treasury issuances are likely to draw on funding liquidity and decrease it, as they had in September 2019. The SLR only made the problem worse.

Second, as further noted by Sissoko, because long-term debt is an important component of collateral supply, any significant increase in long-term rates will dramatically affect the value of the aggregate collateral supply, thereby making monetary policy implementation more difficult. Monetary policy is implemented through changes in short-term rates, which affect long-term rates and asset prices. Insofar as those assets are used as collateral, the impact of monetary policy may be much more significant in a collateral-reliant money market because an increase in interest rates on long-term debt will result in a decline in the value of outstanding debt making lenders in the repo market even less inclined to lend. In the extreme, it is doubtful whether the interest rate can still be viewed as a useful tool of monetary policy.

Third, the events of March 2020 provide evidence of structural instability in the repo market. At the core of that instability, is the volatility of the assets used as collateral. While the regulatory reforms put in place following the GFC sought to address that problem and prompted money market participants to rely on Treasuries as collateral more, the events of March 2020 show that even Treasuries are not immune from pressure. In other words, the collateralized money market can put pressure not only on funding, as

in September 2019, but also on market liquidity, as in March 2020.

The problems with the collateral demand/supply dynamics role as the de facto driver of liquidity in the money market identified by Sissoko have not gone unnoticed. Among the proposals for liquidity regulation designed to address these issues arising in a collateral-reliant money market are central counterparty (CCP) for Treasuries, dealer of last resort, and a standing repo facility.

The CCP proposal has been put forward by a leading authority on market microstructure, Darrell Duffie.¹⁰⁹ The proposal is based on the premise that the March 2020 dysfunction is entirely explained by the lack of capacity on dealer balance sheets. As Sissoko notes, CCP does not provide additional balance sheet space but instead allows for more efficient use of existing balance sheet capacity since dealers only need to finance net positions. It is unclear whether the incremental increase in balance sheet capacity that it can make available is commensurate with the balance sheet demands of the repo market in a liquidity spiral.

Second, the dealer of last resort proposal has by now become the conventional mode of dealing with liquidity crises. Since 2008, it has been used repeatedly, most recently in September 2019 and March 2020. Still, as Sissoko notes, the sheer size of the necessary intervention by the Federal Reserve should prompt us to think about reforming market structure because it is tough to predict the repercussions of actions that are so very large. Indeed, we find evidence of such repercussions already. The March 2020 dealer of last resort action directly caused the banks to be undercapitalized and required regulatory relief from their leverage ratio requirements.

¹⁰⁹ Darrell Duffie, *Still the World's Safe Haven? Redesigning the U.S. Treasury Market After the COVID-19 Crisis* (2020), https://www.brookings.edu/wp-content/uploads/2020/05/Duffie-policy-brief_FINAL.pdf. For an earlier proposal driven by different considerations, see Paolo Saguato, *The Liquidity Dilemma and the Repo Market: A Two-Step Policy Option to Address the Regulatory Void*, 22 STAN. J. L. & BUS. (2017).

Third, rather than providing liquidity through a sequence of discretionary open market operations, a standing repo facility would allow banks to sell Treasury bills to the Federal Reserve, with the assurance of subsequent repurchase, in unlimited quantities at an administered rate. David Andolfatto and Jane Ihring developed a proposal outlining the operation of such a facility. They argue that a standing repo facility would enable tight control over short-term interest rates while reducing financial institutions' need for reserves.¹¹⁰ At their October 2019 meeting, the Federal Open Markets Committee discussed such a facility.

The problem with that is that the terms of the repo require the Fed to demand additional collateral if the market price of the Treasuries falls. Just as in March, when such demands caused relative value traders to sell Treasuries, these demands can set off adverse dynamics in the repo market. Unless the proposal is for a different kind of debt contract that is not participating in the procyclical collateral demands associated with a liquidity spiral. Thus, she concludes, far from preventing violent disruptions in the Treasury market, a SRF is likely to make the Fed part of the problem.

Thus, while these proposals address some gaps in the liquidity regulation frameworks revolving around banks, they come with their limitations. More importantly, they do not address the fundamental structural factor that creates the problem in the first place—the distortion the safe harbors created for the transmission of monetary policy. During a period of expansionary monetary policy, the safe harbors will incentivize dealers to lend. However, the supply of Treasuries available in the market could limit their ability to do so, thereby undermining the expansionary policy objectives of the

¹¹⁰ David Andolfatto & Jane Ihrig, *Why the Fed Should Create a Standing Repo Facility*, ON THE ECONOMY (FEDERAL RESERVE BANK OF ST. LOUIS (2019), <https://www.stlouisfed.org/on-the-economy/2019/march/why-fed-create-standing-repo-facility> (last visited May 2, 2020).

government. While this problem can be addressed through the suspension of the SLR, as it has been during the Covid pandemic, that creates its own set of problems.

How to address the structural problem underpinning the operation of our money markets? As noted earlier, Sissoko's preferred policy solution is the removal of the safe harbors and a move towards an unsecured money market.¹¹¹ Her proposal builds on her earlier work, in which she examined the history of the evolution of the money market in Britain.¹¹² She shows that, historically, the British money market relied almost exclusively on unsecured credit. It also relied on several other institutional features, such as guarantees, ensuring that all the parties' incentives were aligned.

The result was a stable money market, which adequately met the capital market's credit requirements because the lender focused on the asset being financed, not on the collateral. In contrast, in contemporary money markets, the lender's focus is on the collateral, which makes the availability of liquidity in the money market procyclical and unstable. She calls for a limitation on capital market investors' ability to fund themselves on a *secured* basis in the money market.

The principal problem with Sissoko's proposals is that their implementation would result in macroeconomic inefficiencies, such as lower aggregate output, that are unlikely to be offset by the macroeconomic benefits derived from greater financial stability. The legally engineered liquidity can flood the economy and make it vulnerable to violent disruptions like it has most spectacularly during

¹¹¹ SISSOKO, *supra* note 108. Her proposal builds on her earlier work, in particular Carolyn Sissoko, *The legal foundations of financial collapse*, 2 J. FIN. & ECON. POL. 5–34 (2010).

¹¹² Carolyn Sissoko, *Shadow Banking: Why Modern Money Markets are Less Stable than 19th c. Money Markets but Shouldn't Be Stabilized by a "Dealer of Last Resort"* (2014), <https://papers.ssrn.com/abstract=2392098> (last visited Feb 29, 2020).

the GFC. But the legal engineering of liquidity also offers the opportunity to leverage legal frameworks to achieve desired monetary and fiscal goals.

C. Liquidity regulation as collateral regulation

I submit that the strength of the rights of repo creditors should be determined in reference to the prevailing policy and repo rate to help regulate aggregate liquidity, which encompasses both funding liquidity in the money market, market liquidity in capital markets, and credit availability in capital markets. Policymakers should make the strength of the rights of repo creditors a function of the time when repo has been issued to ensure that aggregate liquidity supports the transmission of monetary policy.

During a period of expansionary monetary policy, when liquidity is abundant, the rights of repo creditors should be weaker to offset rather than exacerbate the impact of monetary policy on liquidity. In contrast, during a period of expansionary policy characterized by liquidity scarcity, their rights should be stronger to incentivize creditors to continue to supply liquidity. Table 1 below illustrates the overarching principles of the normative framework for liquidity regulation proposed here.

Debt issued under conditions	Strength of creditor rights
Liquidity abundance	Weak
Liquidity scarcity	Strong

Table 1 Countercyclical bankruptcy law

In Figure 5 below, the x-axis represents the strength of repo creditor rights, and the y-axis represents the relative abundance/scarcity of liquidity. Figure 5 shows that the strength of the repo creditor rights of money market creditors is inversely correlated with the levels of liquidity in the financial system. Their rights are weak in a period of liquidity abundance, but their strength

increases as liquidity becomes scarcer.

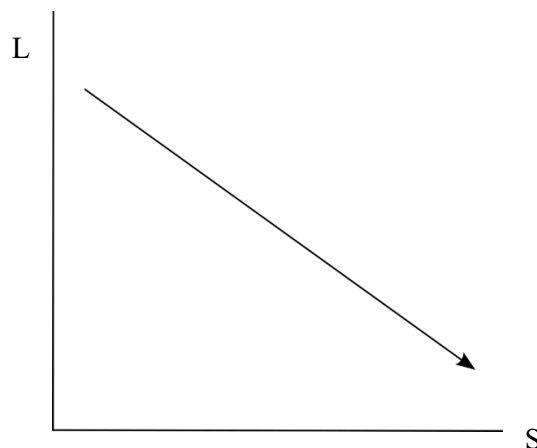


Figure 5 Countercyclical bankruptcy law

How can policymakers identify a period of liquidity abundance? For funding liquidity, either the repo rate or the growth of aggregate liquidity, defined as the growth of repo, can be used as indicators, as suggested in the work of Adrian and Shin.¹¹³ A decrease in funding liquidity should be followed by an increase in the repo creditors' protection. Policymakers should encourage leverage during such time, and that can be achieved by strengthening the rights of repo creditors in the money market with respect to new transactions, but not existing transactions. Existing transactions should be subject to temporary automatic stays, as they have been under the provisions of Title II of the Dodd-Frank Act.¹¹⁴

Furthermore, policymakers should also monitor the bid-ask spreads across various markets, particularly in the Treasuries markets, to identify periods of liquidity scarcity. The bid-ask spread

¹¹³ See *supra* footnote 6.

¹¹⁴ The objective of the imposition of such stays is to prevent the enforcement of contracts during a period of liquidity scarcity from generating financial instability. That risk materialized in the GFC. Katharina Pistor's Legal Theory of Finance captures the destabilizing effects of the law under such conditions. Pistor, *supra* note 15.

is one of the most direct market liquidity measures. A decrease in market liquidity should be followed by an increase in the creditor rights strength.¹¹⁵

D. Safe harbors, true sales and collateral rehypothecation redux

For the design of the safe harbor rules to have the effect described above, the law would have to incorporate a time-varying element or condition. That could be achieved by amending Section 546(e) of the Bankruptcy Code as follows (new text in *bold*):

Notwithstanding sections 544, 545, 547, 548(a)(1)(B), and 548(b) of this title, the trustee may not avoid a transfer made by or to (or for the benefit of) a repo participant or financial participant, in connection with a repurchase agreement entered into at a time *when the [repo rate] rate was in the range of 0%-2%*, and that is made before the commencement of the case, except under section 548(a)(1)(A) of this title.

For example, consider the repo rate from April 2018 to August 2020 in Figure 6 below. During this time, the rate spiked several

¹¹⁵ What about the loss of welfare that could follow from the proposed design? The principal normative benchmark for the paradigm of liquidity regulation proposed here is macroeconomic efficiency. In other words, even if there is some loss of microeconomic efficiency among different groups of creditors, the framework should be designed in a way that will create macroeconomic efficiencies. The social welfare analysis under the framework encompasses the welfare of all agents in the economy, including agents who are nominally outside the debt relationship at issue in bankruptcy. However, we should not dismiss microeconomic considerations even though our focus is on macroeconomic considerations. When bankruptcy law is designed optimally, the creditors who incur a loss of social welfare in one part of the cycle are compensated during the other part. For example, creditors lose out during a credit boom period, but they are compensated during a period of a credit bust. In the long run, social welfare is maintained and even increased if we do not have a crisis. Indeed, the analysis here is in the long run, which distinguishes this analysis from microeconomic ones.

times above 2%, signaling problems with funding liquidity in the money market and, specifically, dealers did not have the balance sheet space. Conceivably, if they did not benefit from the safe harbor before the spikes, they would have more space when the liquidity crunch came, which happened following a large issuance of Treasuries.

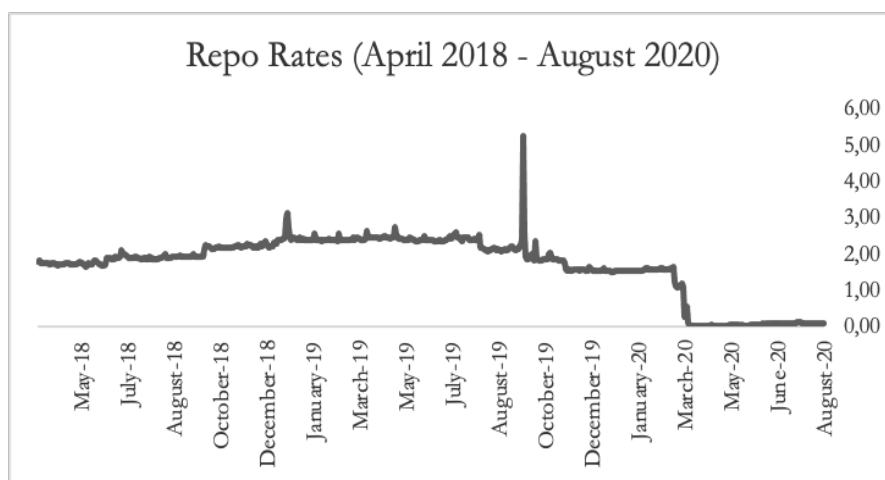


Figure 6 Repo rates. Source: Federal Reserve Bank of New York

The legislative change proposed above would mean that only repo contracts entered into on a date when either 1) the repo rate was higher than 2% or 2) bid-ask spreads widened out sharply in certain asset markets, particularly Treasuries, would benefit from the safe harbor, should one of the counterparties default.¹¹⁶ The idea behind the change would be to encourage market participants to support market liquidity and/or provide funding liquidity without undermining the capital adequacy of the banking system.

¹¹⁶ The adjustment to the strength of the rights of repo creditors would likely result in an increase in the rate in a credit boom reflecting the greater risk faced by repo creditors in the new regime. Thus, the 2% should only be viewed as illustrative and, in practice, the Federal Reserve would have to select a rate or range that would reflect the impact of the new regime on repo rates.

The non-defaulting counterparties of repo contracts entered on a date when 1) the repo rate was lower than 2% and 2) bid-ask spreads were narrow would have to rely on the doctrine of a true sale to enforce their claims outside of bankruptcy. I mentioned earlier that this is what they have historically done, but an adverse interpretation of the provision led to lobbying for safe harbors. In principle, there is nothing that stops financial market participants from arguing that repos are true sales in courts again. Still, some clarification of the scope and function of the doctrine would be helpful. As Hughes notes, the doctrine is confused and unsettled.¹¹⁷ As she further notes, this could be because even if a transaction is deemed a secured loan rather than a true sale, the creditors of a securitization vehicle will still enjoy a first-priority interest in the asset.

However, if creditors have to contend with bankruptcy, their recovery may be delayed and diminished.¹¹⁸ In other words, bankruptcy remoteness is achieved through the doctrine of true sales matters for creditors of securitization vehicles and aggregate liquidity.

The two main doctrinal formulations of true sales in the US are recourse and price. Recourse generally means the extent to which the seller of receivables remains liable for the receivables' performance.¹¹⁹ If the seller remains liable, then the level of recourse is high, and hence the sale is not a *true* sale. By contrast, if there is no recourse, i.e., the purchaser is solely liable for the performance of the receivables, then there is no recourse, and the sale is a true sale.

¹¹⁷ Heather Hughes, *Property and the True-Sale Doctrine*, 19 U. PENN. J. L. & BUS. 57 (2017).

¹¹⁸ Kenneth M. Ayotte & Stav Gaonz, *Asset-Backed Securities: Costs and Benefits of Bankruptcy Remoteness*, 24 REV. FIN. STUDIES (2011).

¹¹⁹ Thomas Plank offers an extensive, if somewhat outdated, discussion of the recourse formulation of the true-sales doctrine. Thomas E. Plank, *The True Sale of Loans and the Role of Recourse*, 14 GEORGE MASON U. L. REV. (1991).

The second doctrinal formulation of a true sale revolves around price. Under this formulation, used by some courts, securitized assets are considered true sales only if the value of the assets provided as collateral in the transaction was *adequate* to the money paid. If it is not, the creditor would be at the risk of losing the benefit of bankruptcy remoteness of those assets, and the securitization transaction would be considered a secured loan.

While the determination of adequate prices is difficult, it could be aided by standardized haircuts set by the Federal Reserve in a countercyclical fashion. Consider the following example of a repo with an asset manager as a cash lender and a dealer as a borrower. Collateral offered by the borrower is a RMBS trading at (market value) 110% of par value. The lender will normally apply some haircut—perhaps will accept it at par value only. The borrower can borrow 100 for 110 worth of collateral. But if the prices are elevated during a period of liquidity abundance, the haircut should be higher to reduce liquidity, e.g., par value 10%. The above hypothetical can be represented graphically as follows:

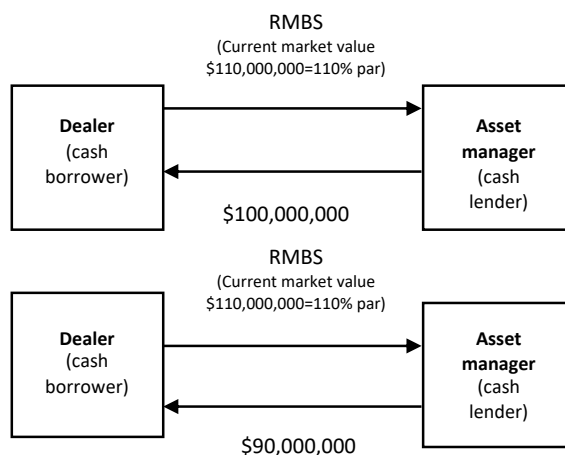


Figure 7 Repo

The question how and why would the Federal Reserve set such

haircuts? The Federal Reserve is already doing this, for example, to determine whether certain assets should be eligible as collateral for certain of its lending facilities, such as the Term Asset-Backed Securities Loan Facility of the Federal Reserve Bank of New York. Conceivably, those haircuts could be used as a guide when determining whether the value of the assets provided as collateral in a repo or securitization transaction was adequate to the money paid and, as a result, whether the repo or securitization should be regarded as a true sale.

E. Some institutional objections

Perhaps the main objection that could be made with respect to the above adaptation of the safe harbors is that it would be difficult to implement as a practical matter. The proposed design would require bankruptcy law to change depending on the prevailing monetary policy stance or other relevant macro-financial conditions. Nevertheless, from a practical standpoint, the challenge of a periodic change of bankruptcy law can be overcome if the new design of bankruptcy law incorporates a set of rules as a form of automatic stabilizers. Admittedly, the design of bankruptcy law as an automatic stabilizer would require some creative legal thinking, but it is surely not an impossible design.

Insofar as countercyclical bankruptcy law incorporates a certain amount of discretion for the agents enforcing it, we would face another problem: the potential unwillingness of certain institutional actors to exercise such discretion. Tarullo recently made that point with respect to the countercyclical capital buffer in banking regulation.¹²⁰ Still, the pandemic has demonstrated that banking regulation can be applied in a countercyclical fashion, as demonstrated by the temporary exemption from the supplementary leverage ratio granted to banks in April 2020.

¹²⁰ Daniel Tarullo, *Time-Varying Measures in Financial Regulation*, 83 L & CONTEMP PROB (2020).

A similar point could be made concerning the role of courts in the normative framework proposed above. While they may not be well equipped to deal with this issue at this time, we can imagine that this could change. After all, the courts adjudicating bankruptcy cases are specialized federal bankruptcy courts, which could easily acquire that kind of expertise. In the past, they incorporated macroeconomic considerations into their reasoning.¹²¹

CONCLUSIONS

Can the law distort the transmission of monetary policy? In this article, I analyzed the macro-financial effects of the repo safe harbors under different monetary policy stances. I distinguished between (1) an expansionary stance when the policy rate is low and liquidity abundant and (2) a contractionary stance when the rate is high and liquidity scarce. I argued that repo safe harbors exacerbate the effects of expansionary monetary policy by incentivizing creditors to oversupply liquidity. However, the safe harbors can also support the effective transmission of contractionary monetary policy by incentivizing creditors to supply liquidity when it is scarcer. In other words, the impact of the safe harbors on the transmission of monetary policy is different under different monetary policy stances. I referred to this claim as the LMFT.

I referred to the claim by that name to distinguish my analysis from a more conventional analysis of the economic effects of the safe harbors on financial development and economic growth in the Law and Finance literature. In that literature, the function of the safe harbors, like the function of all creditor protections, is to reduce agency costs. But that function is analyzed independent from its impact on monetary policy. The cost of borrowing is a function of agency costs, not the policy rate. While that is more (but not entirely) plausible in the case of borrowing in capital market, it is not plausible in the context of borrowing in the money market, the

¹²¹ See e.g., Emily Strauss, *Crisis Construction in Contract Boilerplate*, 82 L. & CONTEMP. PROBS. 31 (2019).

price of which central banks seek to affect directly by participating in those markets.

To capture the economic effects of the safe harbors, we need to rely on macroeconomic, not microeconomic theories. Legal scholars have in the past examined the economic effects of the safe harbors within macroeconomic frameworks. Their analyses were focused on the incentives that those protections create for reliance on repo, the net result of which could be the creation of excess liquidity. They were inspired by the macroeconomic theory of Milton Friedman who, in the 1960s and 1970s, famously promoted a restrictive account of monetary policy, at odds with the current views in macroeconomic theory but also central bank practice.

Instead, in this article, I relied on macro-financial economics, which, in my view, offers a more realistic account of the relationship between liquidity and monetary policy. Where macro-finance has been somewhat deficient was in considering how law can disrupt monetary policy through its impact on liquidity. In this article, I developed an account of the ways in which the law affects liquidity, particularly funding liquidity. More work is needed to validate the LMFT and its policy implications, but the LMFT lays foundations for a new research paradigm at the intersection of law, macroeconomics, and financial economics. I propose to refer to that paradigm as Law and Macro-Finance and make the study of the impact of law on liquidity its central theme.