

ANDREW METRICK

Yale University

DANIEL TARULLO

Harvard University

Congruent Financial Regulation

ABSTRACT After the global financial crisis, bank regulation became more stringent, and as a result the traditional banking system was well capitalized leading into the COVID-19 pandemic. But these same regulatory changes also incentivized a continuing migration of traditional banking activities to nonbank financial institutions (NBFIs), where looser regulation allowed for dangerous buildups of systemic risk. These risks were then realized across many NBFIs and markets in 2020. While legislation to harmonize regulation across these different domains would be desirable, we do not believe it likely in the foreseeable future. In this paper we propose a congruence principle for financial regulation, whereby regulators use existing statutory authority to coordinate rules across economically similar instruments. We provide examples of how such congruence could work for the cases of nonprime mortgage finance and the markets for US Treasury securities.

The prominent role of nonbank financial institutions (NBFIs) in the global money market panic produced by the first COVID-19 lockdown in March 2020 reprised the part they played in the global financial crisis of 2007–2009. Collectively, NBFIs and their associated short-term wholesale funding markets constitute a large and growing component of the global financial system (Financial Stability Board 2020b). But regulation has not kept up with this growth. Howell Jackson (1999) observed more than twenty years ago that the regulatory constraints applicable to financial intermediation are more a function of the classification of the institution within which the intermediation is conducted than its fundamental nature

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and risks. That observation remains apposite today. Indeed, as the two intervening financial disruptions have shown, the consequences of a patchwork regulatory system have become substantially more serious. While more rigorous prudential standards implemented after the global financial crisis made banks a source of stability in the spring of 2020, the vulnerabilities of NBFIs were such that the Federal Reserve felt it had no choice but to use its emergency powers to create an astonishing range of market-supporting measures (Federal Reserve Board 2020a).

The freezing of so many financing markets in March 2020 has revived interest in NBFIs and calls for action across key parts of the official sector (Bank of England 2020; Federal Reserve Board 2020b; Financial Stability Board 2020b; Financial Stability Oversight Council 2020; International Monetary Fund 2020). This renewed attention, while belated in some instances, suggests enough consensus to sustain momentum for a regulatory response. Our argument here is that, to be effective, regulatory initiatives cannot replicate the largely reactive and ad hoc approach to NBFIs activities followed after the global financial crisis. Intermediation activities can quickly migrate in response to regulatory change. The astonishing range of market-supporting measures adopted by the Federal Reserve and other central banks in the first half of 2020 has demonstrated that in very bad states of the world these activities will be supported *ex post*, regardless of whether they have been regulated *ex ante*. Hence the need for a proactive regulatory approach that can, in Jeremy Stein's memorable phrase in a different context, get "in all of the cracks" (Stein 2013).

In this paper we urge a cohesive approach to the macroprudential regulation of NBFIs activities. Specifically, we propose that an overarching congruence principle should inform, and unify, regulatory efforts to address the contribution of NBFIs to systemic risk. Under this principle, the regulation of economically similar activities would be coordinated across agencies, with the goals of minimizing regulatory arbitrage and ensuring that the social costs of systemic risk are internalized by private actors, regardless of their institutional form.

We note at the outset that we are not opining in this paper on the appropriate stringency of financial regulation motivated by financial stability concerns. It is of course the case that the capital regime after the global financial crisis has made banks safer (International Monetary Fund 2018). A full year into the pandemic, large US banks remain well capitalized and, thus far, free of runs or any short-term concerns about solvency. In our view, this experience is a good place to begin in thinking about the degree of resiliency the regulatory system should mandate. But here we address

a different issue. We argue that the regulatory structure is incomplete, and that incompleteness—that *incongruence*—leads to risk shifting and the creation of alternative pathways of financial intermediation that are neither planned nor optimal. The regulatory reform project is unfinished, and that project needs some organizing principles.

Section I lays out the main elements of the congruence principle. In the past, capital and other prudential requirements were justified primarily as microprudential tools, the logic being that the government needed to protect its implicit and explicit insurance position for individual institutions. Under that logic, there was no argument for imposing congruent regulations on nonbank activities, since those institutions were outside of the explicit safety net. But the events of this century have demonstrated the macroprudential value of capital standards. Our proposed principle would be applied through imposing regulation based on the substantive nature of the intermediation. Its application would be limited to regulation motivated by the containment of systemic risk. It calls for regulation to be *congruent*, not necessarily *identical*. This is an important distinction: congruent regulation makes use of economically similar (but not identical) instruments, with regulation coordinated across agencies. We believe that congruence is both more flexible and more achievable than other alternatives.¹

Section II provides two case studies of the role played by important NBFIs in recent events. It explains how the lack of regulatory congruence contributed to both the buildup of risk and market dysfunction during stress. The first case study is the evolution of nonprime mortgage finance in recent decades, a classic example of the disintermediation of banks from their core function of deposit taking and lending. The second case study—Treasury securities—looks at a similar process of bank disintermediation from banks' function as primary dealers of government securities. In both cases, the markets changed over the preceding ten years, such that the pathways for financial intermediation changed radically. Both case studies illustrate how market-driven capital levels were insufficient to reassure markets during the COVID-19 crisis and how a liquidity crisis was quelled only after extraordinary action by the Federal Reserve under its emergency liquidity powers.²

1. Identical rules would be the default under various forms of activity-based regulation. Our proposal for congruent regulation could also be categorized as instrument-based regulation, as in Acharya and Öncü (2012).

2. See Barth and Kahn (2020), Fleming and Ruela (2020), and Haddad, Moreira, and Muir (2020). The notion that liquidity spirals can occur even for instruments with no underlying risk was introduced by Morris and Shin (2008).

Section III provides an example of how the congruence principle could be implemented in what we believe would be a significant first step—an alignment of bank capital requirements with the rules for margining at clearinghouses and haircuts for repo transactions. Our proposed approach to margining shows how similar contributions to systemic risk could be addressed through regulations applicable to all financial intermediaries regardless of legal form, chartering identity, or business model. In this exercise, we take current regulatory structure and statutory authority as fixed. From that starting place, we provide a road map for the regulatory actions that would be necessary to achieve congruence. To execute on this road map, we must meet various legal and institutional challenges. In section IV, we conclude the paper with a few observations on what is at stake. If congruence cannot be achieved under the current configuration of administrative agency authorities, then either we must pass new laws or we must accept that systemically risky NBFIs activities will continue to evolve well ahead of our balkanized regulatory system. A glossary (in the online appendix) provides definitions for key terms and acronyms.

I. A Congruence Principle for Financial Regulation

The congruence principle is a starting point for a regulatory response to the secular trend of financial intermediation migrating outside the banking system. This development has reproduced the same risks of rapid reduction of system-wide liquidity, asset fire sales, and adverse impacts on other intermediaries that motivate macroprudential regulation of banks. Indeed, the very strengthening of bank regulation to contain these risks has increased opportunities for arbitrage (Barth and Kahn 2020; Financial Stability Board 2020a). The absence of an effective regulatory response will reinforce risk-taking tendencies across these markets and potentially erode the franchise value of the regulated institutions whose risk taking has been constrained so as to limit negative externalities and moral hazard.

The congruence principle can be stated simply: forms of financial intermediation posing similar risks to financial stability should be regulated with similar stringency, regardless of legal form, chartering identity, or business model. The amount of systemic risk contributed by nonbank intermediation should be contained to levels reflecting the same balance between shorter-term growth and medium-term financial stability considerations that is implicitly incorporated in prudential regulation of banking organizations.

Our conception of this principle is that it (1) applies only to systemic risk; (2) requires congruent but not necessarily identical modes of regulation;

and (3) operates in an *ex ante*, comprehensive fashion. In this paper we apply the principle only to the discrete, though important, area of lending collateralized with securities. However, we believe congruence would be a useful informing principle in determining appropriate regulatory responses across the range of NBFBI activities, including the form of maturity transformation unaccompanied by risk transformation that is characteristic of money market and other mutual funds.

The focus on systemic risk has two implications for implementing the principle. First, not all nonbank intermediation would be subject to prudential regulation—only those forms that pose enough risk to warrant the costs involved in devising and applying a regulatory framework. Second, congruence measures would be derived only from those elements of prudential banking regulation directed at reducing runs, fire sales, and contagion more generally. Banks are still special in numerous respects. They benefit from federally insured deposit insurance and provide transaction accounts to most households and businesses. The failure of very large banks and the holding companies of which they are part would give rise to financial instability. Thus congruence measures would decidedly not aim to replicate for nonbanks the entire range of bank regulations.

The aim of congruent, but not necessarily identical, regulation arises from the focus on systemic risk, but has somewhat broader implications. For example, we would probably not apply a form of the liquidity coverage ratio (LCR) or similar bank requirements to money market funds (Li and others 2020; COVID-19 Market Impact Working Group 2020). The LCR helps prevent excessive dependence on short-term funding and fire sales, to be sure. But it serves other purposes as well, such as providing breathing space to government authorities deciding how to deal with a highly stressed bank. The COVID-19 crisis confirmed the view of many critics that gates, fees, and maturity limits on assets are inadequate responses to the funding vulnerabilities, and consequent contribution to systemic risk, of money market mutual funds. But other modes of regulation more fitting to the risks of the money fund business model could achieve results congruent to the systemic risk protection afforded by the LCR.

Similarly, in our discussion of congruence for Treasury-backed securities lending later in this paper, we do not propose identical regulatory measures. Capital requirements, margining, and haircuts can all serve the purpose of inhibiting procyclical excesses and ensuring resiliency of financial firms. Yet each is not equally suited to universal application, even for similar risks. Notably, capital regulation is viable only where the market actor engaging in a form of risk-carrying transaction is subject to regulation

on a firm-wide basis. Moreover, the risks associated with, say, a Treasury-backed repo vary with such contextual circumstances as whether the transaction is part of a netting arrangement. In short, while we share the starting point of many other commentators concerned that financial regulation has been based more on form than on function, we doubt that an entirely function-based approach would be feasible.

The congruence principle should operate in an *ex ante*, comprehensive fashion so as to capture evolutions of funding practices, intermediary structures, and other financial innovations before they grow into problems. Following the global financial crisis, regulators generally considered each form of NBF activity in relative isolation. Given the relative ease with which funding can be redeployed to new investment vehicles, this approach almost guarantees that regulators will be several steps behind emerging risks. Implementation of the congruence principle should aim to address maturity and risk transformation in sufficiently broad terms that financial innovations contributing to systemic risk will presumptively be covered. The architects of those innovations would of course be welcome to ask regulators for modifications of regulations tailored to the details of the new form or practice or to argue that no systemic risk is created. But by making the default situation one in which regulation applies, this attribute of the congruence principle would provide a timelier check on regulatory arbitrage and the accretion of systemic risk.

Each of these attributes of the congruence principle will entail both policy judgment and practical hurdles. Judgment will be required in determining, for example, which forms of intermediation contribute materially to systemic risk and whether a congruent but not equivalent form of regulation achieves a roughly equivalent reduction in systemic risk. More generally, it is unrealistic to think that a truly comprehensive framework can be devised and then implemented from the outset. Indeed, our experience in policymaking inclines us to believe that such a complex effort would bog down from its inception and, even if it could be achieved institutionally, would almost surely produce a bevy of unintended, undesirable consequences.

With these reasons for caution in mind, we regard the attributes of the congruence principle as more aspirational than immediately achievable, especially the attribute of comprehensiveness. But the principle is both a good starting point and a good lodestar for building out and regularly adjusting the regulation of systemic risk. We now turn to the two case studies—nonprime mortgage lending and Treasury security markets—and then to a discussion of how congruence could be achieved in these specific markets.

II. Case Studies

II.A. Nonprime Mortgage Lending

In this case study, we look at the evolution of a part of the mortgage lending business, and how regulation influenced that evolution. Our example focuses on the nonprime component of the market, where the loans are ineligible for guarantees from Freddie Mac or Fannie Mae. We consider three methods of intermediation for such mortgages. We follow other authors in ascribing some of the impetus for development of the second method to regulatory arbitrage and believe that the third method can similarly be explained in part as a response to regulation after the global financial crisis.

As shown in figure 1, we begin with the most straightforward method of bank finance, which was dominant until the end of the twentieth century. In this figure—and similar ones to follow—we use ovals to denote players in the intermediation chain, rectangles to denote regulators, number labels on exchanges of cash or securities, and letter labels for regulatory relationships.

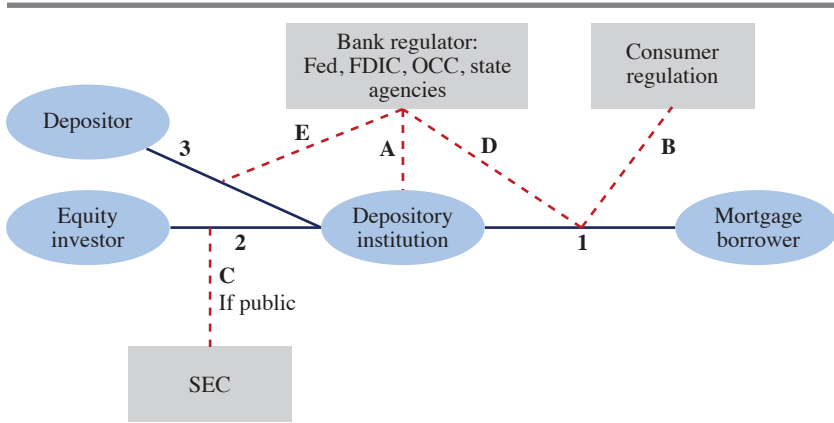
Here, a bank makes mortgage loans (step 1) financed by some combination of equity (step 2) and deposits (step 3). The mortgages then stay on the bank's balance sheet. To regulate this activity, bank regulators set capital requirements as a function of the characteristics of specific mortgages (step A).³ Other regulation would come from the consumer side (step B, both federal and state) and from the Securities and Exchange Commission (SEC; step C) if the bank's equity is publicly traded.⁴ This list of players and regulatory relationships is not intended to be exhaustive; instead, we want to highlight some key features that allow useful comparisons with different ways to perform the same economic function. For our purposes here, the most important regulation is that the bank would be required to fund some part of each mortgage with its own equity, at a ratio that has varied over time but has always been strictly positive for nonprime loans.

Figure 2 illustrates the version of this intermediation that captured so much market share in the years prior to the global financial crisis: private-label securitization funded by highly rated debt securities. Here, we have replaced the bank in the center of the figure with a generically named mortgage company, which is not itself a depository institution. It may be either

3. See 78 Fed. Reg. 62018, 78 Fed. Reg. 55340, 79 Fed. Reg. 20754, and Government Accountability Office (2016).

4. See Dodd-Frank Act Pub. L. No. 111-203, Title X (2010), NY Banking Law § 10 (2012), and Gramm-Leach-Bliley Act, Pub. L. No. 106-102, 113 Stat. 1338, 1385-1407 (1999).

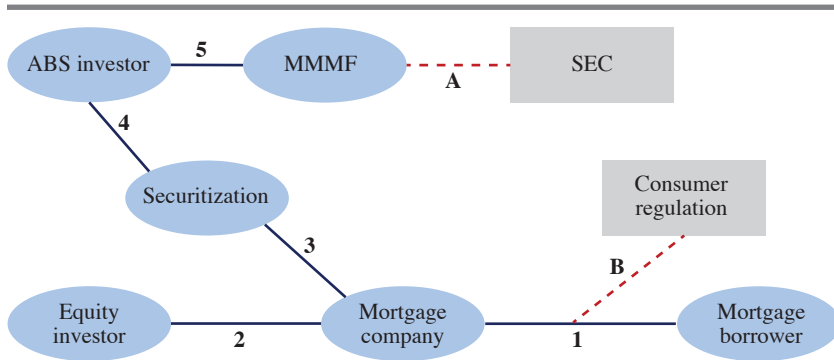
Figure 1. Traditional Mortgage Lending



Source: Authors.

Note: A depository institution originates a mortgage to the borrower in step 1, and this is regulated by a consumer regulatory agency and the appropriate bank regulator (B and D). The depository institution funds the mortgage with a combination of deposits and equity (2 and 3). Other regulation of this mortgage lending process comes from the SEC over the equity investment (C) and the bank regulator (A and E).

Figure 2. Mortgage Lending before the Global Financial Crisis



Source: Authors.

Note: A mortgage company originates the mortgage to the borrower in step 1. This transaction is subject to consumer regulations (B). The mortgage company funds its lending through a combination of equity (2) and the securitization of the mortgage loans (3). These securities are sold to asset-backed securities investors (4) and money market mutual funds (5), which are regulated by the SEC (A).

unrelated to a bank holding company (BHC) or an unconsolidated affiliate not subject to capital regulation. In either case, there are no regulatory capital requirements placed on the funding of the mortgage company. In this form of intermediation the mortgage itself will never sit on the balance sheet of the mortgage company but instead will be transferred to a securitization trust, shown in step 3.⁵ The trust assets are then divided into layers of seniority, with the vast majority being highly rated debt sold to asset-backed security investors in step 4. The securitized bonds received by those investors have an average maturity similar to the mortgages that underlie them, but these investors often perform their own maturity transformation by issuing short-term debt to money market mutual funds (MMMFs) in step 5. Overall, figure 2 represents the intermediation chain that grew rapidly before the global financial crisis and crashed terribly as that crisis began. All along this chain, the only capital requirements are those imposed by the market: the borrowers in step 1 might make only a minimal (or zero) down payment, the mortgage company is not subject to any capital regulation, and in practice the securitization trust will need to satisfy only the rating agencies. Figure 3 shows the rise and fall of several of these links in the chain: private-label securitization, asset-backed commercial paper, and MMMFs (both prime and government).

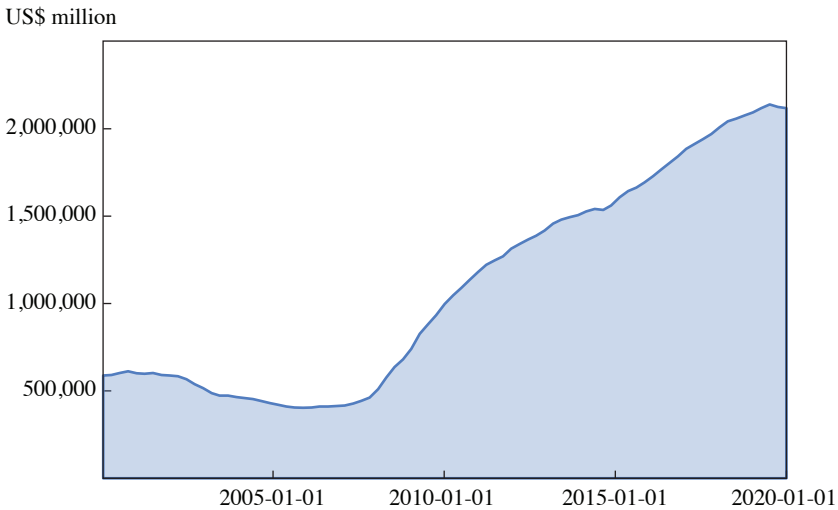
The precrisis developments in mortgage finance have been well studied, but the postcrisis shift in nonprime mortgage finance has received far less scholarly attention.⁶ The scale and scope of these changes have been remarkable. Figure 4 illustrates the main pathway in this market as of March 2020.

Figure 4 reflects several key changes from the chain shown in figure 2. First, the nonprime borrowing now occurs mostly through loans guaranteed by the Federal Housing Administration (FHA) or the Department of Veterans Affairs (VA) and then securitized by Government National Mortgage Association, or Ginnie Mae (GNMA). This change is illustrated in figure 5.

Second, bank-affiliated mortgage companies were another casualty of the global financial crisis, as postcrisis regulatory reforms both tightened requirements for consolidation and increased required capital levels

5. In this example, the securitization trust actually takes on all of the risk, and the underwriter is then out of the chain. But some of the transfers done before the global financial crisis carried various forms of implicit guarantees and made these relationships more complex. See Acharya, Schnabl, and Suarez (2013).

6. Kim and others (2018) and Gete and Reher (2021) are notable exceptions, and their work is closely related to the pathway described in figure 4.

Figure 5. Total Mortgages Held in a Ginnie Mae Pool

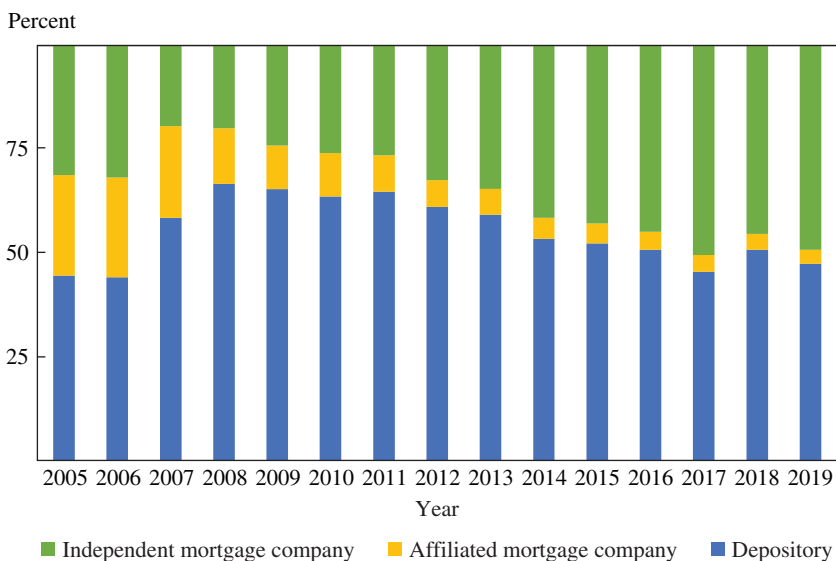
Source: Federal Reserve.

Note: Ginnie Mae, formally known as the Government National Mortgage Association, is a self-financing, government-sponsored enterprise that guarantees investors the timely payment of principal and interest on securities backed by federally insured or guaranteed loans (primarily loans insured by the Federal Housing Administration or guaranteed by the Department of Veterans Affairs). The data show the current asset level of mortgages in Ginnie Mae's pool—mortgages are added, and mortgages roll off as they are paid off.

(Kim and others 2018). The majority of these nonprime loans are now arranged by independent mortgage companies. This change is illustrated in figure 6.

Finally, a large portion of the GNMA securitizations is now purchased by mortgage real-estate investment trusts (mREITs), often highly leveraged and financed mostly with short-term repo contracts. This specialized investment trust barely existed in 2000 before growing to almost \$300 billion in assets prior to the global financial crisis. Unlike other mortgage players from that era, the mREIT industry bounced back after the crisis, partly on the back of friendly regulatory treatment for the rehypothecation for GNMA securities, their main source of investment.⁷ Panel A of figure 7 shows the mREIT industry reaching nearly \$700 billion prior to the pandemic. These mREIT assets are low-yielding, often government-guaranteed securities. The high absolute returns earned to drive growth were generated

7. Gete and Reher (2021) discuss the importance of this regulatory change for the VA/FHA loans that underlie GNMA securitizations.

Figure 6. Share of Dollar Amount of Loan Originations by Lender Type

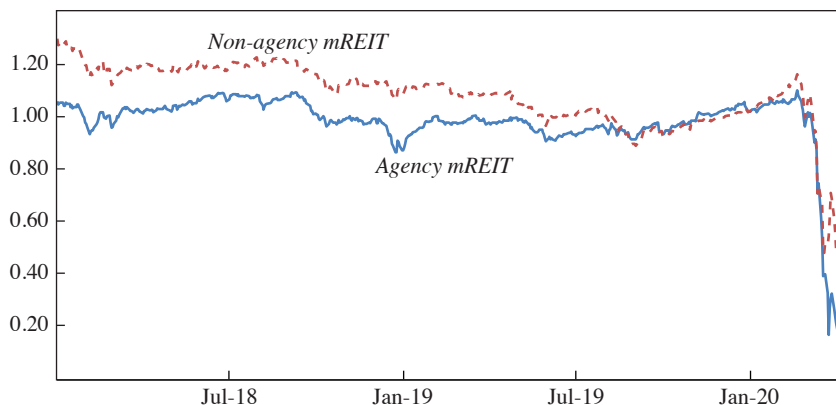
Sources: Home Mortgage Disclosure Act (HMDA); Robert Avery; and authors' calculations.

Note: A variety of lending financial institutions can originate mortgages. An independent mortgage company is an institution that typically does not take deposits from the public and focuses its business on mortgage lending. An affiliated mortgage company is an institution that typically does not take deposits from the public and focuses its business on mortgage lending but is owned by or affiliated with a bank or credit union. A depository institution is an institution that takes deposits from the public and originates mortgages.

primarily by leverage. This leverage is unregulated and provided primarily by repo, as shown in panel B.⁸ In March 2020, we learned again that highly leveraged institutions, even with safe assets on their balance sheet, can be a casualty of a generalized panic.

Figure 8 illustrates the turmoil for mREITs in March 2020, when agency-focused mREITs lost about 80 percent of their value. Since these vehicles invest only in government-guaranteed instruments, these extreme losses are driven solely by liquidity problems. In the commotion, some mREITs had their collateral seized by lenders, and many others would have suffered the same fate had the panic not been stopped by the Federal Reserve's massive injection of liquidity into unregulated parts of the financial system (Scaggs 2020; Maloney 2020; Hoffman and Zuckerman 2020).

8. For more details on mREIT structure and strategy, see Pellerin, Sabol, and Walter (2013).

Figure 8. Mortgage Real Estate Investment Trust Equity Prices

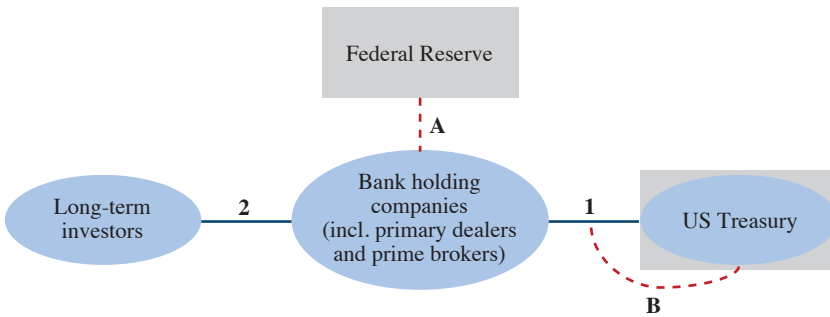
Source: Bloomberg.

Note: Agency mREITs invest in mortgages and mortgage-backed securities backed by one of the government-sponsored enterprises (such as Fannie Mae or Freddie Mac). Non-agency mREITs invest in mortgages and mortgage-backed securities that are not backed by a government guarantee.

II.B. The Treasury Market in March 2020

In this case study, we examine the impact of incongruent regulation on the market for US Treasury securities. Here, our focus is on banks' role as agents: the broker-dealers that facilitate the distribution of Treasury securities between the US government and the ultimate investor.

Prior to the global financial crisis, most government securities were intermediated by primary dealers, the largest of which were affiliates of BHCs. Following the global financial crisis, enhanced prudential standards, higher capital requirements, and changes in banks' own risk management policies placed pressure on this role at the same time that Treasury debt was rapidly increasing, leaving a gap to be filled by NBFIs (Duffie 2018, 2020; Financial Stability Oversight Council 2020; Klingler and Sundaresan 2020). In this case, it was hedge funds that stepped in, making markets in Treasuries through a multistep chain of exchange-traded futures contracts and repo-financed long positions in physical Treasuries (Barth and Kahn 2020, 2021; Financial Stability Board 2020a; Kothari and others 2020; Schrimpf, Shin, and Sushko 2020). The BHCs remained in the chain through their prime-broker subsidiaries, with a complex and shifting impact on their capital requirements. Then, in just the past few years, a portion of this repo activity moved to a central clearinghouse and completely away from bank balance sheets. As we all learned in March 2020, even the market for the world's safest security can malfunction during a stress event. In this

Figure 9. Dealer-Bank Intermediation of Government Securities

Source: Authors.

Note: The US Treasury sells bonds through auctions to primary dealers—the bank holding companies (1). The Treasury also has regulatory authority of the market (B). Primary dealers sell most of the Treasury securities to long-term investors (2). Bank holding companies are subject to capital regulation from the Federal Reserve (A).

instance, the malfunction elicited a targeted and overwhelming response from the Federal Reserve, which calmed the market through measures that (directly and indirectly) rescued many NBFI players (Financial Stability Oversight Council 2020; Financial Stability Board 2020a; Federal Reserve Board 2020c; Kothari and others 2020).

Less than a year after the event, scholars and practitioners have generated a large literature that assesses the underlying causes of the breakdown and proposes policy solutions to prevent a recurrence (Duffie 2020; Liang and Parkinson 2020). We are not engaging here in this important debate over optimal changes in the Treasury market. There have been many excellent suggestions, but our purpose is different: to use this event as a salient example of incongruent regulation, demonstrating that we stumbled into a system of intermediation that was both fragile and unplanned. To do this, we first sketch three different pathways for the process of Treasury debt intermediation.

Figure 9 is a schematic of the players and regulatory relationships in the Treasury market in its simplest form. Here, Treasury sells bonds through auctions (step 1), with primary dealers as the main buyers, who then ultimately sell most of the securities to long-term investors (step 2). The largest primary dealers are subsidiaries of bank holding companies and as such are subject to capital regulation by the Federal Reserve (A). Note the dual role here of the Treasury, which is both the seller of securities and a regulator of those security markets. The importance of this dual role is highlighted below.

The “peace dividend” of the 1990s reduced federal deficits and Treasury issuance, which was part of the reason for the growth of securitization and the manufacture of safe-asset substitutes in the years leading up to the global financial crisis (Gorton and Metrick 2010, 2012). In recent years, the imbalance has gone the other way, with sharply increasing issuance of Treasuries in the years leading up to the COVID-19 crisis (Liang and Parkinson 2020). This additional issuance required ever growing balance sheet capacity from the primary dealers, as they needed to hold ever larger inventories between auctions and the eventual sales.

For the simple intermediation shown in figure 9, regulatory balance sheet constraints were nonbinding prior to the global financial crisis. The capital requirements binding on large banks were risk-adjusted measures of assets, and the risk adjustment on Treasuries was not material.⁹ Following the global financial crisis and the implementation of the Basel III accords in the United States, large banks became subject to a supplementary leverage ratio, where the computed leverage encompassed all assets, including reserves and Treasury securities.¹⁰ Banks of global systemic importance are subject to an enhanced supplementary leverage ratio (ESLR) of 5 percent at the holding company level and 6 percent in bank affiliates. In the years immediately following implementation of the ESLR, it was often considered the binding constraint on balance sheet space, effectively implying that a bank subject to the ESLR would need to hold 5 percent capital against any inventory of Treasury securities (Quarles 2018).¹¹ To the extent that banks consider such capital to be costly, this provided an incentive for the shift to and growth of alternative pathways for the intermediation of Treasuries.

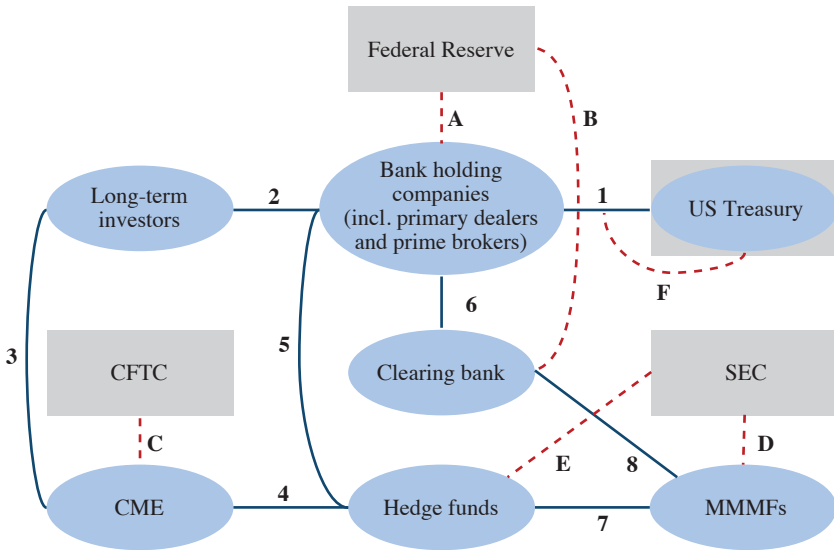
Figure 10 illustrates one popular alternative, where investors looking for the most liquid Treasury market turned more toward the futures contracts traded on the Chicago Mercantile Exchange (CME), shown here in step 2. This increased liquidity raised the price of Treasury futures relative to their cash equivalent and introduced an arbitrage basis between the two. The gap left by primary dealers is taken up (in part) by relative-value hedge funds,

9. Treasuries held in the banking book are zero weighted, that is, considered free of credit risk. Treasuries held in the trading book, especially those of longer maturity, do have a positive market risk weighting, but it is quite small.

10. Regulatory Capital Rule 79 FR 24528.

11. Similarly, until the Federal Reserve eliminated the requirement that banks meet a minimum leverage ratio requirement as part of stress test–related capital requirements, the post-stress leverage ratio was often the binding capital constraint for between two and four of the global systematically important banks.

Figure 10. Nonbank Intermediation of Government Securities

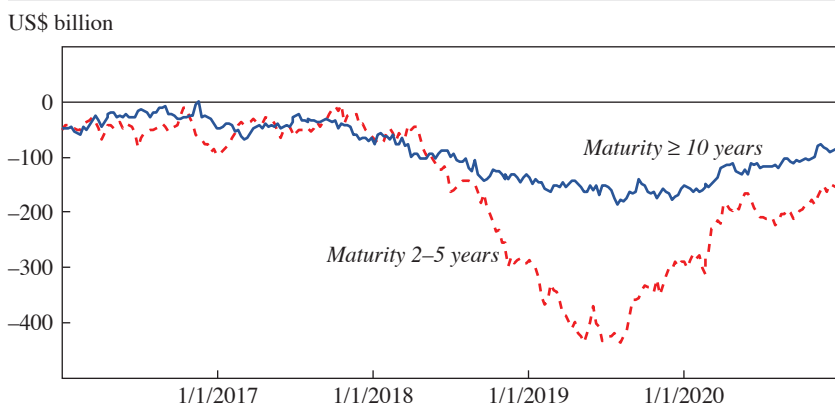


Source: Authors.

Note: The US Treasury sells bonds through auctions to primary dealers—the bank holding companies (1). The Treasury also has regulatory authority of the market (F). In this diagram, hedge funds short the Treasury futures contract and purchase Treasury securities. Hedge funds finance this “relative value” trade through bilateral repos with their prime brokers. The prime broker will often rehypothecate the Treasury through a tri-party transaction which is cleared by a clearing bank, and MMMFs are often on the opposite side of the transaction.

who sell (short) the expensive futures contract (step 4) and hedge their position by taking the physical Treasuries from the market, while financing all this activity through repos with their prime brokers (step 5). The very existence of this arbitrage trade demonstrates that the traditional form of intermediation had become more costly for the banks.

In figure 10, the full repo transaction occurs over several steps. In step 5, the prime broker sends cash to the hedge fund, receiving the Treasury as collateral. This lending is bundled as part of the prime brokerage service and is a form of bilateral repo, with the terms of the transaction set by the two parties. The bank may choose to stop here and hold this collateral on its balance sheet, but often this bond will be rehypothecated, this time through the tri-party repo market operating through a clearing bank (step 6). In tri-party repo, the prime broker sends securities and receives cash, while a cash investor (here represented by money market mutual funds) has cash and securities go in the opposite direction (step 8). The clearing bank—the

Figure 11. Leveraged Fund Net Futures Positions: Treasuries

Sources: Commodity Futures Trading Commission (CFTC) and authors' calculations.

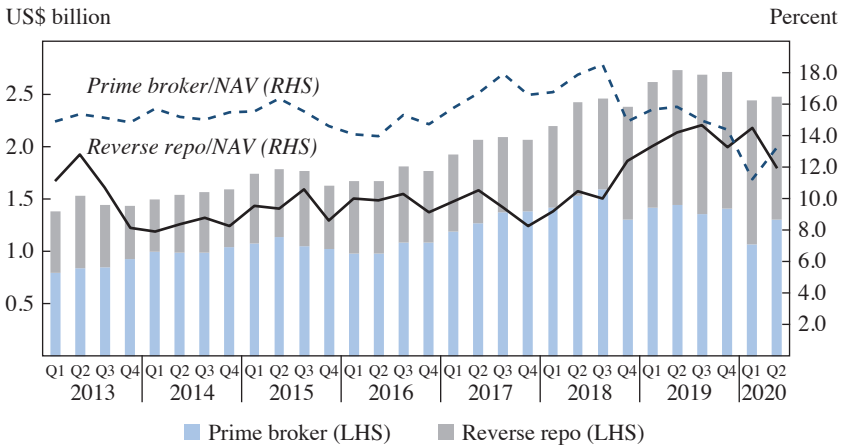
Note: Leveraged funds are financial institutions that use debt to maximize returns on investments. These institutions can invest in Treasuries of different maturities by either shorting the security or going long on the instrument. Shorting involves borrowing securities that one does not own, selling them to another party, and buying them back to return them to the lender at a later date. The goal is to profit off the difference in price if it drops. Investors going long on a security purchase and hold the security with the expectation that it will eventually rise in value. An investor's position with respect to a given security can be net long or net short based on the makeup of its portfolio.

Bank of New York is the only remaining actor in this business—manages the cash and collateral.

While we will refer to the process in figure 10 as “hedge-fund centered intermediation,” we note here that intermediation is not the intent of the hedge funds. Instead, these funds are simply doing what they always do—searching out profitable arbitrage opportunities. The profit for these funds is purely from the trade itself, and they have no ability to cross-sell this function with other client-facing activities. Since banks do have such cross-selling opportunities, they have historically been the efficient provider of the intermediation. The fact that banks have removed themselves from part of this chain is a demonstration not of competition directly for their intermediation services but of the substitution of a less direct pathway by agents having a variety of different incentives.

Figure 11 shows some evidence of this switch through the rising participation of hedge funds on the CME Treasury futures market. Even as hedge funds were increasing their participation in futures markets, they were also increasing their repo financing from their prime brokers—the other part of the intermediation. This increase is illustrated in figure 12.

Figure 12. Funding for Qualifying Hedge Funds



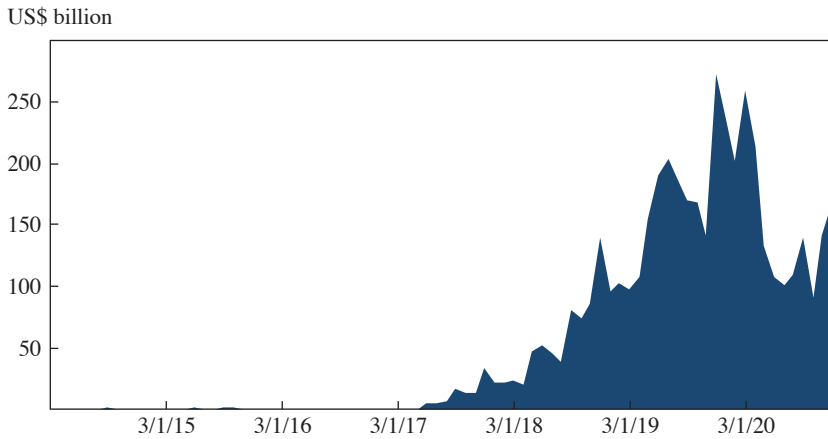
Source: SEC Private Fund Statistics.

Note: Qualifying hedge funds are those that are required to submit Form-PF with the SEC, and two major sources of funding for such funds are reverse repo or their prime brokers. The net asset value (NAV) is the total value of the fund’s assets less its liabilities.

The full intermediation chain includes three different analogues for traditional bank capital requirements: (1) the supplementary leverage ratio imposed on banks for gross repo positions, even with Treasury collateral; (2) the repo haircuts charged by prime brokers in the bilateral market and by the ultimate cash suppliers in the tri-party market; and (3) the initial margins charged by the CME for the futures transactions. This third analogue—initial margin—introduces a new path for incongruity beyond the two seen in the nonprime mortgage market.

In the recent years, regulatory changes and institutional innovations have opened up a new mechanism for the repo transactions. This new mechanism replaces the bilateral/tri-party nexus with a central counterparty, the Fixed Income Clearing Corporation (FICC). This is illustrated in figure 13.

Here, the FICC has taken the place of the tri-party clearing bank in figure 10, which eliminates the need for the initiating bilateral repo between the prime broker and hedge fund. Instead, the prime broker is able to “sponsor” the hedge fund at FICC, and the effective trade between MMMFs and hedge funds occurs at the clearinghouse instead of through the prime broker. In 2017, a rule change by the FICC allowed a broader class of institutions to participate as sponsored members for repo transactions, and

Figure 14. Money Market Mutual Fund Investments in Repo Cleared by the FICC

Source: Office of Financial Research (OFR).

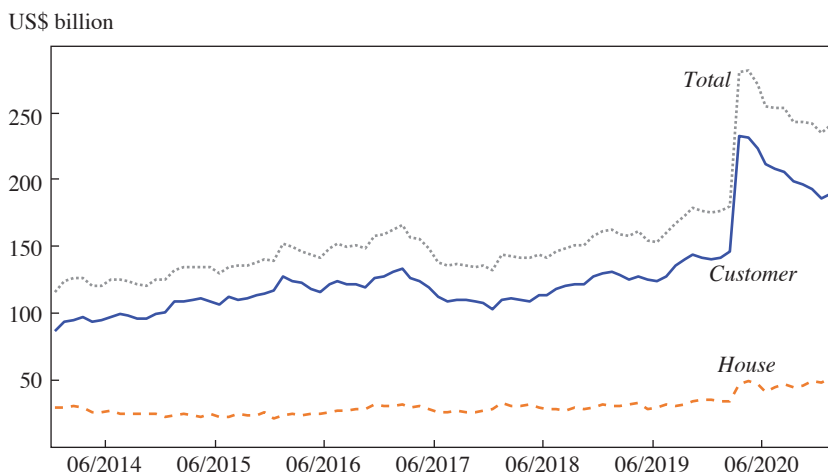
Note: Sponsored repo is a transaction that allows a dealer to sponsor non-dealer counterparties on the Fixed Income Clearing Corporation's (FICC) cleared repo platform. Repo trades are matched and netted, which has a smaller balance sheet impact for dealers. Changes in 2017 and 2019 expanded eligibility for sponsored and sponsoring members.

was the additional hassle of dealing with a new counterparty. The fact that the business grew so fast despite this hassle suggests that banks were subsidizing the move.

Once again, it was the MMMFs that provided the majority of funding for this new activity, with provision rising from nothing pre-2017 to over \$250 billion in early 2020 (figure 14).

In figures 10 and 13, the Treasury is still selling its securities, which eventually will be delivered to long-term investors upon maturity of the futures contracts. But the middle game has more steps than in figure 9, and the broker-dealer services formerly provided by large banks are now performed by a combination of managed investment pools (hedge funds and MMMFs), facilitated by clearing banks (Bank of New York), futures exchanges (the CME), or central counterparties (FICC). An intermediation system anchored by lightly regulated investment pools can look very different from one anchored by highly regulated banks, and recent years witnessed exactly this shift.

This hedge fund-centered intermediation operates under a very different capital regime than does the simpler bank-centered model. Instead of the 5 percent ESLR requirement from the latter case, the capital securing the hedge fund intermediation is from disparate sources, consisting of

Figure 15. Initial Margin Requirements for Futures

Source: Commodity Futures Trading Commission (CFTC).

Note: For a futures contract, the initial margin is the amount required to be covered with cash or adequate collateral.

(1) margin on the futures short sale, as imposed by the CME; (2) haircuts on the repo transactions, as imposed by the prime broker (for the bilateral step) and by the clearing bank (for the tri-party step); and (3) capital requirements on the parent BHC, to the extent that the bank is unable to net the repo transactions on its balance sheet. In section III, we go into more detail about the mechanics and regulatory requirements of these margin and haircut decisions; for now, it suffices to point out that they are decentralized and uncoordinated, in contrast to the simple ESLR requirement from figure 9. For a BHC considering the least-cost method to provide prime brokerage services, the shifting burdens of these various requirements will heavily influence the location of the activity. And the result of those shifting burdens was to move more of the activity to the indirect hedge fund version of intermediation.

The general malfunction in the Treasury market in March 2020 included several links from the hedge fund intermediation. Of most interest to our project here is the change in initial margins for Treasury futures (figure 15).

While regulators have incorporated more countercyclical features in bank capital requirements since the global financial crisis, initial margin (an analogue for futures) will mechanically be pro-cyclical, as seen here. Despite attempts to push back on such pro-cyclicity, initial margins are model driven, and increases in volatility during a stress event will necessarily work

through the model to increase margins. In the next section, we discuss the challenge of making these margins congruent to capital regulation.

III. Aligning Bank Capital, Repo Haircuts, and Market Margining Requirements

Agreement on the congruence principle would provide the foundation from which to derive policies for managing the contribution of nonbank intermediation to systemic risk. However, as with all policymaking, legal and institutional factors beyond the appeal of the concept will substantially determine how effectively it could be implemented. These factors will be more significant in the United States than in most other key financial jurisdictions because of the famously balkanized organization of financial regulation. At the federal level alone there are three bank regulators and two market regulators. There is no federal regulation of insurance companies, even those with activities ranging far beyond traditional insurance businesses. The Financial Stability Oversight Council (FSOC), created following the global financial crisis, is supposed to coordinate regulatory policy to protect financial stability. But it is structurally flawed and, in any case, possesses little in the way of actual authority.

The challenges can be illustrated using our suggestion of congruent margining, repo haircuts, and capital requirements to ask what would need to be done and, of no small importance, who would do it. Consider the Treasury bond intermediation shown in figure 13 of the previous section. Here, the key regulatory relationships are denoted by letters, with relevant regulation applying to different numbered connections in the diagram. The list below, drawn from that diagram, focuses specifically on capital requirements, where “capital” means not just the rules set by government regulators, but also market-driven haircut and margining practices, which also provide a buffer against losses.

III.A. Federal Reserve Regulation of BHCs

After buying Treasuries at auction (step 1), the banks need to decide how long these Treasuries would be held as inventory on their balance sheets. On a balance sheet, all Treasuries would be subject to a 5 percent ESLR if held at the BHC level.¹² The risk-based capital charge would be zero for bills, but the longer-dated maturities could incur a risk-based capital charge

12. Enhanced Supplementary Leverage Ratio Standards, 79 Fed. Reg. 24528 (May 1, 2014) (codified at 12 C.F.R. pt. 217).

if held on the trading book. In the discussion below, we focus on the 5 percent ESLR charge as a benchmark. It was this charge that—crucially—was waived by the Federal Reserve in the spring of 2020 for one year, thereby freeing up balance sheets for banks to retake this intermediation function (Federal Reserve Board 2020b). Thus, regulatory action was explicitly *countercyclical*; crucially, regulators have discretion to make such countercyclical changes and are not bound by any fixed formula to do so.¹³

III.B. Commodity Futures Trading Commission Regulation of the CME

When hedge funds take over some of the intermediation of Treasuries, they do so by selling Treasury futures in step 4. For such short sales, they must post initial margin beyond the proceeds of the sale and update this margin as prices fluctuate during the life of the contract. For now, we focus on the initial margin, the level of which will be an important input to the total amount of leverage that funds can dedicate to this trade. This initial margin calculation is made by the CME, using models that aim (first approximation) to ensure a 99 percent chance of coverage over a preset horizon (Waldis 2020). The Commodity Futures Trading Commission (CFTC) involvement in model development is high level: it does not review model parameters or set specific levels for key variables. Left to their own devices, standard models will tend to increase initial margin during volatile periods. Notably, the exchange and clearinghouse industry has recognized the danger of pro-cyclicality and has taken steps through a statement of principles to minimize it (Committee on Payment and Settlement Systems and International Organization of Securities Commissions 2012). These steps build a buffer and effectively slow—but do not stop—the pro-cyclical adjustment of initial margin. In March 2020, the CME ultimately increased initial margin right in the midst of the market stress (CME Group 2020). Defenders of this practice can correctly argue that the clearinghouse needs to be protected, since it too is systemically risky. But there is certainly a difference between microprudential protection of a clearinghouse and macroprudential concerns of a liquidity panic. And, under the current rules, there is no regulatory body actively involved in this decision. It is entirely driven by the rules set by the exchange. We return later to a discussion of this important point.

13. The Federal Reserve allowed the waiver to expire in March 2021, apparently without any immediate consequences for bank balance sheets and capital requirements (Federal Reserve Board 2021).

III.C. SEC Regulation of the FICC

The FICC, as a subsidiary of the Depository Trust and Clearing Corporation, is regulated by a self-regulatory organization, the Financial Industry Regulatory Authority (FINRA), which is itself regulated by the SEC. For the sponsored repo shown in steps 6 and 8, FICC sets haircuts and may make future adjustments to collateral, thus acting analogously to the CME for futures. Here, we have even less visibility into the underlying models, and we have no data to tell us whether collateral calls were a source of stress on this part of the market. What we do know is that the haircut and collateral agreements are bespoke with each sponsoring member and thus are market driven. In making those judgments, the FICC and its regulators are naturally concerned about the safety of the clearinghouse itself and have no statutory requirement to consider impacts on overall financial stability. The danger here, as in the CME-CFTC case, is that the initial margins and haircuts in non-stress times will be too low from a macroprudential perspective, incentivizing the intermediation activity to move to these venues. The downside risk will then de facto be absorbed by countercyclical adjustments by the safety net.

III.D. SEC Regulation of MMMFs

The MMMFs are important cash providers in the FICC-sponsored repo market (step 8 of figure 13) and also in the parallel tri-party repo market (step 7 in figure 10). In each of these cases, the MMMFs have handed off their risk to a central counterparty and should be indifferent to specific haircut decisions. But these funds are impacted by regulation in other ways, several of which were relevant for market dysfunction in 2008 and then again in 2020. In particular, MMMF concerns about meeting liquidity rules led them to sharply decrease the maturity of their holdings in March and to pull back on term-repo funding (Eren, Schrimpf, and Sushko 2020).

III.E. SEC Regulation of Hedge Funds

For hedge funds, the long leg of the intermediation comes from the purchase and subsequent repo of physical Treasury securities. While the largest hedge funds are under limited regulatory authority of the SEC (mostly reporting), there are no direct capital requirements for their whole portfolio. Thus, under present regulations, the haircuts paid by hedge funds—either as part of sponsored or bilateral repo—are market driven. This appears to be the most difficult place to achieve congruence, since the

statutory authority to regulate hedge fund capital does not exist and, if it did, would likely just allow that activity to move to another entity.

III.F. US Treasury Authority over the Government Securities Markets

The inclusion of the Treasury Department here may surprise some readers, even those expert in financial stability policy. But the little-known Government Securities Act of 1986 gives the Treasury relevant contingent regulatory authority and, potentially, active leadership of the exercise we contemplate.¹⁴ This legislation was passed in response to the failures of firms that dealt only in government securities and thus escaped regulation by the SEC.¹⁵ It requires the Treasury to adopt rules governing financial responsibility and reporting requirements of government securities brokers and dealers.¹⁶ In practice, the Treasury has exempted from its financial responsibility requirements (covering capital and related measures) any financial institution already subject to the jurisdiction of a market or banking regulator.¹⁷ But its capital regulations—which largely mirror SEC requirements—apply to any freestanding government securities dealer. And it retains the option to adopt additional or more stringent requirements than those imposed by the functional regulators.

How can we get congruence from this morass? To start, we divide the task into three steps. First, the portion of prudential regulatory requirements motivated by concerns other than financial stability aims would be separated out from the effective regulatory charge associated with either holding Treasuries or using them as collateral to obtain funding. Second, the remainder of that regulatory charge would be converted into an initial margin equivalent which, as we suggested, would effectively combine capital and liquidity requirements. Third, that margin equivalent would be applied to the different trading platforms and arrangements, perhaps with adjustments to take account of different risk factors associated with each.

The first two steps would require considerable analysis and, ultimately, regulatory judgment. There will likely be a good bit of debate around what part of the regulatory costs of these transactions for banks is attributable to their special status within the US financial system, either as a whole or individually. Some issues would be fairly clear-cut. Thus, for example,

14. Government Securities Act of 1986, Pub. L. No. 99-571, 100 Stat. 3208 (codified at 15 U.S.C. § 78o–5).

15. United States Code 15 U.S.C. § 77c(a)(2).

16. United States Code 15 U.S.C. § 78o-5(b)(1)(A)–(B).

17. Code of Federal Regulations 17 C.F.R. § 402.1(b)–(c).

the Federal Deposit Insurance Corporation (FDIC) deposit insurance premium that banks must pay on (uninsured) repo liabilities should probably be carved out.¹⁸ Other issues would be considerably less straightforward. In the context of Treasuries, for example, an important question would be whether the appropriate input into the process of converting prudential requirements would be the minimum leverage ratio imposed on all banks or the higher ESLR imposed on the most systemically important banks. The latter is imposed in accordance with the Dodd-Frank principle of more stringent regulation on systemically important banking organizations, based on the greater negative externalities that would follow from their insolvency (and, perhaps, the associated moral hazard).

Similarly, the second step of converting the macroprudential component of the prudential banking regulations into specific minimum margining requirements would be a complicated process involving important, non-obvious decisions. For example, since capital requirements for the largest banks are clearly intended to mitigate microprudential and macroprudential concerns, there is no specific formula to divide the total requirement between these two motivations. However, like the issues raised in the first step, it seems no more complicated or judgmental than many existing financial regulatory efforts, including development of the very regulatory capital standards that would be the starting point for this exercise. Moreover, to a considerable extent the work here would be heavily front-loaded. Once regulators made some of the key threshold judgments, revisions to the original regulation or application of the congruence principle to other shadow banking activities should be somewhat more straightforward.

There would need to be agreement on methodologies for the first and second steps among all financial regulatory agencies whose legal authorities would be needed to implement congruent margins across markets and platforms. Here is where the balkanization of US financial regulatory authority becomes a consideration (Yadav 2019). Under current law and practice, achieving congruence for transactions collateralized with Treasuries would involve six agencies: the US Treasury itself; the three federal banking agencies—the Federal Reserve, the Office of the Comptroller

18. In fact, there is a good argument for requiring all forms of short-term financing to bear a fee reflecting the implicit systemic risk insurance provided by the Federal Reserve. However, the extension of the FDIC premium requirement to the uninsured liabilities of BHCs was essentially a way to augment the insurance fund without raising premia on the insured deposits of depository institutions, not a fee calibrated to insurance provided by the Federal Reserve.

of the Currency (OCC), and the FDIC; the CFTC; and the SEC. While the SEC and CFTC obviously do not set capital requirements for banks, congruence will be achieved only if all agencies agree on the amount of resiliency that will align margining requirements with bank regulatory requirements. And, although regulatory relationship A in figure 13 refers to BHCs and thereby originates only at the Federal Reserve, national banks within BHCs are directly regulated by the OCC, and state-chartered banks that are not members of the Federal Reserve System are directly regulated by the FDIC. Under long-standing practice the three federal banking agencies jointly adopt capital requirements applicable to BHCs and all insured depository institutions.¹⁹

Needless to say, this would not be a nimble process, as evidenced by experience with mandatory joint rule making under the Dodd-Frank Act. These efforts have generally been slow moving, especially in rule making involving both banking and market regulators. The sheer complexity of coordinating agreement among six sets of agency staffs and principals (a total of as many as twenty-three Senate-confirmed presidential appointees) can make for cumbersome regulations that reflect sometimes awkward compromises. Of equal or, at times, greater importance has been the difference in perspectives and missions of regulators. The original missions of the market regulatory agencies, which gave rise to their institutional cultures, were those of investor protection and operationally well-functioning markets. While financial stability has always been at least a background concern of bank regulators, it was considerably more peripheral to the market regulators. During the protracted interagency negotiations over Dodd-Frank mandated rules, including the very relevant rule on minimum swap margins, these differences in perspective—especially at the SEC—could be substantial hurdles to agreement.

As shown by the swap margin rule making, for example, it can be done. But the prospect of the prolonged and difficult process that eventually produced that and other Dodd-Frank rules could present an additional hurdle to realizing a congruent margining regime.²⁰ Unlike the joint regulations

19. The joint rule making on capital and certain other prudential standards is a voluntary undertaking of the banking agencies, in contrast to the many instances of joint rule making required by the Dodd-Frank Act, as discussed in the next footnote.

20. Some of the joint rule making required by Dodd-Frank has not been completed more than a decade after that law was enacted. Notably, there is still no rule on limiting bank incentive compensation arrangements that encourage inappropriate risk-taking, as required by section 956 of Dodd-Frank. While the problems in developing a rule on this immensely complicated topic are not wholly attributable to differences in policy perspective and agency practices on compliance, they have certainly played a role.

on swaps and the Volcker Rule, which were mandated by Congress, here there could be an initial hurdle in gaining agreement among the agencies to undertake the effort in the first place. Still, we think there are grounds for optimism, albeit guarded optimism. First, the set of agency principals appointed by President Biden, including those at the market regulatory agencies, may well share a stronger inclination toward acting on NBFII activities than their predecessors. Second, the Treasury's authority under the Government Securities Act significantly increases its leverage, both in initiating and driving the process.

Unlike the many macroprudential regulatory issues for which the Treasury lacks authority beyond its hortatory role as head of the FSOC, here the Treasury has a key, possibly central, role. The Government Securities Act requires it to adopt rules that "provide safeguards with respect to the financial responsibility and related practices" of government securities brokers and dealers.²¹ To date, the Treasury has generally taken a minimalist approach to its regulatory role, adopting capital and other requirements for dealers trading exclusively in government securities that parallel those adopted by the SEC for dealers more generally. But in the Government Securities Act Congress stated its purposes in far-reaching terms, to "provide for the integrity, stability, and efficiency of . . . transactions" in government securities and "to protect investors and to insure the maintenance of fair, honest, and liquid markets in such securities."²² While the direct motivation for the act was the failure of certain firms that had dealt only in government securities and were thus exempt from SEC regulation, the law gave the Treasury both a broad mandate to protect the government securities market and the regulatory tools to adapt to evolving risks to the integrity of that market.²³ Thus, while a Treasury regulation requiring minimum haircuts would be a new use of the authority, it would be entirely consistent with the text and purposes of the law. In this context, it would be sensible for the Treasury to dust off its authority under the Government Securities Act and to exercise that authority with an eye to problems in Treasury markets that did not exist when the act was passed.

The prospect of Treasury rules that would augment or displace the rules of functional regulators pertaining to government securities transactions should provide considerable incentive for the other agencies to cooperate

21. United States Code 15 U.S.C. § 78o-5(b)(1)(A).

22. Government Securities Act of 1986, Pub. L. No. 99-571, § 1, 100 Stat. 3208, 3208 (codified at 15 U.S.C. § 78o-5).

23. For a discussion of current problems in the Treasury market, see Liang and Parkinson (2020).

in the process we sketch out.²⁴ Otherwise, the Treasury might dictate capital or margin rules for dealing in Treasuries that sit uncomfortably with existing regulatory regimes. On the other hand, since the Government Securities Act places most responsibility for implementation and enforcement of its regulations in the hands of the financial regulators, the Treasury needs their cooperation and expertise to attain its desired regulatory outcome. So, we hope, all six agencies have reason to support this collective process. Indeed, a good prelude to the process would be formal endorsement by the FSOC agencies of the congruence principle and a public commitment to cooperative solutions to the risks created by NBFIs activities.

One final point on this subject—while the Treasury’s largely unexercised authority gives it the ability to initiate and drive a collaborative effort to achieve congruency in Treasury-backed repo markets, it also means that the Treasury could impede any such process. For example, Treasury officials could be skeptical of congruence efforts that might incrementally decrease the attractiveness of holding Treasuries, thus increasing the government’s debt servicing costs. In such cases, it would be awkward at best for the other agencies to use their broad authority over banks and general broker-dealers to impose congruent margins and haircuts.

The third step is certainly not more analytically difficult than the first two steps. But it introduces issues of legal authority, organizational capacity, and agency traditions that both complicate the execution of the first two steps and raise potential trade-offs between theoretically preferable regulatory features and practical questions of administrability.

After agreement on the methodologies in the first two steps, regulators would need to adopt regulations binding both central counterparties and significant non-centrally cleared Treasury repo activity by non-prudentially regulated actors. As for the central counterparties, the CFTC would establish minimum margins for Treasuries futures trading on the CME. Either directly, or through FINRA, the SEC would establish minimum haircuts for FICC (regulatory relationships B and C, respectively, in figure 13). A significant institutional choice will need to be made during the step 3 process of applying the initial margin requirements in different market contexts (i.e., in relationships B, C, E, and possibly D): Would regulators themselves calculate the minimum initial margin or haircut for CME, FICC, and other central counterparties? Current practice, as included in formally adopted, binding regulations, is that the market regulators adopt principles-based regulations for central counterparties, which themselves determine

24. United States Code 15 U.S.C. § 78o-5(b)(1)(A)–(B).

specific margin requirements. Given the complexities of central clearing and the risk-related differences that may exist among different clearing entities, there is reason for this practice. Yet the experience of March 2020 raises the issue of whether regulatory oversight of central counterparties' margining practices is, or can be, sufficiently rigorous. If effective monitoring is not possible, then specific mandatory margins or margining formulas might be necessary.

While trade-offs between conceptually desirable regulatory tailoring and administrability are regularly made in financial regulation, the difference in perspective between market regulators and banking regulators could cause additional coordination difficulties. The latter, chastened by the failures of bank modeling and risk management in the years leading up to the global financial crisis, may be more skeptical of frameworks that contain a good bit of what is effectively self-regulation.

Under current statutory authority, the other task for regulators—covering significant Treasury repo activity by nonbanks that is not centrally cleared—would need to be addressed somewhat differently. In addition to current activity falling into this category, one could expect that in the absence of comprehensive regulation certain market actors would see opportunities for arbitrage. Actors falling outside applicable regulatory perimeters could be incentivized to amass cash pools that could engage in Treasury-backed repo lending without the minimum haircut or capital requirements applicable in transactions involving central clearing or banks.

No agency, including the Treasury, has authority to impose minimum margining requirements on such activity directly—that is, on a transaction basis. With respect to entities that are already registered as dealers, whether or not part of a BHC, the SEC has authority to require them to apply minimum margins when they extend credit against Treasuries. However, the Treasury has authority over all government securities dealers, defined as “any person engaged in the business of buying and selling government securities for his own account.”²⁵ The question would then be whether any other entity regularly engaged in substantial amounts of repo transactions is, within the terms of the securities laws, “engaged in the business” of buying and selling government securities.

The statutory definition of “government securities dealer” appears broad enough to capture any existing or new entity that participated in substantial Treasury-backed repo activity. The definition has not been elaborated upon by the courts. However, the definition of “dealer” subject to SEC

25. Securities Exchange Act of 1934 § 3(a)(44), 15 U.S.C. § 78c(a)(44).

jurisdiction—on which the government securities dealer definition was modeled—has been broadly construed. Courts have found the statutory definition of dealer—“any person engaged in the business of buying and selling securities”—to cover a range of situations in which market actors regularly involved themselves in purchases and sales.²⁶

The Treasury would need to establish minimum haircuts to cover non-centrally cleared transactions by dealers not already subject to the jurisdiction of a financial regulatory agency. Like the Treasury’s capital requirements for such entities, its haircut requirements would presumably parallel those developed by the SEC. Because the SEC has broad authority to set conditions for the operation of MMMFs, it could either impose haircuts directly through regulatory relationship D (figure 13) or leave those funds subject to requirements that the Treasury establishes directed at the broader market in regulatory relationship F.

While, as a technical matter, the banking agencies would not need to adopt their own regulations as part of the initial effort to conform margining and haircut practices to the resiliency standards implicit in capital regulation, there are two ways in which they, too, might modify their regulations in implementing the congruence principle. First, of course, changing market practices and regulatory assessments of risk could counsel changes in capital, as well as margining, requirements. Second, since minimum margins would by definition apply to the trading of prudentially regulated entities on central clearing platforms, the banking agencies might want to adjust some of their prudential regulations to take account of the stricter margining requirements. Similarly, since banks are exempted from the universe of dealers subject to SEC and Treasury regulation, the banking agencies may want to consider imposing the same margin requirements on repo lending by banks and adjusting capital requirements to take account of this change.

The mREIT case that served as our first example could be addressed through a comparable process, though here the role of catalyst would be played by the Federal Reserve. The Securities Exchange Act of 1934 authorizes the Fed to set minimum margins on most securities financing transactions backed by collateral other than government securities, which were

26. See *SEC v. River N. Equity LLC*, 415 F. Supp. 3d 853, 858–59 (N.D. Ill. 2019) (noting that the Exchange Act “broadly defines ‘dealer’” because the act’s dealer registration requirement is “of the utmost importance in effecting the purposes of the Act”); see also *SEC v. Fierro*, Civil Action No. 20-2104 (MAS) (DEA), 2020 WL 7481773, at *3–*4 (D.N.J. Dec. 18, 2020) and *SEC v. Keener*, 1:20-CV-21254, 2020 WL 4736205, at *3–*5 (S.D. Fla. Aug. 14, 2020).

excluded from the act's coverage.²⁷ In practice, the Fed has delegated that authority to the market regulators, just as the Treasury has for government securities. But, as with the Treasury for government securities, the Fed has leverage over the market regulators and residual authority that can be used to drive a congruence exercise. Indeed, in 2015 the Fed anticipated use of that authority in supporting an international agreement to require minimum haircuts on non-centrally cleared securities financing transactions using any collateral other than government securities (Financial Stability Board 2015). That agreement, whose implementation has been repeatedly delayed by the Fed and the other members of the Financial Stability Board, could pave the way for efforts to extend congruence efforts internationally.

In fact, this process would be somewhat simpler than the Treasuries exercise, since neither the Treasury nor the CFTC regulates any of the principal actors. Thus the first two analytic steps would involve fewer agencies. As illustrated in figure 4, the key implementation action in the third step would be on line F, where the SEC would require minimum margining practices by the broker-dealers that are the repo counterparties of the mREITs. As with the Treasury example, the Federal Reserve would have the option of adopting its own regulation or allowing the SEC—acting in the shadow of the Fed's authority—to make appropriate modification of its regulatory requirements for dealers. Again, were market actors to form a cash pool and undertake repo activity with the mREITs, the securities law definition of “dealer” is likely broad enough to capture that intermediary.

IV. Conclusion

The prospect of protracted interagency negotiations is hardly encouraging for those, including us, who believe that containment of systemic risk outside the prudentially regulated sector is both important and long overdue. But what are the alternatives? We can think of two.

One alternative is to eschew formal efforts at coordination and to rely on each agency to address risks arising within its usual regulatory domain. This describes the status quo, though it is reasonable to assume that the COVID-19 market turmoil and the arrival of Biden-appointed leadership will push each agency toward more rigor. Still, the likelihood of divergence

27. The authority is given in section 7 of the Securities Exchange Act of 1934, 15 U.S.C. § 78g. The Fed's implementation of that authority is contained within its Regulation T, 17 C.F.R. pt. 220. There are some statutory limits on this authority, which probably would not be too consequential for our purposes.

in the effective regulatory charges on similarly risky activities when conducted by different kinds of intermediaries will reproduce opportunities for regulatory arbitrage. That, of course, is much of what has motivated our congruence principle in the first place.

The second alternative would be to expand agency regulatory authority, concentrate it in a smaller number of regulatory actors, or both. One approach would be a version of proposals that are periodically advanced to reduce the number of financial regulatory agencies. Whatever the merits of consolidating and enhancing agency authority to counteract systemic risk, near-term prospects for such legislation are at best modest. In the aftermath of the global financial crisis, of which financial intermediaries were a principal cause, the only institutional changes were the elimination of the much-criticized Office of Thrift Supervision, the creation of the FSOC with its cumbersome organization and limited authority, and the creation of a new agency with the sole mission of consumer financial protection. Indeed, the approach in Dodd-Frank—allocating additional regulatory jurisdiction among agencies and then requiring joint rule making—increased, rather than diminished, coordination needs.

Prospects for a major reorganization of the relevant governmental agencies directed at more effective control of systemic risk are likely even lower following the COVID-19 crisis than they were after the global financial crisis. In the spring of 2020 the vulnerabilities of nonbank intermediaries amplified stress but did not create it. Other legislative priorities, the interests of some groups in maintaining a balkanized regulatory regime, and broader policy concerns about further concentrations of regulatory authority combine to make such legislation a long shot for the foreseeable future.²⁸ Finally, it is worth noting that more concentrated authority would not eliminate the need to tailor margining and other regulatory requirements to the varying risk characteristics of trading markets in which similar financial

28. Here are two examples observed by one of the authors who was involved in the process that led to the Dodd-Frank Act: First, during debate over the Dodd-Frank Act, proposals to consolidate bank regulatory authority in two agencies (one for national banks and one federal regulator for state banks) were opposed by many medium-sized and smaller banks, which wanted to retain the option of switching primary federal regulators. Second, key members of the two congressional agriculture committees have in the past strongly resisted transferring to the SEC the CFTC's authority over financial futures (as opposed to futures for physical commodities—the original motivation for the CFTC). While commentators (and legislators on the banking committees) have advanced policy arguments for doing so, giving up such an influential oversight and legislative role is not a natural instinct of most legislators.

activity is being conducted. That is, even under a single regulatory authority, the same factors that argue for congruence rather than equivalence will require the expertise currently located in the SEC and CFTC.

There are, of course, many other worthwhile suggestions that have been offered in response to the growth of NBFIs contributions to systemic risk. Unfortunately, many of these suggestions would likely, or certainly, require new legislation. So, for example, existing legal authorities may not extend to requiring all significant financial intermediaries to participate in a system-wide stress test. A proposal that any intermediary receiving liquidity support during stress periods thereafter become subject to some form of prudential regulation has some intuitive appeal, but it would surely require congressional action. Here again, while we can remain hopeful, we are not sanguine about near-term chances for legislation to extend the prudential regulatory perimeter.

In sum, we are very much aware of the institutional and practical constraints on realizing in practice the congruence that we find so compelling in principle. We would be delighted to learn of other approaches that would be more efficient and effective. But, in the absence of such ideas, and with the reality of substantial hurdles to legislative solutions, we believe that interagency processes in which the Treasury and Federal Reserve have the legal authority to take leadership is superior to the currently available alternatives.

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References

- Acharya, Viral V., and T. Sabri Öncü. 2012. "A Proposal for the Resolution of Systemically Important Assets and Liabilities: The Case of the Repo Market." Paper prepared for Central Banking: Before, During and After the Crisis, Federal Reserve Board, Washington, March 23–24, 2012. http://pages.stern.nyu.edu/~sternfin/vacharya/public_html/Resolution%20of%20Systemically%20Important%20Assets%20and%20Liabilities_Sabri_VA_10.pdf.
- Acharya, Viral V., Philipp Schnabl, and Gustavo Suarez. 2013. "Securitization without Risk Transfer." *Journal of Financial Economics* 107, no. 3: 515–36.
- Bank of England. 2020. *Financial Stability Report*. London: Financial Policy Committee. <https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-report/2020/august-2020.pdf>.
- Barth, Daniel, and Jay Kahn. 2020. "Basis Trades and Treasury Market Illiquidity." Brief 20–01. Washington: US Department of the Treasury, Office of Financial Research. https://www.financialresearch.gov/briefs/files/OFRBr_2020_01_Basis-Trades.pdf.
- Barth, Daniel, and Jay Kahn. 2021. "Hedge Funds and the Treasury Cash-Futures Disconnect." Working Paper 21–01. Washington: US Department of the Treasury, Office of Financial Research. <https://www.financialresearch.gov/working-papers/files/OFRwp-21-01-hedge-funds-and-the-treasury-cash-futures-disconnect.pdf>.
- CME Group. 2020. "CME Clearing's Margining Practices: CoVid Pandemic." Presented at the Global Markets Advisory Committee Meeting, Teleconference, December 17. https://www.cftc.gov/media/5496/GMAC_121720CME/download.
- Committee on Payment and Settlement Systems and International Organization of Securities Commissions. 2012. "Principles for Financial Market Infrastructures." Basel: Bank for International Settlements. <https://www.bis.org/cpmi/publ/d101a.pdf>.
- COVID-19 Market Impact Working Group. 2020. *Experiences of US Money Market Funds during the COVID-19 Crisis*. Washington: Investment Company Institute. <https://www.sec.gov/comments/credit-market-interconnectedness/cll10-8026117-225527.pdf>.
- Duffie, Darrell. 2018. "Financial Regulatory Reform after the Crisis: An Assessment." *Management Science* 64, no. 10: 4835–57.
- Duffie, Darrell. 2020. "Still the World's Safe Haven? Redesigning the U.S. Treasury Market after the COVID-19 Crisis." Working Paper 62. Washington: Brookings Institution, Hutchins Center on Fiscal and Monetary Policy. https://www.brookings.edu/wp-content/uploads/2020/05/WP62_Duffie_v2.pdf.
- Eren, Egemen, Andreas Schrimpf, and Vladyslav Sushko. 2020. "US Dollar Funding Markets during the Covid-19 Crisis—the International Dimension." BIS Bulletin 15. Basel: Bank for International Settlements. <https://www.bis.org/publ/bisbull15.pdf>.

- Federal Reserve Board of Governors. 2020a. "Federal Reserve Announces Extensive New Measures to Support the Economy." Press Release. Washington. <https://www.federalreserve.gov/newsevents/pressreleases/monetary20200323b.htm>.
- Federal Reserve Board of Governors. 2020b. "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." Press Release. Washington. <https://www.federalreserve.gov/newsevents/pressreleases/bcreg20200401a.htm>.
- Federal Reserve Board of Governors. 2020c. *Financial Stability Report*. Washington. <https://www.federalreserve.gov/publications/files/financial-stability-report-20201109.pdf>.
- Federal Reserve Board of Governors. 2021. "Federal Reserve Board Announces That the Temporary Change to Its Supplementary Leverage Ratio (SLR) for Bank Holding Companies Will Expire as Scheduled on March 31." Press Release. Washington. <https://www.federalreserve.gov/newsevents/pressreleases/bcreg20210319a.htm>.
- Financial Stability Board. 2015. "Transforming Shadow Banking into Resilient Market-Based Finance: An Overview of Progress." Progress Report. Basel. <https://www.fsb.org/2015/11/transforming-shadow-banking-into-resilient-market-based-finance-an-overview-of-progress/>.
- Financial Stability Board. 2020a. "Holistic Review of the March Market Turmoil." Basel. <https://www.fsb.org/wp-content/uploads/P171120-2.pdf>.
- Financial Stability Board. 2020b. "Global Monitoring Report on Non-Bank Financial Intermediation 2020." Basel. <https://www.fsb.org/wp-content/uploads/P161220.pdf>.
- Financial Stability Oversight Council. 2020. *Annual Report*. Washington. <https://home.treasury.gov/system/files/261/FSOC2020AnnualReport.pdf>.
- Fleming, Michael, and Francisco Ruela. 2020. "Treasury Market Liquidity during the COVID-19 Crisis." Blog post, April 17, Liberty Street Economics, Federal Reserve Bank of New York. <https://libertystreeteconomics.newyorkfed.org/2020/04/treasury-market-liquidity-during-the-covid-19-crisis.html>.
- Gete, Pedro, and Michael Reher. 2021. "Mortgage Securitization and Shadow Bank Lending." *Review of Financial Studies* 34, no. 5: 2236–74.
- Gorton, Gary, and Andrew Metrick. 2010. "Regulating the Shadow Banking System." *Brookings Papers on Economic Activity*, Fall, 261–312.
- Gorton, Gary, and Andrew Metrick. 2012. "Securitized Banking and the Run on Repo." *Journal of Financial Economics* 104, no. 3: 425–51.
- Government Accountability Office. 2016. "Mortgage-Related Assets: Capital Requirements Vary Depending on Type of Asset." Report to the Chairman, Committee on Banking, Housing, and Urban Affairs, US Senate GAO-17-93. Washington. <https://www.gao.gov/assets/gao-17-93.pdf>.
- Haddad, Valentin, Alan Moreira, and Tyler Muir. 2020. "When Selling Becomes Viral: Disruptions in Debt Markets in the COVID-19 Crisis and the Fed's

- Response.” Working Paper 27168. Cambridge, Mass.: National Bureau of Economic Research. <https://www.nber.org/papers/w27168>.
- Hoffman, Liz, and Gregory Zuckerman. 2020. “RBC Seeks Fire-Sale Buyers for Seized Mortgage Debt.” *Wall Street Journal*, March 25. <https://www.wsj.com/articles/rbc-seeks-fire-sale-buyers-for-seized-mortgage-debt-11585159333>.
- International Monetary Fund. 2018. *Global Financial Stability Report: A Decade after the Global Financial Crisis: Are We Safer?* Washington: Author. https://www.elibrary.imf.org/doc/IMF082/25319-9781484375594/25319-9781484375594/Other_formats/Source_PDF/25319-9781484376829.pdf.
- International Monetary Fund. 2020. *Global Financial Stability Report: Bridge to Recovery*. Washington: Author. <https://www.imf.org/en/Publications/GFSR/Issues/2020/10/13/global-financial-stability-report-october-2020>.
- Jackson, Howell E. 1999. “Regulation in a Multisectoral Financial Services Industry: An Exploratory Essay.” *Washington University Law Quarterly* 77, no. 2: 319–97.
- Kim, You Suk, Steven M. Laufer, Karen Pence, Richard Stanton, and Nancy Wallace. 2018. “Liquidity Crises in the Mortgage Market.” *Brookings Papers on Economic Activity*, Spring, 347–428.
- Klingler, Sven, and Suresh M. Sundaresan. 2020. “Diminishing Treasury Convenience Premiums: Effects of Dealers’ Excess Demand in Auctions.” Working Paper 3556502. Social Science Research Network, March 18. <https://doi.org/10.2139/ssrn.3556502>.
- Kothari, S. P., Dalia Blass, Alan Cohen, and Sumit Rajpal. 2020. *U.S. Credit Markets Interconnectedness and the Effects of the COVID-19 Economic Shock*. Washington: Securities and Exchange Commission, Division of Economic and Risk Analysis. https://www.sec.gov/files/US-Credit-Markets_COVID-19_Report.pdf.
- Li, Lei, Yi Li, Marco Macchiavelli, and Xing (Alex) Zhou. 2020. “Runs and Interventions in the Time of COVID-19: Evidence from Money Funds.” Working Paper. Social Science Research Network, December 29. <https://doi.org/10.2139/ssrn.3607593>.
- Liang, Nellie, and Pat Parkinson. 2020. “Enhancing Liquidity of the U.S. Treasury Market Under Stress.” Working Paper 72. Washington: Brookings Institution, Hutchins Center on Fiscal and Monetary Policy. https://www.brookings.edu/wp-content/uploads/2020/12/WP72_Liang-Parkinson.pdf.
- Maloney, Tom. 2020. “After \$50 Billion of Losses, No One Comes to Save Mortgage Market with \$50 Billion of Losses.” Bloomberg, April 3.
- Morris, Stephen, and Hyun Song Shin. 2008. “Financial Regulation in a System Context.” *Brookings Papers on Economic Activity*, Fall, 229–74.
- Pellerin, Sabrina R., Steven J. Sabol, and John R. Walter. 2013. “MBS Real Estate Investment Trusts: A Primer.” *Economic Quarterly* 99, no. 3: 193–227.
- Quarles, Randal. 2018. “Liquidity Regulation and the Size of the Fed’s Balance Sheet.” Speech given at Currencies, Capital, and Central Bank Balances: A Policy Conference, Stanford University, Stanford, Calif., May 4.

- Scaggs, Alexandra. 2020. "These Two Mortgage REITs Are Falling after a Spectacular Rally." *Barron's*, June 9.
- Schrimpf, Andreas, Hyun Song Shin, and Vladyslav Sushko. 2020. "Leverage and Margin Spirals in Fixed Income Markets during the Covid-19 Crisis." *BIS Bulletin* no. 2. Basel: Bank for International Settlements. <https://www.bis.org/publ/bisbull02.pdf>.
- Securities and Exchange Commission (SEC). 2017. "Order Approving a Proposed Rule Change, as Modified by Amendment No. 1, to Expand the Types of Entities That Are Eligible to Participate in Fixed Income Clearing Corporation as Sponsored Members and Make Other Changes." Washington: Author. <https://www.sec.gov/rules/sro/ficc/2017/34-80563.pdf>.
- Securities and Exchange Commission (SEC). 2019. "Order Approving a Proposed Rule Change to Expand Sponsoring Member Eligibility in the Government Securities Division Rulebook and Make Other Changes." Washington: Author. <https://www.sec.gov/rules/sro/ficc/2019/34-85470.pdf>.
- Securities and Exchange Commission (SEC). 2021. "Self-Regulatory Organizations; Fixed Income Clearing Corporation; Notice of Filing of Proposed Rule Change to Add the Sponsored GC Service and Make Other Changes." Washington: Author. <https://www.sec.gov/rules/sro/ficc/2021/34-92014.pdf>.
- Stein, Jeremy C. 2013. "Overheating in Credit Markets: Origins, Measurement, and Policy Responses." Speech given at Restoring Household Financial Stability after the Great Recession: Why Household Balance Sheets Matter, Federal Reserve Bank of St. Louis, St. Louis, Mo., February 7. <https://www.federalreserve.gov/newsevents/speech/files/stein20130207a.pdf>.
- Waldis, Matthew. 2020. "Understanding Margin Changes." Chicago: CME Group. <https://www.cmegroup.com/content/cmegroup/en/education/articles-and-reports/understanding-margin-changes.html>.
- Yadav, Yesha. 2019. "The Failed Regulation of U.S. Treasury Markets." Vanderbilt Law Research Paper 19-12. Social Science Research Network, April 19. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3365829.