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PREFACE

EIGHT YEARS HAVE PASSED since the “Great Financial Crisis” of 2008.

The efforts of legislators and financial regulators here and abroad have gone a long way toward protecting the safety and soundness of our large banks and financial institutions. An approach to assure the orderly liquidation of failing financial institutions is being developed in an effort to end concerns about “too big to fail” and the related “moral hazard.”

Yet the system remains vulnerable.

Highly leveraged and interconnected financial firms continue to rely on panic-prone funding structures, posing the clear risk of contagious “runs,” the central and highly damaging characteristic of the 2008 crisis. Many other documented crises in history, including the banking collapse in the early 1930s in the United States, demonstrate the fragility of borrowing short to lend long.

Today, it is not the heavily regulated traditional commercial banks that are the main source of concern. Rather, it is the lightly regulated nonbank financial institutions that are deeply reliant on uninsured short-term debt that pose significant risk. Moreover, critical elements in the market infrastructure need attention.

The point is not to inhibit the risk taking that is a vital characteristic of healthy markets or to prevent the failure of individual institutions. Instead, we need protection against the excesses that too easily cascade into a systemic crisis, impairing the basic functioning of the financial system, with huge costs to jobs, businesses, and economic growth.

Events before and after the recent crisis have confirmed that the present regulatory framework, with its redundancies and inconsistencies, simply is not up to the challenge. Timely and effective oversight of the complex and transforming “shadow banking” system is absent, while some regulations may bear too heavily or redundantly on the provision of essential customer services by true community banks.

The political dialogue has instead been preoccupied with “breaking up” the biggest banks or restoring “Glass-Steagall,” the law that separated commercial and investment banking. Those may be relevant concerns in terms of promoting ethical and competitive banking practices; of enhancing the ability of managements to oversee exceptionally large, complex, and dispersed enterprises; and of reducing conflicts of interest.

But let not that debate divert our attention and energy from the more pressing challenge of better assuring the stability of the modern financial system and its functional effective-

ness, however large and diversified its individual components.

This report sets out several constructive paths toward that end, dealing both with the critical vulnerabilities and the dysfunctional regulatory structure. It deserves serious consideration.

PAUL A. VOLCKER

A Word on Report Terminology and Scope

In this report, “bank” refers to any institution that accepts insured deposits. The nonbank subsidiaries, affiliates, and special purpose vehicles of bank holding companies (BHCs), as well as an array of other entities—including money market funds, broker-dealers, hedge funds, finance companies, private equity funds, and investment companies—are called “nonbank financial institutions.” These institutions are often referred to generally as shadow banks.

While this report touches on many significant issues of financial stability, it is not intended to address every such issue. For instance, reform of government-sponsored enterprises is a public policy matter that should be prioritized but is beyond the scope of this report. Moreover, the reforms highlighted in this report do not reflect a rigid vision for change and may be considered separately or in combination. They are intended to contribute to an ongoing dialogue on ways to mitigate systemic risk, and we hope that the report will help advance this important conversation.

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OVERVIEW

THE ECONOMIC AND SOCIAL COSTS of the 2008 financial crisis were enormous. According to the US Treasury Department, nearly nine million jobs were eliminated, more than five million Americans lost their homes, and almost thirteen trillion dollars of household wealth was erased, wiping out two decades of gains.¹

Yet eight years after the crisis, and in spite of significant reform efforts by regulators, the risk of busts and bailouts remains all too real. The fundamental reason is that highly interconnected nonbank financial institutions – or shadow banks – remain heavily reliant on runnable short-term debt² to finance their portfolios of longer-term and relatively illiquid investments and loans.

The maturity transformation inherent in this funding scheme carries risk. During periods of stress, short-term lenders can cut off borrowers, leaving them with insufficient funds to pay creditors. To stay afloat, borrowers may need to hoard cash, stop their own lending activities, and sell assets at below-market or fire sale prices – all of which can further destabilize the financial system. This dynamic was at the center of the 2008 crisis as well as other major financial crises in US history.³

Short-term debt remains an attractive funding source for financial institutions. Because it is overcollateralized, marked to market, and exempt from normal bankruptcy rules, it is less expensive than equity and long-term debt, and market participants do not bear the social cost of its excessive issuance.⁴ That the US tax code encourages the use of debt in general⁵ only heightens the appeal of short-term funding. While some forms of such debt are being used less than they were before the crisis, levels are expected to rise as monetary policy normalizes.⁶

Regulators have undertaken serious steps to make the financial system safer and more resilient, but little has been done to confront the risks of short-term debt. The regulatory response has not been comprehensive, either, which creates opportunities for risky activity to migrate to potentially less resilient and more opaque corners of the financial system. Put simply, absent more assertive action, short-term debt is likely to again trigger massive panics and bailouts.

The risk is amplified in a profoundly complex financial system, in which large firms are intertwined in many ways, including through central clearinghouses for over-the-counter (OTC) derivatives. While central clearing as mandated by the Dodd-Frank Act has helped make the financial system safer overall, a vast quantity of credit risk has become concentrated

in a handful of highly interconnected, systemically important clearinghouses.⁷ These clearinghouses lack appropriate incentives, risk management practices, and regulatory standards, and they can serve as a channel for losses to reverberate through the financial system.

Compounding matters, our regulatory framework itself remains problematic. Regulators struggle with outdated mandates and objectives that deprive them of a comprehensive understanding of risks in the system and the tools necessary to mitigate those risks. This disjointed apparatus also encourages regulatory arbitrage, fuels excessive risk taking, and impedes the effective implementation of policies to promote financial stability.

This report presents three policy options designed to enhance the resilience of the financial system and its regulation. The options seek to strike a balance between the objective of mitigating systemic risk and the deep-rooted principle that risk and loss are inherent in healthy financial markets, and to accomplish their goals in the least intrusive way possible. They are:

1. Roll back nonbank financial institutions' reliance on short-term debt. The report details two approaches for implementing this option. The first, an *incremental* approach designed to supplement the current regulatory response, encourages policymakers to consider the following three measures:

- *Require all money market funds (MMFs) and their close substitutes to publish a floating share price, or net asset value (NAV), and subject the funds to appropriate liquidity buffers.* Money market funds were a major source of instability in the 2008 crisis and remain vulnerable to runs, despite recent reforms.
- *Establish safeguards to mitigate the risk of fire sales after a major counterparty defaults.* Certain provisions in the US Bankruptcy Code can lead to the rapid termination of short-term funding and other contracts, which can cause financial panic.
- *Develop strategies for resolving systemically significant nonbank financial institutions.* Nonbank financial institutions, such as the hedge fund Long-Term Capital Management, American International Group (AIG), and Lehman Brothers, played a significant role in past crises and could again become a source of instability.

While those incremental measures could significantly enhance financial stability, they would not comprehensively confront the risk of short-term debt at its root. For that, we offer a second approach, which is *structural* in nature and encourages policymakers to examine the merits of the following three distinct measures.

- *Establish quantitative limits on short-term debt.* Significant nonbank financial institu-

tions would be precluded from issuing short-term debt beyond a certain percentage of their overall debt, and banks' use of nondeposit short-term debt would be confined to financing certain high-quality assets.⁸

- *Require assets to be pre-positioned with the Federal Reserve.* Bank and nonbank financial institutions' issuance of short-term liabilities would be limited to the pre-positioned amount, subject to an appropriate haircut determined by the Federal Reserve.⁹
- *Crowd out private maturity transformation.* The Fed would have to generate a sufficient amount of genuinely safe short-term instruments, such as interest-bearing reserves and reverse repurchase agreements (RRP), for the crowding out to occur.¹⁰

The report does not explicitly endorse any of these structural measures, but each could make the system safer. We offer them with the hope that their related monetary policy, moral hazard, and practical implications will be seriously discussed.

2. Fortify central clearinghouses for OTC derivatives. Clearinghouses have become vastly more important as a result of postcrisis reforms, yet their regulatory and supervisory standards contain major gaps and weaknesses. In addition, their risk management strategies and incentives have not been aligned with their newly assigned public purpose of mitigating systemic risk. Their failure could be catastrophic to the broader economy. This report urges that policymakers take the following measures:

- *Determine the ideal governance and ownership structure of central clearinghouses, including whether they should function and be regulated as nonprofit utilities.*
- *Establish an effective framework for their regulation and supervision, including credible capital, liquidity, stress testing, and loss-allocation standards, as well as robust resolution-planning standards.*
- *Craft a clear and effective statutory framework for their recovery and resolution to preclude the expectation of, or reliance on, a taxpayer bailout if they fail.*

3. Strengthen the structure for regulating financial institutions in the US. The financial regulatory structure in the United States is ineffective and outdated. This report encourages policymakers to adopt the framework proposed by the Volcker Alliance in its April 2015 report *Reshaping the Financial Regulatory System: Long Awaited, Now Crucial*. Specifically, executing the recommendations of this framework would:

- *Strengthen the authority of the Financial Stability Oversight Council (FSOC) to address*

systemically significant activities currently beyond the mandate of prudential regulators, streamline the FSOC's decision-making process, and insulate the council from outside influence.

- *Create a more streamlined framework for supervising banks and their holding companies, securities dealers, MMFs, clearinghouses, and nonbank systemically important financial institutions (SIFIs) under a newly established prudential supervisory authority (PSA), which would have a close nexus to the Federal Reserve, the Federal Deposit Insurance Corporation (FDIC), and the Securities and Exchange Commission (SEC).*
- *Reinforce the role of the Federal Reserve as the systemic risk regulator monitoring activities, practices, trends, and emerging problems across institutions and the financial system, and give it rulemaking authority for entities supervised by the PSA or as authorized by the FSOC.*
- *Integrate the regulation of the highly linked markets for securities and derivatives by merging the Commodity Futures Trading Commission (CFTC) into the SEC and ensuring independent, appropriate funding for the combined agency.*

The remainder of this report is organized as follows: Section I highlights the risk of short-term funding and provides steps to curtail its use. Section II describes the increasing importance of and risks associated with central clearinghouses for OTC derivatives and presents ways to strengthen their resilience. Section III makes the case for reforming the highly fragmented regulatory structure and offers suggestions for reorganizing it.

A Historical Perspective

Borrowing short term to lend long term is not new. Banks have depended on short-term, liquid deposits to fund longer term, illiquid loans for centuries. The maturity and credit transformation inherent in this funding structure is critical for economic growth because it enables banks to pool savers' funds and channel them toward productive purposes.

But maturity transformation also carries significant risk. American monetary history is replete with instances in which maturity transformation failed and triggered banking panics. During periods of economic stress, depositors frequently rushed en masse to their banks to withdraw money, exhausting the banks' reserves and triggering cascading bank failures with long-lasting consequences for the system.

Thousands of banks failed throughout US history, including in the panics of the late 1920s and early 1930s.¹¹ These panics undercut the stability of even well-run institutions that, by today's standards, would be considered small and well capitalized. These panics inflicted severe pain on people and prompted bold reform.

After the Panic of 1907, Congress established the Federal Reserve System as the nation's central bank and authorized it to serve as the lender of last resort to banks. Following the panics of the 1920s and 1930s, which ushered in the Great Depression, Congress passed the Glass-Steagall Act, which separated investment and commercial banking and established the FDIC. These and other important reforms were followed by an era of financial stability.¹²

But as the financial system changed—most dramatically in the two decades before the 2008 crisis—this era came to an end. The traditional banking model of deposit-funded loans held to maturity receded, and a shadow banking system deeply reliant on uninsured short-term debt emerged.

Short-term debt was relatively inexpensive—it was overcollateralized, marked to market, and exempt from the automatic stay normally applicable in insolvency proceedings. Nonbank financial institutions, which had little or no capital, few liquid assets, and did not internalize the social costs of instability from excessive issuance of short-term debt, took on tremendous leverage in these markets. This ignited in the financial markets the risk of runs that had plagued banks before deposit insurance.

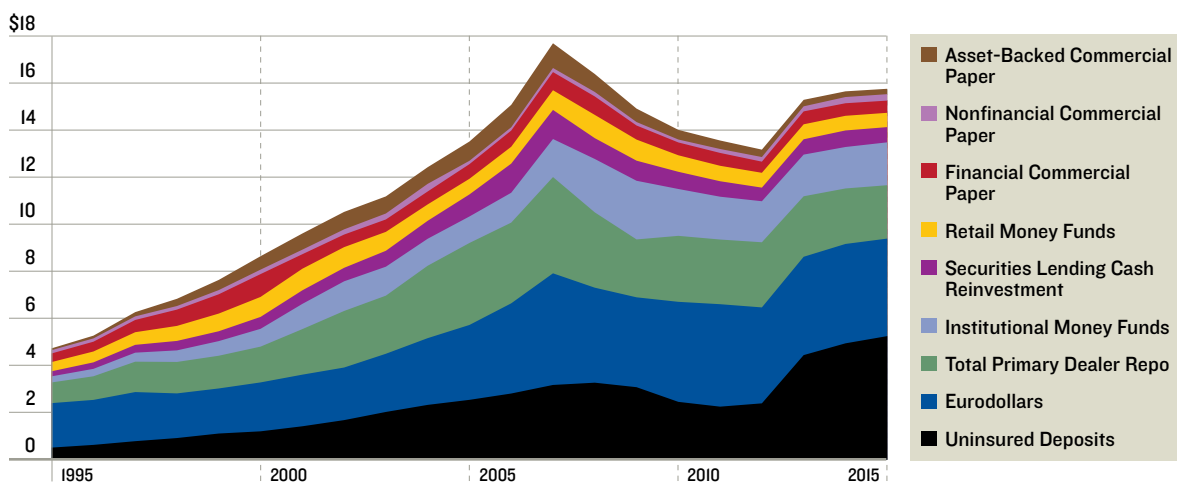
The risk was not theoretical. It materialized in 2007 when the housing market collapsed: Lenders lost confidence, the short-term debt markets unraveled, and financial institutions dependent on short-term loans either failed or required a taxpayer bailout to limit the devastating effects a total collapse of the financial system would have imposed on the US economy.

I. ROLLING BACK RELIANCE ON SHORT-TERM DEBT

THE SHORT-TERM DEBT MARKETS are large and complex. A diverse range of market participants relies on them for a variety of purposes. They provide an important opportunity for cash investors such as MMFs, corporate treasuries, municipalities, and insurers to make “safe” short-term investments. For securities dealers, hedge funds, nonbank lenders, and others, they are a lower-cost source of financing than longer-term debt or equity.¹³ The instruments that make up these markets are also diverse. They include repurchase agreements (repos), securities lending arrangements, secured and unsecured commercial paper, uninsured deposits, and eurodollars. (See Glossary on page 45.)

As Figure 1 illustrates, the uninsured short-term debt markets grew dramatically in the years leading up to the 2008 financial crisis, reaching a precrisis peak of roughly \$18 trillion,¹⁴ or about 120 percent of US gross domestic product and more than four times the amount of insured deposits. This growth can be attributed to a number of factors, including a rise in the cash holdings of foreign and institutional investors,¹⁵ the cap on FDIC insurance (which created the need to find an alternative to bank deposits),¹⁶ tighter banking regulations,¹⁷ interest rate dynamics, and the US Bankruptcy Code’s safe harbor exemption from the automatic stay, which normally applies in insolvency proceedings.¹⁸ If the debtor defaults, the exemption allows creditors to seize and immediately sell the debtor’s posted collateral.

FIGURE I Total Short-Term Debt Instruments (in trillions of dollars)



SOURCES Ricks (2016), FSOC, Federal Reserve Bank of St. Louis, US Treasury, Bank for International Settlements, FDIC, authors’ calculations.

In normal times, “short-term wholesale funding can help to satisfy investor demand for safe and liquid investments, lower funding costs for borrowers, and support the functioning of important markets, including those in which monetary policy is executed.”¹⁹ It can facilitate market making, support price discovery, and, according to some, instill discipline on bank management.²⁰

But as the 2008 crisis showed, overreliance on short-term funding also can be extremely damaging.²¹ If not monitored carefully, it can lead to a massive misallocation of capital, increase financial system leverage, and—far from instilling discipline—result in an accumulation of excesses.²² Short-term debt creates a so-called liquidity mirage that fuels extreme risk taking, distorts economic growth, and deepens the disconnect between Wall Street and Main Street.

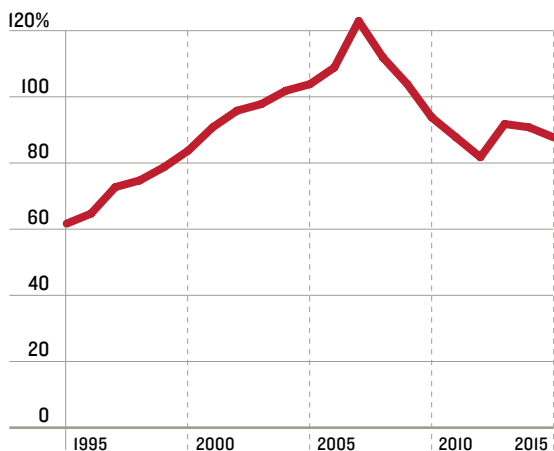
The effects of too much short-term debt are most destructive after an economic shock. The exuberance spurred by the liquidity mirage gives way to the unraveling of short-term debt markets. Financial institutions lose funding, and the effects of their stress or failure can propagate throughout the markets at lightning speed.

In the 2008 crisis, institutions that most depended on short-term funding experienced massive runs as their creditors stopped rolling over the loans or demanded more collateral. In response, these institutions hoarded cash, reduced lending, and liquidated their assets in fire sales. These moves exacerbated the crisis, amplifying the liquidity crunch and deepening the recession. Such institutions also suffered the greatest losses and required the most taxpayer assistance. If they survived, they took the longest to recover.²³

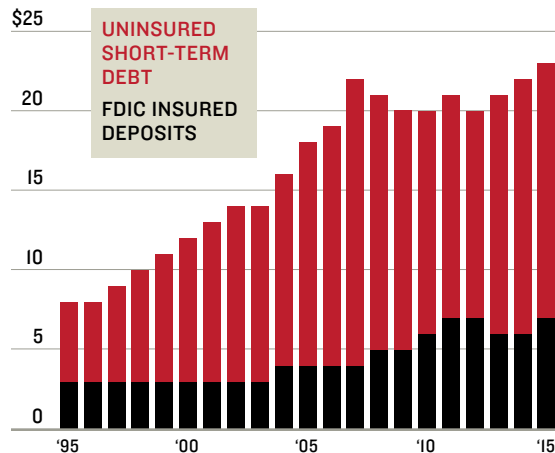
Bear Stearns and Lehman Brothers are powerful examples.²⁴ As Figures 4 and 5 illustrate, both were heavily reliant²⁵ on short-term funding and lost billions of dollars of liquidity in just a few days before they collapsed, throwing the broader financial system and economy into turmoil.²⁶ After Lehman imploded, the Reserve Primary Fund, a large money market fund that had lent to the firm on a short-term basis, broke the buck, or failed to maintain its \$1 share price.²⁷ It experienced a run from its own investors, which triggered hundreds of billions of dollars in redemptions from investors of other MMFs.²⁸ The panic was stanchied ultimately by a massive government guarantee of the entire MMF industry.

Regulators share the concerns about the risks of short-term debt.²⁹ For instance, in a speech in 2015, Federal Reserve Board Governor Daniel Tarullo gave this warning:

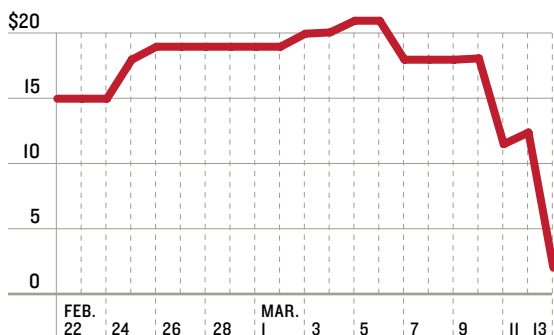
[T]he greatest risks to financial stability are the funding runs and asset fire sales associated with reliance on short-term wholesale funding.... If there is one lesson to be drawn from the financial crisis, it is that the rapid withdrawal

FIGURE 2 Percentage of Short-Term Debt to GDP


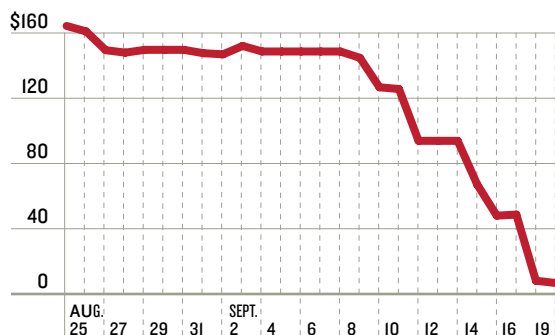
SOURCES Ricks (2016), FSOC, Federal Reserve Bank of St. Louis, US Treasury, Bank for International Settlements, FDIC, authors' calculations.

FIGURE 3 Insured Deposits to Uninsured Short-Term Debt Instruments (in trillions of dollars)


SOURCES Ricks (2016), FSOC, Federal Reserve Bank of St. Louis, US Treasury, Bank for International Settlements, FDIC, authors' calculations.

FIGURE 4 Loss of Liquidity at Bear Stearns, 2008 (in billions of dollars)


SOURCE SEC.

FIGURE 5 Lehman's Triparty Repo Borrowing (in billions of dollars)


SOURCE Copeland, Martin and Walker (2011), Federal Reserve Bank of New York.

of funding by short-term credit providers can lead to systemic problems as consequential as those associated with classic runs on traditional banks. When financial intermediaries must liquidate a substantial amount of longer-term assets that they can no longer fund, the impact can reverberate throughout the financial system. The resulting declines in asset prices can trigger margin calls on other investors, who themselves may need to de-lever by selling their own holdings, adding to the fire sale-induced price impact on these, and potentially

other, assets. In the worst case, the result can be the kind of generalized asset price decline and liquidity freeze observed at the height of the financial crisis.³⁰

Proponents of short-term funding have argued that it increases liquidity in the financial system. But in his book *The End of Alchemy: Money, Banking, and the Future of the Global Economy*, former Governor of the Bank of England Mervyn King provided another perspective:

Liquidity is an illusion; here one day, gone the next. It reminds me of those attractive soap bubbles that one can blow into the air. From a distance, they look appealing. But if you ever try to hold them in your hand, they disappear in a trice. And whenever at the same time many people try to convert their assets into a liquid form, they often discover that liquidity has disappeared without trace. When there is a sudden jump in the demand for liquidity and investors rush to convert their claims on illiquid assets into money, the result is usually a crisis, exposing the alchemy for what it is.³¹

Echoing this sentiment, FDIC Chairman Martin Gruenberg said in a speech in June:

The pre-crisis liquidity of financial markets was abundant, but it vanished during the crisis with devastating effects. It is worth remembering that between 2003 and 2007, the five largest U.S. investment banks doubled in size before they all failed, merged, or became bank holding companies. Insufficient capital and liquidity that was dependent on readily available short-term wholesale funding made these firms especially vulnerable to distress, and they became transmitters of financial instability.

Mr. Gruenberg went on to note that:

Effective prudential regulation should help promote *sustainable* liquidity conditions through time. Strong financial institutions that are better protected against losses, and less vulnerable to runs, should better insulate the financial system against a catastrophic failure of liquidity such as the one that occurred in 2008.³² (Emphasis original.)

Despite broad recognition of the hazards of short-term debt, the regulatory response has been piecemeal and inadequate. Next, we discuss that response and how it has fallen short.

A. Sizing Up the Regulatory Response

Regulators and supervisors, acting under the authority of the Dodd-Frank Act, have undertaken a significant effort to make financial institutions more resilient.

Most notably, large bank holding companies (BHCs) are required to fund themselves with more capital, hold more liquid assets, submit to regular stress testing, and develop living wills.³³ In addition, Title II of the Dodd-Frank Act has established an Orderly Liquidation Authority, which if invoked³⁴ would let the FDIC resolve any failing financial institution that poses a significant risk to the financial stability of the United States in a manner that imposes losses on shareholders and creditors, and prevents a taxpayer bailout.³⁵

A proposed rule would require large BHCs to meet a total loss-absorbing capacity by maintaining a higher level of unsecured long-term debt, which can be converted to equity during resolution.³⁶

Partly because of these and other measures, large BHCs are better capitalized and hold more high-quality liquid assets, which enables them to absorb more losses in a crisis. They also appear to rely less on certain forms of short-term funding on a net basis than they did before the crisis, and many of the prototypical short-term-funded shadow banks, such as structured investment vehicles, are less prevalent.³⁷

While these reforms are worthwhile, they fall short in some important ways.

First, they apply only to the prudentially regulated sector, and a significant amount of activity occurs outside prudential regulation. Further, as regulatory requirements tighten in that sector, more activity may migrate toward opaque and potentially less resilient corners of the financial system.³⁸

Second, capital requirements are a critical part of the postcrisis reform effort. But as some experts have observed, they (1) are extremely complex to implement effectively;³⁹ (2) may be arbitrated through the use of firms' own internal risk models⁴⁰ or through derivatives,⁴¹ many of which are booked outside the US to evade regulatory requirements;⁴² and (3) continue to lean heavily on static asset risk weights—a methodology that has been discredited⁴³ repeatedly, including during the 2008 crisis.^{44 45}

While higher capital requirements would undoubtedly be beneficial, they raise the fundamental question: How much capital is enough in a system so dependent on uninsured short-term, panic-prone funding? It is particularly important in light of how quickly funding runs can tear through the financial system.

Third, though the liquidity rules are more directly aimed at runnability, they also have some shortcomings. They are based on the questionable premise that certain types of non-Treasury securities can be easily liquidated in a panic.⁴⁶ Moreover, researchers, including at the Yale School of Management, have raised questions about how effective one of the liquidity

rules may turn out to be.⁴⁷

Fourth, while Title II of the Dodd-Frank Act is critically important, how certain nonbank financial institutions may be resolved remains an open question. For instance, the resolution of one or more of the small number of large, interconnected, and highly leveraged hedge funds could pose a significant challenge: No single regulator has a full view of the risks that such hedge funds pose to financial stability, large data gaps prevent regulators from gaining a sufficient understanding of such funds,⁴⁸ and it remains unclear which regulator would resolve them and how. Significant questions have also been raised about the effectiveness of the requirement for firms to hold large amounts of unsecured debt for conversion to equity in a crisis.⁴⁹

Finally, as previously noted, policymakers have established new stress-testing requirements for the largest banking firms. Stress testing is a valuable tool that lets supervisors assess on a forward-looking basis the adequacy of capital and impose remedial measures on those showing deficiencies.⁵⁰ But while stress tests can help assure the resilience of a banking organization, data constraints render their current design limiting. The Treasury Department's Office of Financial Research (OFR) has stated:

Currently, US regulators primarily use microprudential stress tests to examine a bank's resiliency to hypothetical shocks. These stress tests do not consider how a financial firm's response to a given shock might affect its counterparties, investors, and other financial institutions, much less how those effects could feed back to the firm. Evaluating those interactions would require a broad range of transaction level data on securities, derivatives, and short-term funding markets, such as repurchase agreements.⁵¹

Regulators also have taken limited steps outside the sphere of prudential banking regulation. For instance, the SEC has finalized a rule to require institutional prime MMFs (funds that invest in private debt) to implement a floating NAV. The rule further requires nongovernment MMFs to impose under certain circumstances withdrawal restrictions (gates) and liquidity fees to stem mass redemptions.⁵² Other reforms have also been finalized, including ones requiring securitizers to retain more credit risk (skin in the game),⁵³ enhanced disclosure for investors of securitized bonds,⁵⁴ and stronger internal controls for credit rating agencies.⁵⁵

While all these steps have been helpful, they are limited and face significant challenges. The MMF rule applies only to a shrinking subset of funds,⁵⁶ contains exemptions that reduce the reform's effectiveness,⁵⁷ and arguably may perpetuate rather than stem panics.⁵⁸ The scope of the skin in the game rule for securitizations exempts most mortgages – the very asset class

at the heart of the financial crisis.⁵⁹ This glaring exclusion prompted Barney Frank, former chairman of the House Financial Services Committee, to declare that “the loophole has eaten the rule.”⁶⁰

The rule intended to provide investors with greater disclosure – often referred to as Regulation AB II – does not apply to private placements. It was to these placements’ “sophisticated” investors that collateralized debt obligations (CDOs) were marketed in the lead-up to the crisis,⁶¹ and this market has seen a resurgence in the last four years.⁶² In addition, the credit rating agency reform keeps intact the misaligned incentives between securitizers, investors, and rating agencies, and creates novel problems.⁶³

Further reforms remain on the table. US regulators are considering the Financial Stability Board’s proposal to impose minimum margin requirements on repos and securities-lending transactions.⁶⁴ The requirements, which would apply on a marketwide basis to all participants, whether regulated banks or nonbanks, could prove an effective tool to reduce procyclicality. But maintaining requirements at correct levels may be challenging given the difficulty of setting adequate haircuts, particularly on an international basis.

Finally, an area that has received little attention from Congress is the Bankruptcy Code’s safe harbor from the automatic stay. Contrary to their stated purpose of enhancing systemic stability, “considerable evidence shows that, when they matter most – during a crisis – the safe harbors exacerbate the crisis, weaken critical financial institutions, destabilize financial markets and then prove costly to the real economy.”⁶⁵ The safe harbors remain a significant trigger for marketwide fire sales after a major market participant defaults,⁶⁶ and they represent a serious impediment to safe failure resolution.⁶⁷ Yet they remain on the books, continuing to incentivize and encourage dangerous short-term funding at the expense of more stable forms of funding, such as equity and long-term debt.⁶⁸

A twenty-four-hour stay was established under Title II of the Dodd-Frank Act, but it would apply only if Title II were actually triggered under any given scenario. Even if Title II were triggered, it is unclear whether its reach would extend across international boundaries. Bank dealers have voluntarily added language in their financial contracts as part of the International Swaps and Derivatives Association protocol that has the effect of the short stay, but that too has some limitations.⁶⁹ These uncertainties dampen the effectiveness of the short-term stay contemplated under the Dodd-Frank Act. A rule proposed by the Federal Reserve aimed at addressing the cross-jurisdictional issues has not been finalized.

While levels of some forms of short-term funding have declined in recent years – partly

because of the regulatory response—policymakers should not become complacent, as these points demonstrate:

- Trillions of dollars of short-term debt continue to roll over regularly, with a range of financial institutions relying on these markets to finance their activities.
- The lower numbers “[do] not necessarily mean they are at safe or optimal levels. And it seems quite reasonable to expect that new forms of financial intermediation based substantially on runnable funding could develop in the future.”⁷⁰
- There is no assurance that the level of short-term debt will not again meet or exceed its precrisis peak as monetary policy normalizes and the lessons of the last crisis recede over time.⁷¹
- The decline pertains to areas that are visible to and measurable by regulators. Potentially important portions of the short-term funding markets remain hidden from regulatory view.⁷² Though progress is being made by regulators, the size of the bilateral repo and securities-lending markets is not known exactly. Also not known with certainty is the tenor, rates, haircuts, the nature of collateral, or the extent of rehypothecation or repledging of collateral, in those markets.⁷³
- According to the OFR, “The migration of securities financing activities to less-regulated sectors is also a potential risk. For repo and securities lending markets, this migration cannot be systematically tracked because of a lack of consolidated reporting.”⁷⁴ The use of synthetic financings may also muddy the water. These transactions are economically similar to short-term funding transactions but are structured using swaps.
- Finally, according to recent data, while overall levels of triparty repo have declined for large dealers within BHCs, their use of riskier, nongovernment collateral, such as corporate bonds and equities, has increased.⁷⁵

Put simply, uninsured short-term funding remains a threat to financial stability. As interest rates normalize, incentives to engage in even more short-term borrowing and lending will return. Despite recent reforms, the financial system will remain prone to funding runs and make failure resolution all the more difficult. Reforms that directly target run-prone funding structures are required to ensure the health and well-being of the financial system and the broader economy. In a speech earlier this year, Mr. Tarullo said, “I continue to believe that the postcrisis work to create a solid regime to protect financial stability cannot be deemed complete without a well-considered approach to regulating runnable funding outside, as well as inside, the regulatory perimeter.”⁷⁶

B. Approaches and Measures

Incremental Approach Measures

1. Require all MMFs and their close substitutes to publish a floating NAV and be subject to appropriate liquidity buffers. This proposal recognizes that MMFs function essentially as deposits and, therefore, are prone to banklike runs. To address this problem, this option would require all MMFs and their close substitutes to float their NAVs. This rule would also eliminate the option for MMFs to account for assets at amortized cost if they have a maturity of less than 60 days. These requirements would help eliminate the “first mover advantage” embedded in MMFs and directly address the view that they are alternatives to bank deposits. The Regulatory Structure section later in this report proposes that MMFs be regulated by a new PSA, which could administer these requirements.⁷⁷

2. Narrow the scope of the Bankruptcy Code safe harbors to include only Treasuries and agency securities backed by the full faith and credit of the US on a prospective, phased-in basis.⁷⁸ This proposal would dramatically reduce the risk of runs and fire sales after the default or bankruptcy of a major counterparty. Only the most liquid forms of collateral would be permitted to be seized and immediately sold by short-term lenders in case of default. Importantly, since Fannie Mae and Freddie Mac securities are not backed by the full faith and credit of the United States, they would not be eligible for safe harbor protection. Likewise, rehypothecated or reused securities would not receive safe harbor protection.

A challenge in implementing this approach could be regulatory circumvention. Market participants could attempt to structure short-term funding transactions as swaps, which have their own safe harbor from the automatic stay in the Bankruptcy Code. To minimize that possibility, policymakers should preclude safe harbor protection for swaps that are functionally equivalent to short-term funding. While this measure is focused on safe harbors for short-term debt, narrowing them for all “qualified financial contracts” should also be seriously considered.

3. Lengthen maturities of short-term funding transactions backed by nongovernment collateral. Even with the narrowing of safe harbors as provided above, it is likely that illiquid nongovernment collateral will continue to be used in short-term funding transactions. One reason might be a robust demand from institutional investors for safe assets to borrow and lend against. Therefore, a firm known to be in distress could experience a preemptive run by short-term lenders that fear losing access to such collateral in insolvency proceedings.

To help prevent this outcome, this proposal would lengthen the maturity of transactions backed by nongovernment collateral. This could help ensure that a distressed firm does not lose funding abruptly and get pushed into insolvency. One possibility is to require that such transactions be structured as ninety-day “evergreens,” which would automatically renew each day on preestablished terms until one of the counterparties declines to renew.⁸⁰ This would allow firms at least ninety days to find alternative means of funding.

4. Establish cash collateral reinvestment requirements for securities lending transactions. There are no uniform collateral reinvestment standards, since financial institutions are regulated by different regulatory agencies. Cash collateral is often reinvested in MMFs or in the repo market directly. During the crisis, AIG reinvested cash collateral into mortgage-backed securities and was unable to return it to its nervous counterparties seeking immediate access to their cash. Data limitations prevent a thorough analysis of marketwide cash collateral reinvestment practices. This report encourages regulators to continue data collection in this area and establish conservative, appropriately tailored systemwide standards for reinvesting cash collateral.

5. Move forward with developing resolution strategies for systemically significant nonbank financial institutions. The Dodd-Frank Act requires nonbank SIFIs to develop resolution plans. Three nonbank financial institutions have been designated so far. This does not mean there are no other financial institutions whose stress or failure could destabilize the financial system. Moving forward with nonbank resolution strategies will help ensure that the failure of nonbank financial institutions can be managed with minimal spillover into the rest of the financial system. For instance, developing an understanding of how the largest, most leveraged hedge funds may be resolved in a systemic scenario could make a major contribution to financial stability.

These measures could substantially enhance the stability of the financial system and build on what regulators are doing in response to the 2008 crisis. If implemented, they could eliminate the possibility of runs in MMFs, mitigate the risk of fire sales following the default of a major market participant, establish conservative securities lending cash collateral reinvestment practices, and move toward developing robust resolution strategies for important nonbanks under the Bankruptcy Code.

A limitation of these measures is that they would apply primarily to secured short-term funding techniques. Runnable short-term debt instruments, however, include various types of short-term funding, both secured and unsecured, including commercial paper and uninsured

deposits. In fact, excessive focus on collateralized markets could create arbitrage opportunities for market participants to exploit. Though more sweeping in nature, the structural measures outlined below would apply to all forms of short-term debt instruments and more directly confront the risks of short-term funding than the incremental approach outlined above.

Structural Approach Measures

A considerable number of proposals have been generated to address the risks of short-term debt, underscoring the need for action. Most proposals have acknowledged benefits, but many are often dismissed as politically or otherwise impractical. Such criticism should not stifle needed argument on tackling these risks at a deeper, more structural level. This report offers three proposals for advancing that objective.

The first presents a new idea for setting quantitative limits on the use of short-term funding by large banking organizations and nonbank financial firms.⁸¹ The second shares elements with a proposal in *The End of Alchemy*.⁸² The third proposal is based on Robin Greenwood, Samuel G. Hanson, and Jeremy Stein's "The Federal Reserve's Balance Sheet as a Financial-Stability Tool."

All three approaches are outlined below, together with an assessment of their strengths and potential weaknesses. The report does not explicitly endorse these approaches and suggests that the monetary policy, moral hazard, and practical implications of each approach be given serious consideration.

Structural Measure I: Restricting Issuance of Short-Term Debt

This measure aims to help reduce the potential for runs caused by certain bank and nonbank financial institutions' extensive use of nondeposit short-term debt or debt equivalents to fund the acquisition of long-term assets. It proposes to do this with the simple, transparent tool of setting limits on such use that arguably can be applied without the need for intrusive regulation.

Applicability to Nonbank Financial Firms The first part of this proposal would limit large nonbank financial companies (for instance, those with debt of a \$1 billion or more on a consolidated basis) from relying on short-term debt funding in excess of a limited percentage of their consolidated total liabilities (say, 5 percent).

Nonbank financial companies would be defined as companies, including bank affiliates and subsidiaries, incorporated in the United States, or incorporated abroad and doing busi-

ness in the US, that have 85 percent or more of gross revenues or consolidated assets derived from activities that are financial in nature.

To prevent evasion or regulatory arbitrage, debt would be broadly defined to include any loan, contract for the sale and repurchase of a financial instrument, derivative, or any other instrument having the same economic result as a loan or sale and repurchase contract. The focus would be on this limited class of financial intermediary firms and their funding with short-term debt of all kinds: Runs on these firms carry a high risk of contagion, with disastrous effects on financial system stability.

The definition of nonbank financial companies and the thresholds outlined above and in the second part of this proposal may be adjusted, including for the purpose of achieving the objective of minimizing runnable debt to levels that would avoid financial system instability.

The proposal would exempt (1) manufacturer-affiliated finance companies exclusively dedicated to financing the sale of the parent's goods and services; (2) MMFs that have a float-ing NAV and liquidity buffers similar to those applicable to banks; and (3) any funding by a covered nonbank company for the purpose of buying, selling, trading, or holding full faith and credit obligations of the United States provided that such obligations are not rehypothecated by the covered company buyer, seller, lender, trader, or holder.

Applicability to Depository Banks This second part of the measure, which applies to banks, recognizes that banks' business model involves maturity transformation. As such, banks are subject to capital and liquidity requirements and strict prudential supervision, and have access to lender of last resort support and to deposit insurance. Taking these factors into account, as well as the impact of the newly adopted liquidity coverage ratio as applied to large banks, a limited form of the proposal described above would be applied to banks for the purpose of further reducing run risks on short-term nondeposit liabilities.

Specifically, banks with \$50 billion or more in consolidated assets would be permitted to rely on nondeposit short-term funding for the sole purpose of financing assets eligible for discounting by the Federal Reserve, provided that such assets were subject to no more than a 15 percent haircut. This arrangement would prevent or mitigate runs by assuring that systemically significant banks would always have readily available liquidity to counter a run by short-term creditors. The safety and soundness of banking organizations would be further reinforced by the limited reliance on short-term funding by nonbank subsidiaries and affiliates of banking organizations, which include the largest broker-dealers.

Both the nonbank and bank elements of this approach would be phased in and become

fully effective five years after adoption, giving affected businesses time to adjust to the new debt structure requirements. To assure transparency of compliance, all covered companies would have to publish an online monthly report of the total amounts of their outstanding debt and short-term debt, and the term and amount of each debt instrument liability aggregated by maturity period. Establishing a private right of action for those suffering damages from a financial institution's nonconformance would enhance compliance with proposed limits on short-term funding. The proposal's basic concepts could be implemented under the FSOC's and Federal Reserve's existing authority or fully implemented under specific legislation by Congress.

Assessment of Pros and Cons This proposal has several potential benefits. Most important, it effectively reduces panic-prone funding structures without contributing to moral hazard. It achieves this in a simple and enforceable manner, without the need to extend the regulatory perimeter. Further, as many have observed, the issuance of short-term debt instruments is akin to the private creation of money—a privilege accorded to chartered banks, which are prudentially regulated. In this regard, the proposal reduces such money creation, which has proliferated in recent decades and increased systemic risk.

In concept, if short-term funding can be limited to safer levels, nonbank financial firms can take such risks as they deem appropriate, with gross errors in resource allocations corrected through markets and normal bankruptcy proceedings, without endangering financial system stability. That is because failed firms—and the system as a whole—will have insignificant runnable debt and an amount of longer-term funding that can allow them to absorb losses in a bankruptcy proceeding with fewer systemic consequences.

The proposal also has drawbacks. If implemented, it would require fundamental changes in how finance is intermediated. An extended phase-in would be required. If international agreement is not reached on such a proposal, cross-border arbitrage could mean that US financial institutions would be at a disadvantage to their global counterparts. Strong financial structures are most often a competitive advantage, however. In addition, most large financial institutions are in the US market and would have to conform to the proposal with respect to their worldwide debt structure in order to participate in the US market.

Structural Measure 2: Pre-Positioning Collateral at the Central Bank

This approach shares elements with a proposal in *The End of Alchemy*. Banks as well as nonbank financial institutions would be required to pre-position assets with the Federal

Reserve that they could borrow against during a crisis. For each type of asset, the Fed would calculate a haircut, which would have to be set relatively high based on the Fed's assessment of asset quality. The central bank could, at its discretion, reject any assets from being pre-positioned.

The amount a financial institution—bank or nonbank—could borrow against the pre-positioned assets, plus any central bank reserves, would be that institution's effective liquid assets. Its effective liquid liabilities (composed of total short-term secured debt and unsecured debt of less than one year, including functionally equivalent derivatives) could not exceed its effective liquid assets. (Whereas Mr. King's proposal excludes secured short-term debt from effective liquid liabilities, this measure includes them in recognition of its risks.) This would limit an institution's short-term debt, thereby reducing its leverage and interconnectedness. The institution could continue to fund itself at any level using equity and long-term debt.

Consider the following example, modified from *The End of Alchemy*. An institution has \$100 million in assets; \$10 million is in cash reserves at the Federal Reserve, \$40 million is in holdings of relatively liquid securities, and \$50 million is in loans to businesses. If the Fed decides that the appropriate haircut is 10 percent on the liquid securities and 50 percent on the illiquid loans, it will be willing to lend \$36 million against the former and \$25 million against the latter, provided that the entity pre-positioned its assets as available collateral. Its effective liquid assets would be \$71 million, and the entity could finance itself with no more than \$71 million in short-term debt. A long phase-in period could allow financial institutions to comply with these requirements without significant disruption. This proposal too would have to be evaluated in light of the impact of the Federal Reserve's liquidity coverage ratio.

Assessment of Pros and Cons This measure has several advantages. First, as Mr. King notes, it “recognizes that in a real crisis the only source of liquidity is the central bank, supported by a solvent government, which can convert illiquid assets into liquid claims.”⁸³ Second, it provides financial intermediaries and the markets an element of predictability, since the level of liquidity support available to an institution would be widely known. Third, intermediaries could choose their own funding structures within given parameters, retaining some flexibility in the funding of their activities. Fourth, the proposal addresses moral hazard associated with the conventional lender of last resort, and the pre-positioned assets at relatively high haircuts would serve as an insurance policy against losses for taxpayers. Fifth, it is comprehensive, addressing all forms of short-term debt, secured and unsecured, reducing opportunities for arbitrage. Finally, if effectively implemented, financial regulation could arguably be

streamlined and made simpler given the restrictions on short-term funding.

This measure is not without flaws. The Federal Reserve will be lobbied to keep haircuts low, and taxpayers could be on the hook in a crisis if haircuts are too low. Mr. King says, “No doubt in normal times there will be pressure on the central bank to set haircuts to favor politically popular types of bank lending and intense lobbying by banks to lower the haircuts.”⁸⁴ In fact, it is hard to see how the Fed could have imposed a high haircut on large direct and indirect holdings of mortgage-backed securities by bank and nonbank financial firms in the period before 2007. Moreover, this measure would also require the Fed to keep a large balance sheet on a permanent basis, which could create challenges in the transmission of monetary policy.

Structural Measure 3: Crowding Out Private Maturity Transformation⁸⁵

This proposal is based on the premise that when demand for moneylike assets exceeds supply, the private sector will step in and create its own short-term, moneylike instruments. Further, because private financial intermediaries do not internalize the social cost of private maturity transformation, they issue an excessive amount of runnable, short-term claims, which puts the economy at risk for devastating panics.⁸⁶

Messrs. Greenwood, Hanson, and Stein argue that the Federal Reserve should maintain a relatively large balance sheet to ensure an ample supply of government-provided, safe short-term claims, such as interest-bearing reserves and reverse repos (RRP).⁸⁷ The authors say that by increasing the supply of such claims, the Fed could weaken the market-based incentives for private sector intermediaries to issue too many short-term liabilities, thus allowing the Fed to crowd out private sector maturity transformation.

This measure rests on three underlying assumptions for which the authors provide detailed evidence.⁸⁸ One, a special demand for short-term claims leads certain investors to pay a higher premium—the money premium—for these moneylike instruments. Two, the government can influence the money premium by fluctuating the supply of short-term government claims. Three, because there is partial substitutability between government and private short-term debt, changes in the supply of government claims will affect the amount of private short-term debt issuance.

Assessment of Pros and Cons This approach has conceptual benefits. First, it would directly impact market prices and incentives, and apply comprehensively to institutions across the financial sector. Therefore, it would not be susceptible to regulatory arbitrage or lead to activities migrating to less regulated sectors. Second, as monetary policy normalizes in the

coming years, funds are expected to flow from sticky deposits to run-prone instruments such as MMFs, which invest in run-prone instruments like commercial paper and repos. This proposal can be effective in leaning against such a dynamic. Third, it would serve as a complement to the regulatory response by addressing what the authors see as unintended consequences of new liquidity and leverage rules.⁸⁹

The plan's drawbacks also must be assessed. Because the Federal Reserve would need to maintain a permanently large balance sheet, some argue that the plan could create challenges in the transmission of monetary policy, expose the Fed to increased interest rate risk, imperil the Fed's independence, and increase moral hazard. Moreover, as some have argued, the Fed's large RRP program itself could be destabilizing in a crisis, as investors may rush to safety by lending to the Fed instead of other market participants, thereby perpetuating the fire sale dynamic.

Messrs. Greenwood, Hanson, and Stein, however, argue that today's Fed possesses a more multidimensional tool kit and can achieve financial stability while fulfilling its traditional mandates.⁹⁰ The authors also suggest that fiscal risk may be mitigated by reducing the average maturity of bonds backing the Fed's moneylike liabilities to between two to six years from the current eight years and six months. The authors further contend that the risk of the Fed's RRP program exacerbating instability could also be mitigated by capping the program and keeping RRP interest rates low during a panic.

C. Economic Growth and Liquidity

Many commentators have observed that finance has become an end in itself instead of a means to an end, and that it no longer sufficiently serves the real economy. That in turn leads to sluggish growth and exacerbates the divide between Wall Street and Main Street.⁹¹ The proposals highlighted above would help combat that trend by building safeguards to protect the economy from the dangers of short-term funding.

The short-term funding markets are replete with special treatment and implicit government backstops. These protections can result in the mispricing of risk and misallocation of capital, create a liquidity mirage, and contribute to debt-fueled bubbles. These conditions can magnify the effects of a severe economic shock, which as we have observed firsthand can devastate the real economy and inflict pain on people. The approaches highlighted in this report would help reduce or eliminate these harmful implicit government subsidies.

The dangers of short-term funding outside the bank safety net are now also well acknowl-

edged. Financial institutions more reliant on short-term funding were among the hardest hit in the crisis, requiring the most taxpayer assistance and taking the longest to recover, if they survived. Indeed, economists at the International Monetary Fund (IMF) have found that “short-term wholesale funding is the most significant balance sheet determinant of individual contributions to global systemic risk.”⁹² Others have argued that short-term funding is the key factor in predicting financial crises, because it not only increases leverage but does so with unstable funds.⁹³

Some might argue that short-term funding is necessary for economic growth. In fact, excessive reliance on short-term funding does not improve economic conditions but can be a drag on growth. One study coined the term “maturity rat race” to describe the competition among firms to offer shorter-term funding, examples of which can be seen in the rise in the use of overnight repos leading up to the crisis.⁹⁴ Other academics show that the private sector will engage in excessive issuance of short-term debt because participants do not bear the cost of their actions contributing to a crisis.⁹⁵

Perhaps most important, liquidity in the short-term debt markets will disappear in a crisis, and a crisis can wipe out the gains of prior decades. Placing limits on short-term debt would be well worth the enhanced stability of the financial system over the long run. As Adair Turner wrote in his book *Between Debt and the Devil*:

Too tight controls, the banking industry have warned, will reduce “liquidity” in crucial markets and impair the financial system’s ability to provide new credit to the economy or to deliver the benefits of efficient price discovery. Similar arguments have been made against increases in the capital that banks have to hold against assets held for trading.

But if more liquidity and more credit are not limitlessly beneficial, these objections are invalid. If markets in subprime mortgage credit had been less liquid in the pre-crisis years, less subprime credit would have been extended, fewer lower income Americans would have been tempted into unaffordable debt, and the world financial system would have been more stable. Tight regulation of all nonbank activities that involve bank-type risks should not be diluted out of fear that market liquidity or credit supply will be reduced.⁹⁶

The emergence of nondeposit runnable debt markets is fairly recent. These markets were small from 1950 to 1980 and began to grow explosively only in the mid-1990s. The postwar period until 1990 was a golden age of US economic growth. One reason for that was the limited

quantity of run-prone funding, which reduced the likelihood of massive misallocations of capital and consequent financial panics—a major source of severe macroeconomic contractions. More importantly, it shows that large runnable debt markets are not a prerequisite for robust economic growth. To the contrary, they can be deeply damaging to the real economy.

II. STRENGTHENING THE RESILIENCE OF CENTRAL CLEARINGHOUSES FOR OVER-THE-COUNTER DERIVATIVES

THE OTC DERIVATIVES MARKET was a major source of instability in the 2008 financial crisis. Derivatives contracts exposed counterparties to each other's credit risk, trades were negotiated through an informal dealer network, and regulators had little if any insight into these markets.⁹⁷ The near-collapse of AIG provides a potent example of how opaque exposures and a web of entanglements from these markets almost brought down the entire financial system.⁹⁸

In 2009, to enhance transparency and reduce counterparty credit risk, domestic and international policymakers agreed that all standardized OTC derivatives—those standardized as to contractual terms—would be cleared through central clearinghouses.⁹⁹ The purpose of these reforms was “to improve transparency in the derivatives markets, mitigate systemic risk, and protect against market abuse.”¹⁰⁰

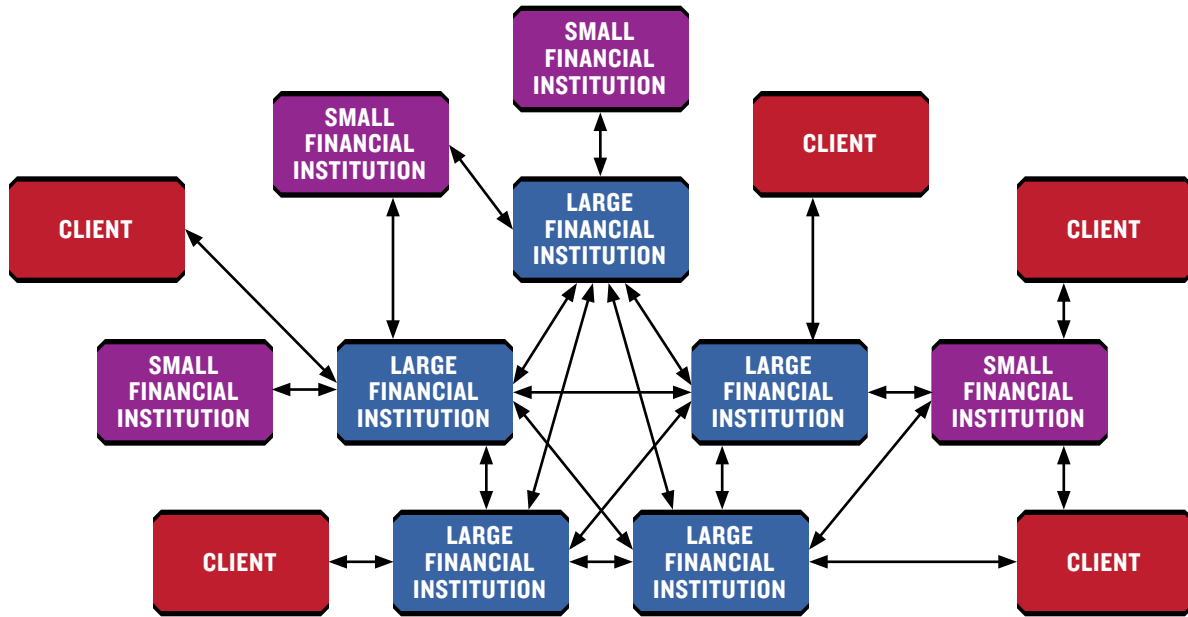
Clearinghouses interpose themselves between counterparties to OTC derivatives contracts, becoming the buyer to every seller and the seller to every buyer. To protect themselves from credit losses, clearinghouses restrict clearing privileges to their members. They are required to meet minimum financial qualifications, agree to be bound by the rules of the clearinghouse, post margins on cleared transactions, and contribute to a common default or guarantee fund.¹⁰¹

Clearinghouses can provide significant benefits. Through multilateral trade netting,¹⁰² they can reduce a clearing member's exposure to individual counterparties, mitigate overall credit risk, and bring greater transparency to counterparties and regulators (see Figure 6). As Federal Reserve Governor Jerome Powell has explained:

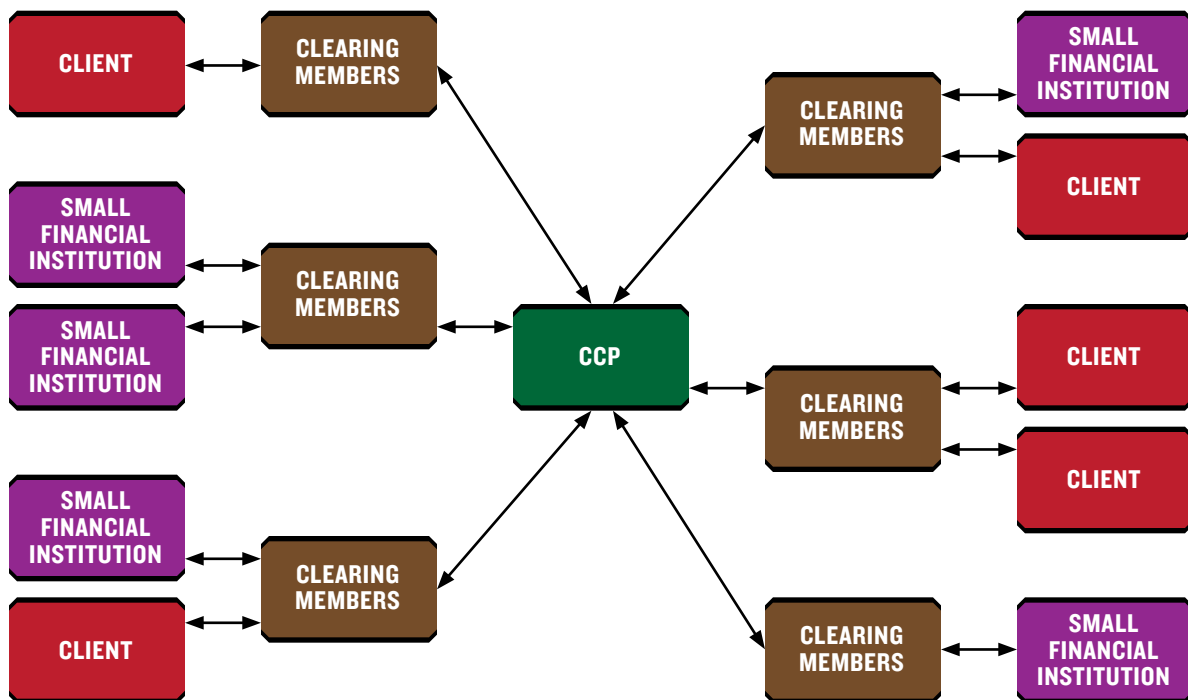
By design, central clearing offers important advantages over a bilateral market structure in which no participant can know the full extent of its counterparties' risk exposures. The hub-and-spoke structure of central clearing enables the netting of gains and losses across multiple market participants, which has the potential to significantly reduce participants' aggregate counterparty risk exposure. Central clearing also improves transparency, which is important in reducing incentives for market participants to pull away from other institutions in times of stress.¹⁰³

While central clearing has some obvious benefits and has helped make the financial sys-

FIGURE 6 Bilateral Derivatives Market



Centrally Cleared Derivatives Market



NOTE Clearing members consist mostly of large financial institutions.

SOURCE Financial Stability Oversight Council, 2015.

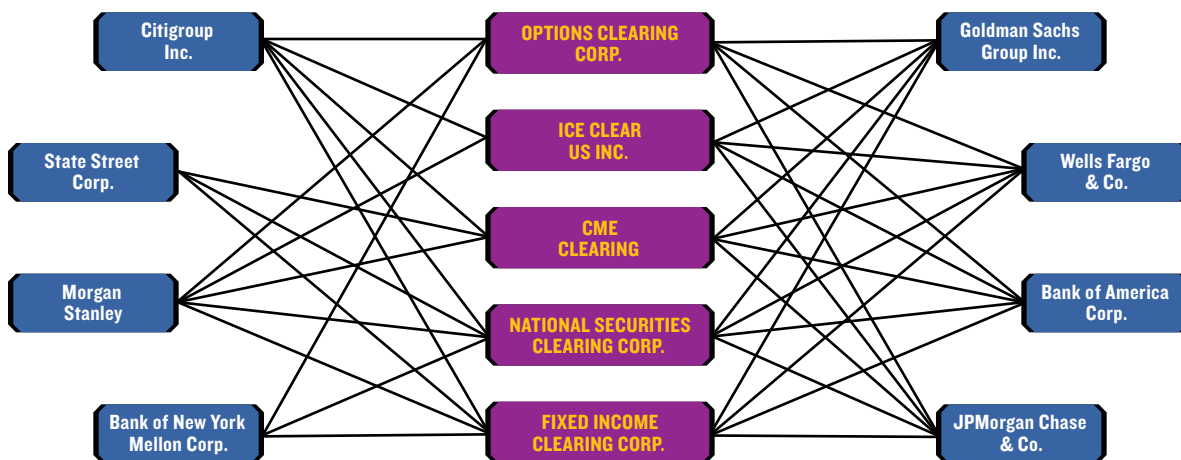
tem safer overall, concerns have arisen that clearinghouses themselves might pose a threat to financial stability.¹⁰⁴ These concerns revolve around the facts that (1) a vast amount of credit risk that was previously dispersed across a small group of banks and other financial institutions is now concentrated in a handful of systemically significant clearinghouses that have intensified the interconnections in the financial system; and (2) while policymakers have chosen to rely on clearinghouses to mitigate systemic risk, many clearinghouses’ interests, risk management and recovery practices, and regulation may not be aligned with the broader aims of financial stability.¹⁰⁵

A. Increased Concentration and Intensified Interconnections

As a result of the central clearing mandate, more OTC derivatives are being centrally cleared. Over 70 percent of all new OTC derivatives, including 80 percent of all new interest rate swaps and 70 percent of all new CDS based on credit indices, are centrally cleared, most through a handful of clearinghouses.¹⁰⁶ As a result, a small number of systemically significant clearinghouses are assuming vast quantities of counterparty credit risk that was previously being dispersed among other financial institutions.

Central clearing also intensifies financial system interconnectedness. For instance, every global systemically important bank (GSIB) is a clearing member of virtually every systemically significant clearinghouse, and many of those clearinghouses have cross-margining agree-

FIGURE 7 Linkages among Clearinghouses and Large Bank Holding Companies



SOURCE Office of Financial Research.

ments with one another. In addition, various systemically important clearing members provide critical services, such as custody and emergency liquidity lines, to clearinghouses of which they are members.

Important nonmembers may also provide critical services. For instance, a consortium of twenty global insurers offers insurance products to systemically important clearinghouses.¹⁰⁷ The Options Clearing Corporation—a systemically significant financial market utility—has a \$1 billion repo liquidity arrangement with CalPERS, the nation’s largest public pension fund.¹⁰⁸

Substantial concentrations of OTC derivatives risk remain within the largest clearing members. For example, as of first-quarter 2016, the largest US banks still primarily used bilateral settlement for their credit derivative transactions.¹⁰⁹ The riskiest, most complex, and illiquid OTC derivatives—potentially the most dangerous from a financial stability perspective—are likely to remain uncleared for the foreseeable future.¹¹⁰ This indirectly exposes clearinghouses to additional risk.

Other interconnections could arise from clearinghouse investments. A significant portion of clearinghouses’ own funds, as well as their clearing members’ posted margin, is invested in MMFs and the short-term funding markets, including repos. This could exacerbate liquidity risk at the clearinghouses in times of stress, further destabilizing members and the clearinghouse itself.

Few doubt that the failure of a clearinghouse would be catastrophic. In a 2015 report, the Office of Financial Research warned that “the failure of a CCP [clearinghouse] could impose losses on major financial firms and disrupt the operations of other parts of the financial system.”¹¹¹ A failure would result in the loss of critical services, financial contagion to systemically significant clearing members and other financial institutions, and fire sales of collateral and derivatives contracts. Since the systemically significant clearinghouses can have access to emergency liquidity from the Federal Reserve, the current central clearing construct increases moral hazard.

B. Misaligned Incentives, Risk Management Practices, and Regulatory Standards

Although policymakers look to clearinghouses for the public purpose of mitigating systemic risk, the interests, incentives, and risk management strategies of some clearinghouses have not been adequately aligned with the broader aims of financial stability. Specifically, many of the largest clearinghouses are for-profit businesses that answer to shareholders and have

not historically been designed to mitigate systemic risk.¹¹² Far from mitigating systemic risk, clearinghouses compete with each other for business and have an incentive to keep margins and clearing costs low for their members.¹¹³

Their risk management strategies reflect this misalignment.¹¹⁴ For instance, during stressed times, clearinghouses employ the microprudentially focused tool of margin calls, which could have a destabilizing effect from a financial stability perspective. Their margin calls can be highly procyclical, as they demand additional collateral from clearing members at precisely the time those members can least afford it. This can destabilize those clearing members, putting even more stress on the clearinghouse and its other clearing members.

Clearinghouse recovery strategies create similar tensions with the goal of systemic risk mitigation. “The typical CCP recovery strategy does not take a systemwide perspective and is premised on imposing losses on, or drawing liquidity from, CCP members during what may be a period of systemic stress.”¹¹⁵ These actions could have a further destabilizing effect on the financial system and lead to broader market disruptions.

Although clearinghouses function as self-regulatory organizations (SROs) for their clearing members, they are deeply conflicted in their role as for-profit entities and market regulators. As most clearinghouses are now for-profit businesses, it seems reasonable to ask whether their profit-seeking and regulatory functions should be separated to avoid the inherent conflict in these roles.

Finally, gaps in the regulation and supervision of systemically important clearinghouses increase systemic risk. Specifically:

- Default loss allocation is not standardized as to the placement of clearinghouse capital, leaving tremendous uncertainty over the placement of that capital or how a clearinghouse would apportion losses that exceed its prefunded resources.
- Stress testing is usually not standardized, and to the extent it occurs at the clearinghouse level, regulators tend to give clearinghouses considerable discretion to design and implement those tests. There is generally no supervisory stress testing of clearinghouses in the US, despite their risks and importance.¹¹⁶
- There are no requirements to ensure that clearinghouses have enough capital to cover business, investment, or operational losses for which there can be no mutualization among clearing members.
- It remains unclear who would resolve a clearinghouse in case of failure, whether the FDIC’s Title II Orderly Liquidation Authority would apply, whether the application of

Title II would be useful, and how and whether an organization or multiple organizations of such size and network connections could be resolved in an ordinary insolvency proceeding.

- The regulation of systemically important clearinghouses is split between the SEC, the CFTC, and the Federal Reserve, with the Fed's enhanced standards not applicable to SEC- and CFTC-supervised clearinghouses. As a result, agencies can impose different sets of standards on similar clearinghouses.

C. A Recommended Approach

Policymakers worldwide have recognized many of the issues raised in this section and more fully explored in *Clearinghouses for Over-the-Counter Derivatives*, the Volcker Alliance working paper released with this report. As policymakers deal with these questions and determine how best to regulate clearinghouses, this report encourages them to:

1. Determine clearinghouses' ideal governance and ownership structure, including whether they should function and be regulated as nonprofit utilities, and consider the number of clearinghouses necessary for the proper functioning of the OTC derivatives markets, balancing competition and financial stability concerns.

2. Establish an effective regulatory and supervisory framework, including:

- Credible standards for capital, liquidity, supervisor-run stress testing utilizing network considerations, as well as for loss allocation and resolution planning, including for distress or failure from operational, business, and investment losses that cannot be mutualized. As provided in the next section of the report, clearinghouses would be overseen by the PSA instead of the current patchwork of regulators. In conjunction with the Federal Reserve and international regulators, the PSA could establish these standards.

3. Craft a clear statutory framework for clearinghouse recovery and resolution to preclude the expectation of, or reliance on, a taxpayer bailout in the event of failure of a systemically significant clearinghouse.

III. THE CASE FOR RESHAPING THE FINANCIAL REGULATORY SYSTEM

THE SOCIAL COSTS OF THE 2008 FINANCIAL CRISIS were enormous. Many factors contributed to the collapse, but one important piece was the ill-configured regulatory system, which deprived regulators of a comprehensive understanding of the risks in the financial markets and the tools necessary to address those risks.¹¹⁷ While the Dodd-Frank Act strengthened the regulation of financial institutions, it did not fundamentally restructure the regulatory framework, which remains substantially the same as it was in the aftermath of The Great Depression. As a result, regulators continue to struggle with outdated mandates and objectives, thereby increasing systemic risk.

This section outlines the case for reorganizing the regulatory system and presents a recommended approach consistent with the Volcker Alliance's April 2015 report *Reshaping the Financial Regulatory System: Long Awaited, Now Crucial*.

A. Challenges in Comprehensively Implementing a Systemwide Perspective¹¹⁸

Regulators and policymakers globally have devoted considerable effort and resources to developing a systemwide perspective, conducting research on key parts of the financial markets, and working to develop a framework for the use of tools intended to maintain stability in the financial system.¹¹⁹ In the US, however, regulators lack the ability to effectively and uniformly act on their systemwide view. This inability is a function of the convoluted regulatory framework, which was not designed but rather accumulated over the last 150 years—a result of political compromises layered on top of one another by people who never could have fathomed the shape or complexity of today's financial markets.

Specifically, the regulatory apparatus consists of large gaps and redundancies. For instance, some important segments of the financial markets remain out of reach of the Federal Reserve, the systemic risk regulator. They include parts of the short-term funding market, which was at the center of the 2008 financial crisis. Other systemically important areas are overseen by too many regulators. These include the highly intertwined securities and derivatives markets, as well as the Treasury markets, which are important for financial stability and monetary policy. Those with light or no regulation include algorithmic and high-frequency trading firms, which now dominate trading in equities, foreign exchange, and Treasury markets.

The consequence of such a disjointed and illogical framework is that regulators lack a comprehensive understanding of the financial markets; opportunities for arbitrage continue

to send risky activities to unregulated or less regulated corners of the financial system; and accountability for financial stability policy has become diffused across many regulatory agencies, some of which lack a clear statutory financial stability mandate.

Donald Kohn, former vice chairman of the board of governors of the Federal Reserve System, said in 2015:

If you ask people who is responsible for financial stability, they would say, ‘The Fed,’ but the Fed doesn’t really have the instruments. It doesn’t really have the tools. And I think this is a dangerous situation if people perceive that it has the responsibility and it doesn’t have the tools.¹²⁰

Echoing the challenges of implementing financial stability policy, Federal Reserve Bank of New York President William Dudley said in a speech last year:

The US regulatory structure is fragmented, so that in most cases, no single regulator is able to implement macroprudential tools in a comprehensive manner. As a result, imposing macroprudential tools in the United States would almost certainly leave significant gaps in coverage. Such coverage gaps would likely lead to distortions within the financial sector, as the tool would have differential impacts across financial intermediaries inside versus outside a particular regulatory boundary. Also, activity would migrate toward those areas outside the scope of the macroprudential tools that had been implemented.¹²¹

As regulators grapple with these challenges, the financial system continues to evolve. Market structure is becoming highly fragmented and opaque. Virtual currencies are emerging, and marketplace lenders are gaining popularity. Mobile technology is reshaping the payments paradigm, and cyberattacks on financial institutions and market infrastructures are becoming more frequent and sophisticated. All these changes put further pressures on a creaky regulatory apparatus.

Mr. Tarullo discussed a possible approach to addressing financial stability risks in areas outside the Federal Reserve’s jurisdiction in a 2015 speech in which he raised the following question:

[W]hich regulators would make the assessment and policy tradeoffs that I contemplate in addressing financial stability risks associated with nonbank financial intermediation. The natural answer would be the regulator with authority to act. While this may well be the best answer from a policy perspective, it does raise some potential issues on its own. For example, if regulators with responsibility for one sector believe that the failure of regulators

with responsibility for another sector to act on financial stability concerns is creating debilitating disadvantages for firms in the first sector, they might be tempted to relax regulation on their firms, even though they might agree that the best outcome would be to retain their existing regulations but have the other sector subject to some constraints as well. This seems to me not a bad description of what happened in banking for a good part of the three decades beginning in the mid-1970s, when the banking agencies pursued a variety of deregulatory measures in part because they believed that the franchise of commercial banking was being eroded by various capital market activities that were not subject to appropriate prudential requirements.¹²²

The Dodd-Frank Act created the fifteen-member FSOC, chaired by the Treasury secretary, in part to address this problem by allowing regulators to extend the perimeter of regulation. While the FSOC represents a step in the right direction, it has too many member agencies to fulfill its mission effectively. It is too weak to provide a comprehensive, forward-looking view or to take decisive and timely action.

The OFR, an important tool for helping regulators better understand the financial system, also faces roadblocks. To obtain necessary data, it must navigate a labyrinth of agencies that are often reluctant to share information with one another. When information is exchanged, it is often not readily usable given the different data collection methodologies and objectives of the many agencies that may be involved in a given market segment. Concerns also have been raised that the OFR may lack the necessary independence, authority, and stature to be effective in its mission to assist the council.

B. Challenges in Supervision, Regulation, and Oversight of Nonbanks

The current regulatory configuration has led to insufficient and incoherent oversight, supervision, and regulation of financial market participants, including many at the heart of the shadow banking system.

These include:

- Globally active BHCs with thousands of subsidiaries and complex business lines, which remain subject to functional regulation by their primary regulators, including the SEC and CFTC.
- Broker-dealers, including those not within BHCs, which remain subject to the SEC's insufficient net capital rule from the precrisis era.¹²³

- Central clearinghouses in the derivatives markets, which have become more important and risky but continue to be regulated by different regulatory agencies under varying and insufficient standards.
- Investment advisers, investment companies, and hedge funds, the vast majority of which are not examined regularly and have raised concerns among regulators about liquidity, redemption, and leverage risk. Hedge funds also remain insufficiently understood.
- Money market funds, which remain at risk of runs despite regulatory changes that took effect in October 2016.
- High-frequency trading firms, which dominate trading in important markets.

Many complex factors are at play, but this circumstance essentially stems from a mismatch between the SEC and the CFTC's traditional focuses on one hand, and their obligation to supervise complex financial institutions on the other. Supervision is an area where the agencies have historically lacked experience and resources.

Efforts to overcome these problems will continue to be thwarted by the underfunding of both agencies, which remain subject to congressional appropriations. As a result, the SEC and CFTC arguably have come to regard SROs as frontline regulators. This is problematic in some instances because of conflicts of interest—for example, when an SRO is itself a clearinghouse or when no authority has clear primary responsibility for overseeing particular entities. This was the case with MF Global, where overlapping oversight by the CFTC, the SEC, the National Futures Association, and exchanges failed to uncover the fraudulent activity until it was too late.¹²⁴

In a 2015 assessment of the US financial regulatory system, the IMF noted:

The level of funding of both the SEC and CFTC is a key challenge affecting their ability to deliver on their mandates in a way that provides confidence to markets and investors. Funding limitations have impacted the timely delivery of new rules and the implementation of registration programs for the new categories of participants. In this context, the number of expert staff in the SEC and CFTC does not appear to be sufficient to ensure a robust level of hands-on supervision, which has become clear in the case of investment advisers. Leveraging on technology can mitigate but not replace the need for additional human resources. Consideration should be given to making both agencies self-funded and allowing for multiyear budgeting.¹²⁵

C. Artificial Bifurcation in the Regulation of Securities and Derivatives

The SEC and CFTC share oversight of these highly interconnected markets. Oversight is further fragmented throughout five other agencies depending on how the law defines institutions engaged in the activity. This atomized structure continues to cause confusion and lack of coordination among regulators – including with international counterparts – and inefficiencies in the private markets.

As a joint report of the SEC and CFTC stated, “Financial engineers [have] developed products that [have] the attributes of both futures and securities, thus helping to confuse the line between futures and securities regulation.”¹²⁶ The Treasury Department’s 2008 *Blueprint* posits that the “realities of the current marketplace have significantly diminished, if not entirely eliminated, the original reason for the regulatory bifurcation between the futures and securities market.” It goes on to state that “[p]roduct and market convergence, market linkages, and globalization have rendered regulatory bifurcation of the futures and securities markets untenable, potentially harmful, and inefficient.”¹²⁷

The securities and derivatives markets are highly intertwined, with trading strategies of market participants often encompassing many or even all of the types of markets regulated by the SEC and CFTC.¹²⁸ Bifurcation of the regulation of these markets deprives regulators of a comprehensive understanding of the activities of financial firms; results in the asymmetrical regulatory treatment of economically similar instruments in some markets,¹²⁹ breeding opportunities for regulatory arbitrage and market distortions; and reduces the effectiveness of market surveillance, causing regulators sometimes to miss important problems.

D. Poor Regulatory Outcomes

The multiagency framework, with more than 100 state and federal regulators, and numerous SROs, continues to produce poor regulatory outcomes. This structure fuels interagency tension and causes communication and coordination problems at home and abroad. It fosters a lack of accountability (with everyone involved but no one in charge) that hinders action on critical matters. It prevents timely and appropriate data collection and standardization across markets, and it dilutes talent and resources. Various postmortems of the financial crisis are laced with examples of these problems, yet they remain unaddressed, impeding progress on reform.

Some argue that the multiagency system contains intelligent checks and balances. But such balances, to the degree that they exist, were no match for the groupthink among regu-

lators as they headed toward the 2008 crisis. The current system is a recipe for maintaining the status quo, even though it's clear that the consequences could again be dire. This dysfunctional arrangement must be rationalized.

E. A Recommended Approach

In April 2015, the Volcker Alliance issued its report *Reshaping the Financial Regulatory System: Long Awaited, Now Crucial*. Its recommendations, summarized below, are designed to create a more comprehensive and resilient regulatory framework and should be given serious consideration by Congress.

- The FSOC's powers would be strengthened not only to recommend but to require appropriate standards and safeguards on activities and practices that the council believes could pose a threat to financial stability.
- The FSOC's voting structure would be rationalized to make the council more effective and independent in its decision making. In particular, while the Treasury secretary would continue to chair the FSOC, staying abreast of developments and encouraging a coordinated crisis response, the secretary would not vote on matters of designation, which would be handled by a smaller group of independent regulators. This streamlining would allow regulators to enlarge the perimeter of regulation into areas of the capital markets from a financial stability perspective.
- The supervisory responsibilities of the banking regulators with respect to banks and SIFIs, and of the SEC and CFTC with respect to clearinghouses, MMFs, broker-dealers, and futures commission merchants would be consolidated into a prudential supervisory authority. The PSA would be nonpartisan and governed by a five-member board headed by the Federal Reserve's vice chairman for supervision, with representation by the heads of the FDIC and the SEC, and two independent members appointed by the president and confirmed by the Senate.
- The Federal Reserve would maintain a focus on financial stability, concentrating on trends, activities, practices, and products across firms and the overall financial system. It would be given more robust rulemaking authority over financial institutions supervised by the PSA or as otherwise required by the FSOC.
- The CFTC would be merged into the SEC, which would be independently funded and maintain a strong focus on investor protection and market integrity, but would not have a focus on prudential regulation or financial stability.

- The OFR would be granted autonomy from the Department of the Treasury, and in addition to collecting, compiling, and standardizing data, would have a reinforced mandate to help identify threats to financial stability and to issue recommendations to the FSOC on matters of systemic risk.

As Chairman Volcker said, the report “lay[s] out a strong framework for reform. We recognize differing particular proposals could be consistent with this framework. What we do insist is that Congress, the administration, existing regulatory agencies, and financial institutions themselves step up to the needed debate and set out an agreed program for reform suitable for the 21st century.”¹³⁰ We hope this call is heeded.

GLOSSARY

Asset-backed commercial paper Commercial paper that is collateralized by a discrete pool of assets (such as loans, leases, or receivables) and that makes payments based primarily on the performance of those assets.*

Asset-backed security Security that is collateralized by a discrete pool of assets (such as loans, leases, or receivables) and makes payments based primarily on the performance of those assets.*

Automatic stay Prohibits a creditor from seizing or selling collateral, from starting or continuing litigation against a debtor, or taking other action to collect what is owed.†

Bank holding company Any company with direct or indirect control of one or more banks, and regulated and supervised by the Federal Reserve in accordance with the Bank Holding Company Act of 1956.§

Bankruptcy safe harbor Exempts certain transactions from the automatic stay and gives the nondefaulting counterparty the right to seize and sell posted collateral.†

Bank safety net A broad term referring to protection of banking institutions through deposit insurance, discount window credit, other lender of last resort support, and certain forms of regulations to reduce risk. Commercial and industrial companies generally lack any of these cushions against loss.‡

Bilateral repo Repurchase agreement between two institutions in which settlement generally occurs on a “delivery versus payment” basis. The transfer of the collateral to the cash lender is concurrent with the transfer of the cash to the collateral provider.**

Capital Funding that a bank has received from its shareholders or owners.

Commercial bank A chartered, regulated financial institution authorized to take deposits from the public, obtain deposit insurance from the FDIC, and engage in certain lending activities.§

Commercial paper Short-term negotiable promissory note maturing in 270 days or less and issued by an industrial or financial company, or a commercial firm.*

Contagion Negative spillover effects following a shock to an institution, market, or country.

Credit default swap A financial contract in which one party agrees to make a payment to the other party in the event of a specified credit event, in exchange for one or more fixed payments.**

Credit transformation The practice of using liabilities of high credit quality to fund assets of lower credit quality.

Depository institution A financial institution—such as a savings bank, commercial bank,

savings and loan association, or credit union—legally allowed to accept monetary deposits from consumers.††

Derivative Financial contracts whose payments are usually linked to the prices of other financial instruments. The contracts are used mainly for speculation and hedging.†

Eurodollars Dollar-denominated short-term IOUs issued by financial institutions domiciled outside the United States.‡‡

Fire sale The disorderly liquidation of assets to meet margin requirements or other urgent cash needs. Such a sudden sell-off drives down prices, potentially below their intrinsic value, when the quantities to be sold are larger than typical volumes. Fire sales can be self-reinforcing and lead to more forced selling by some market participants that—subsequent to an initial fire sale and consequent decline in asset prices—may also need to meet margin or other urgent cash requirements.**

General collateral finance repo A service offered by the Fixed Income Clearing Corporation (FICC) and used by dealers that are netting members of FICC’s Government Securities Division. The GCF Repo differs from a standard one in that the trade is completed on a blind-brokered basis, with dealers negotiating their trades through interdealer brokers and thus preserving their anonymity. These repos are general collateral repos, meaning that dealers agree that the securities to be posted as collateral are required to be only in a specific asset class, as opposed to being specific securities.§§

Haircut The discount at which an asset is pledged as collateral. A \$1 million bond with a 5 percent haircut would collateralize a \$950,000 loan, for instance.***

Leverage The practice of using borrowed funds to purchase assets. This funding structure can multiply gains if the cost of borrowing is lower than the return on the assets or multiply losses in the reverse case.

Lender of last resort Governmental lender that acts as the ultimate source of credit in the financial system. In the United States, the Federal Reserve has this role.‡

Liquidity transformation The practice of funding illiquid assets such as loans by issuing liquid liabilities such as checking deposits.

Liquidity The quality that makes an asset easily convertible into cash with relatively little loss of value.††

Maturity transformation An activity in which a financial intermediary issues short-term liabilities to fund long-term assets.§

Money market fund A type of mutual fund that invests in short-term, liquid securities includ-

ing government bills, CDs, commercial paper, and repos.**

Nonbank financial institution Any financial intermediary or financial services company that is not a depository. These include investment banks, broker-dealers, insurance companies, mortgage lenders, and many others. Different types of institutions have different regulators.

Nonbank subsidiary of BHC Most large BHCs have nonbank subsidiaries that are not depositories but are nonetheless linked through the parent.

Over the counter A trading method that does not involve an organized exchange. In over-the-counter markets, participants trade directly and bilaterally, typically through voice or computer communication and often with certain standardized documentation with counterparty-dependent terms.§

Panic An event that occurs when investors lose confidence in banks and financial markets and engage in widespread runs, forcing fire sales, driving down asset prices, and pushing financial institutions into failure.

Prudential regulation A type of regulation that promotes the safety and soundness of financial institutions.

Qualified financial contracts (QFCs) Used for derivatives, securities lending, and short-term funding transactions such as repos. Bankruptcy law exempts QFCs from the automatic stay and several other core bankruptcy provisions.†

Rehypothecation The reuse of collateral posted by clients of banks or broker-dealers for securities lending, repurchase agreements, or as collateral for the bank's or broker-dealer's own borrowing.§

Repurchase agreement (repo) The sale of a security combined with an agreement to repurchase the security, or a similar one, on a specified date at a prearranged price. A repo is a secured lending arrangement.**

Risk-based capital An amount of capital, based on the risk-weighting of different asset categories, a financial institution holds to help protect against losses.**

Run Withdrawal of funds en masse by depositors or other short-term creditors.

Securities lending/borrowing The temporary transfer of securities between parties for a specified fee and term, in exchange for collateral in the form of cash or other securities.*

Total loss-absorbing capacity (TLAC) A mix of long-term debt and equity that GSIB holding companies would be required to hold under recent proposals. The holding would have to be sufficient to absorb losses and implement an orderly resolution without resorting to taxpayer-funded bailouts or extraordinary government measures.***

Triparty repo A repurchase transaction is a sale of securities coupled with an agreement to repurchase the securities at a specified price later. In a triparty repo, an agent facilitates the deal by providing operational services such as custody of securities, settlement of cash and securities, valuation of collateral, and optimization tools to allocate collateral efficiently.*

* Federal Reserve Glossary: http://www.federalreserve.gov/newsevents/reform_glossary.htm

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‡‡ Morgan Ricks, *The Money Problem* (Chicago: The University of Chicago Press, 2016), 51.

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*** Office of Financial Research, *Financial Stability Report, 2015*, 117-125. https://financialresearch.gov/financial-stability-reports/files/OFR_2015-Financial-Stability-Report_12-15-2015.pdf

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 7. Financial Stability Oversight Council, *Annual Report, 2016*. <https://www.treasury.gov/initiatives/fsoc/studies-reports/Pages/2016-Annual-Report.aspx>
 8. This option shares elements with a proposal by Morgan Ricks in *The Money Problem* (Chicago: The University of Chicago Press, 2016). There are also significant differences. The essence of the Ricks plan is to ban the issuance of short-term debt by nonbank financial institutions and provide unlimited FDIC insurance. The proposed measure would apply to a subset of nonbanks, which would be permitted to issue some nominal amount of short-term debt relative to their total liabilities; banks would be restricted to using nondeposit short-term debt to finance only high-quality assets; and FDIC insurance would not be extended.
 9. This option shares elements with a recent book by former Governor of the Bank of England Mervyn King, *The End of Alchemy: Money, Banking and the Future of the Global Economy* (New York City: W. W. Norton, 2016). There are also significant differences, the most important being that Mr. King’s plan applies only to deposits and unsecured short-term debt, while the proposed measure applies to all forms of short-term debt, secured and unsecured.
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22. William C. Dudley, “Fixing Wholesale Funding to Build a More Stable Financial System” (speech at the New York Bankers Association 2013 Annual Meeting and Economic Forum, New York City, February 1, 2013). <https://www.newyorkfed.org/newsevents/speeches/2013/dud130201>

23. See for example Financial Crisis Inquiry Commission, *The Financial Crisis Inquiry Report: Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States* (January 2011). <https://fcic.law.stanford.edu/report>; Marcia Millon Cornett, Jamie John McNutt, Philip E. Strahan, and Hassan Tehrani, “Liquidity Risk Management and Credit Supply in the Financial Crisis,” *Journal of Financial Economics* 101, no. 2 (2011): 297–312. <http://www.sciencedirect.com/science/article/pii/S0304405X11000663>; German Lopez-Espinosa, Antonio Moreno, Antonio Rubia, and Laura Valderrama, “Short-Term Wholesale Funding and Systemic Risk: A Global CoVar Approach,” IMF Working Paper 12/46 (February 2012). <https://www.imf.org/external/pubs/ft/wp/2012/wp1246.pdf>; Gary Gorton and Andrew Metrick, “Securitized Banking and the Run on Repo,” *Journal of Financial Economics* 104 (2012): 425–451. <http://www.sciencedirect.com/science/article/pii/S0304405X1100081X>; Morgan Ricks, *The Money Problem* (Chicago: University of Chicago Press, 2016).

24. Others include asset-backed commercial paper conduits, structured investment vehicles, and MMFs, each an issuer of the type of short-term or demandable debt at the center of the crisis.

25. The scale of their reliance is best conveyed in the Financial Crisis Inquiry Commission, which notes: “At the end of 2007, Bear Stearns had \$11.9 billion in equity and \$383.6 billion in liabilities and was borrowing as much as \$70 billion in the overnight market. It was the equivalent of a small business with \$50,000 in equity borrowing \$1.6 million, with \$296,750 of that due each and every day.” Financial Crisis Inquiry Commission, *The Financial Crisis Inquiry Report: Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States* (January 2011), xix–xx. <https://fcic.law.stanford.edu/report>

26. Financial Crisis Inquiry Commission, *The Financial Crisis Inquiry Report: Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States* (January 2011). <https://fcic.law.stanford.edu/report>

27. MMFs are allowed to publish a constant NAV and maintain the value of their shares at one dollar. When shareholders redeem or the value of the fund’s investments changes, the fund adjusts its portfolio to maintain the NAV at a constant level. Under the extreme conditions of September 2008, the Reserve Primary Fund was unable to maintain its NAV at one dollar per share and broke the buck as investors engaged in a run. For a full discussion of MMFs, see John Crawford, “Memorandum on the Asset Management Industry” (issue paper prepared for the Volcker Alliance and released with this report).

28. Marco Cipriani, Antoine Martin, and Bruno M. Parigi, “Money Market Funds Intermediation and Bank Instability,” Federal Reserve Bank of New York Staff Report 599 (February 2013). https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr599.pdf
29. Many officials have expressed alarm over the fragility of financial markets and their reliance on short-term funding. “Parts of these lightly regulated—even unregulated—markets nearly came unglued during the crisis, acting like accelerants in a fire,” Henry M. Paulson Jr., *On the Brink, Inside the Race to Stop the Collapse of the Global Financial System* (New York: Hachette, 2013) xviii.
- “How comfortable should we be with a system in which critical financial activities continue to be financed with short-term wholesale funding without the safeguards necessary to reduce the risk of runs and the fire sales of assets that can threaten the stability of the entire financial system?” ... “I don’t think we should be comfortable with a situation in which extensive maturity transformation continues to take place without the appropriate safeguards against runs and fire sales. Pretending the problem does not exist, or dealing with it only ex post through emergency facilities cannot be consistent with our financial stability objectives.” William C. Dudley, “Fixing Wholesale Funding to Build a More Stable Financial System” (speech at the New York Bankers Association Annual Meeting and Economic Forum, New York City, February 1, 2013). <https://www.newyorkfed.org/newsevents/speeches/2013/dud130201>
30. Daniel K. Tarullo, “Thinking Critically About Nonbank Financial Intermediation” (speech at the Brookings Institution, Washington, DC, November 17, 2015). <http://www.federalreserve.gov/newsevents/speech/tarullo20151117a.htm#pagetop>
31. Mervyn King, *The End of Alchemy: Money, Banking, and the Future of the Global Economy* (New York City: W. W. Norton, 2016), 253, 254.
32. Martin J. Gruenberg, “The Impact of Post-Crisis Reforms on the US Financial System and Economy” (speech at the Exchequer Club, Washington DC, June 15, 2016). <https://www.fdic.gov/news/news/speeches/spjun1516.html>
33. Ibid.
34. Under Title II of the Dodd-Frank Act, the secretary of the Treasury, upon the written recommendation of the Federal Reserve and the FDIC, may place a nonbank financial institution into FDIC receivership as an alternative to bankruptcy. See Dodd-Frank Act 203-b. <https://www.gpo.gov/fdsys/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf>
35. Dodd-Frank Act 204-a. <https://www.gpo.gov/fdsys/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf>
- See also 12 CFR Part 380 Orderly Liquidation Authority Provisions of the Dodd-Frank Wall Street Reform and Consumer Protection Act. <https://www.fdic.gov/regulations/laws/federal/2011/11finalJan25.pdf>
36. Total Loss-Absorbing Capacity, Long-Term Debt, and Clean Holding Company Requirements for Systemically Important U.S. Bank Holding Companies and Intermediate Holding Companies of Systemically Important Foreign Banking Organizations Proposed Rule, November 30, 2015. <https://www.gpo.gov/fdsys/pkg/FR-2015-11-30/pdf/2015-29740.pdf>
37. Daniel K. Tarullo, “Thinking Critically About Nonbank Financial Intermediation” (speech at the Brookings Institution, Washington, DC, November 17, 2015). <http://www.federalreserve.gov/newsevents/speech/tarullo20151117a.htm#pagetop>.
38. Office of Financial Research, *Financial Stability Report*, 2015. https://financialresearch.gov/financial-stability-reports/files/OFR_2015-Financial-Stability-Report_12-15-2015.pdf
39. Morgan Ricks, *The Money Problem* (Chicago: The University of Chicago Press, 2016).
40. Anat R. Admati, “The Missed Opportunity and Challenge of Capital Regulation” (Research Paper 16-6, Stanford University Graduate School of Business, 2015). https://www.gsb.stanford.edu/sites/gsb/files/missed-opportunity-dec-2015_1.pdf
- Thomas Hoenig (statement on Basel Capital Notices of Proposed Rulemaking, June 12, 2012). <https://www.fdic.gov/news/news/speeches/chairman/spjun1412.html>
41. According to economists at the Office of Financial Research, BHCs can reduce their regulatory capital requirements by transferring credit risk to third parties, such as hedge funds or private equity firms, through a CDS, total return swaps, eligible guarantees, or synthetic securitizations. The economists report that limited counterparty information prevents regulators from assessing whether a nonbank provider of credit protection has sufficient capital and liquidity to satisfy the protection sold to a bank. Jill Cetina, John McDonough, and Sriram Rajan, “More Transparency Needed For Bank Capital Relief Trades,” Office of Financial Research Brief Series (June 11, 2015). <https://www.financialresearch.gov/briefs/files/OFRbr-2015-04-bank-capital-relief-trades.pdf>
42. Charles Levinson, “U.S. banks moved billions of dollars in trades beyond Washington’s reach,” *Reuters Investigates*, August 21, 2015. <http://www.reuters.com/investigates/special-report/usa-swaps/>
43. Static risk weights do not always reflect the actual risk posed by various asset classes, particularly in the years before and during a crisis. Preferential risk weights of rapidly deteriorating residential MBS and sovereign bonds of certain jurisdictions in the lead-up to and during the crisis exemplify this problem.
- See Thomas Hoenig, “A risk-based system inflates the role of regulators and denigrates the role of bank managers,” *The Wall Street Journal*, August 11, 2016. <http://www.wsj.com/articles/why-risk-based-capital-is-far-too-risky-1470957677>;

See also Thomas Hoenig, “Basel III Capital: A Well-Intended Illusion” (speech at the International Association of Deposit Insurers 2013 Research Conference, Basel, Switzerland, April 9, 2013). <https://www.fdic.gov/news/news/speeches/spapro913.html>

44. Former FDIC Chairman Sheila Bair recently wrote that “‘risk-based’ capital standards, which provided highly generous capital treatment for mortgage-backed securities, derivatives contracts, and other risky assets, encouraged mega-banks to take on excessive levels of leverage and load up on assets which were, in fact, high-risk.” See Gillian B. White and Bourree Lam, “Could Reviving a Defunct Banking Rule Prevent a Future Crisis?” *The Atlantic*, August 23, 2016. <http://www.theatlantic.com/business/archive/2016/08/glass-steagall/496856/>

45. The supplementary leverage ratio is helpful for addressing problems relating to risk-based capital, but some argue that it may be too low. Anat R. Admati, “The Missed Opportunity and Challenge of Capital Regulation” (Research Paper 16-6, Stanford University Graduate School of Business, 2015), 7. https://www.gsb.stanford.edu/sites/gsb/files/missed-opportunity-dec-2015_1.pdf

Others argue that the supplementary leverage ratio may increase reliance by firms on risky assets. Daniel Tarullo (remarks at A Conversation with Fed Governor Daniel K. Tarullo, *The Wall Street Journal*, Washington, DC, July 6, 2016). <http://www.wsj.com/articles/transcript-q-a-with-fed-governor-daniel-tarullo-1467847300>

Still others argue that the supplementary leverage ratio may also lead to market distortions. Darrell Duffie, “Financial Regulatory Reform After the Crisis: An Assessment” (paper invited for presentation to the 2016 ECB Forum on Central Banking, Sintra, Portugal, June 2016). <http://www.darrellduffie.com/uploads/policy/DuffieSintraJune2016.pdf>

46. Morgan Ricks, *The Money Problem* (Chicago: The University of Chicago Press, 2016).

47. Gary Gorton and Tyler Muir, “Mobile Collateral Versus Immobile Collateral,” NBER Working Paper No. 22619 (September 2016). <http://www.nber.org/papers/w22619>

48. Financial Stability Oversight Council, *Update on Review of Asset Management Products and Activities*, (April 18, 2016). <https://www.treasury.gov/initiatives/fsoc/news/Documents/FSOC%20Update%20on%20Review%20of%20Asset%20Management%20Products%20and%20Activities.pdf>

49. Federal Reserve Bank of Minneapolis, “The Minneapolis Plan to End Too Big to Fail” (November 16, 2016). <https://www.minneapolisfed.org/~media/files/publications/studies/endingtbtft/the-minneapolis-plan/the-minneapolis-plan-to-end-too-big-to-fail-2016.pdf?la=en>

50. Janet Yellen, “Improving the Oversight of Large Financial Institutions” (speech at the Citizens Budget Commission, New York City, March 3, 2015). <http://www.federalreserve.gov/newsevents/speech/yellen20150303a.htm#f7>

51. Office of Financial Research, *Financial Stability Report*, 2015, 73. https://financialresearch.gov/financial-stability-reports/files/OFR_2015-Financial-Stability-Report_12-15-2015.pdf

52. 17 CFR Parts 230, 239, 270, 274 and 279. <https://www.sec.gov/News/PressRelease/Detail/PressRelease/1370542347679>

53. Treasury Department, Office of the Comptroller of the Currency; Board of Governors of the Federal Reserve System; Federal Deposit Insurance Corporation; U.S. Securities and Exchange Commission; Federal Housing Finance Agency; and Department of Housing and Urban Development, Final Rule, Credit Risk Retention. https://www.fhfa.gov/SupervisionRegulation/Rules/RuleDocuments/Final%20Rule%20Preamble%20and%20Reg%20Text%2010-22-14_for%20Posting%20to%20Web.pdf

54. Securities and Exchange Commission, Final Rule, Asset-Backed Securities Disclosure and Registration, 17 CFR Parts 229, 230, 232, 239, 240, 243, and 249. <https://www.sec.gov/rules/final/2014/33-9638.pdf>

55. Securities and Exchange Commission, Final Rule, Nationally Recognized Statistical Rating Organizations, 17 CFR Parts 232, 240, 249, and 249b. <https://www.sec.gov/rules/final/2014/34-72936.pdf>

56. Specifically, the MMF rule requiring a floating NAV applies only to institutional prime funds. Its protections would not apply to retail or government funds, where the problem would remain. While there were significant outflows from prime MMFs in advance of the October 2016 effective date of the rule, cash has largely moved to other stable value funds, mostly government MMFs. Some analysts say investments in prime funds are likely to increase again as investors get accustomed to the floating NAV.

Vipal Monga, “Prime Money Fund Outflows Slow After Reform,” *The Wall Street Journal*, October 21, 2016. <http://blogs.wsj.com/cfo/2016/10/21/prime-money-fund-outflows-slow-after-reform/>

Liz McCormick, “Specter of New Threat Emerges in \$1 Trillion Money-Fund Exit,” *Bloomberg*, October 17, 2016. <http://www.bloomberg.com/news/articles/2016-10-17/specter-of-new-threat-emerges-from-1-trillion-money-fund-exodus>

57. The rule lets mutual funds account for assets at amortized cost if they have a maturity of sixty days or less, which means the floating NAV does not truly reflect the fair market value of fund assets; investors will have an incentive to run. See Squam Lake Group, SEC comment letter, Re: Money Market Fund Reform, September 17, 2013. <https://www.sec.gov/comments/s7-03-13/s70313-198.pdf>

58. While the gates and fees could halt destabilizing redemptions from an MMF, some have argued that these measures create the incentive for a preemptive run.

See International Monetary Fund, Financial Sector Assessment Program, United States, IMF Country Report 15/170 (July 2015). <http://www.imf.org/external/pubs/ft/scr/2015/cr15170.pdf>

59. Floyd Norris, “Banks Again Avoid Having Any Skin in the Game,” *The New York Times*, October 23, 2014. http://www.nytimes.com/2014/10/24/business/banks-again-avoid-having-any-skin-in-the-game.html?_r=0

60. Ibid.

61. Charles Levinson, “How Wall Street captured Washington’s effort to rein in banks,” *Reuters Investigates*, April 9, 2015. <http://www.reuters.com/investigates/special-report/usa-bankrules-weakening/#graphic-securitizations>

62. Financial Stability Oversight Council, *Annual Report, 2016*. <https://www.treasury.gov/initiatives/fsoc/studies-reports/Documents/FSOC%202016%20Annual%20Report.pdf>

See also Charles Levinson, “How Wall Street captured Washington’s effort to rein in banks,” *Reuters Investigates*, April 9, 2015. <http://www.reuters.com/investigates/special-report/usa-bankrules-weakening/#graphic-securitizations>

63. John Soroushian, “Credit Ratings in Financial Regulation: What’s Changed Since the Dodd-Frank Act?” Office of Financial Research Brief Series (April 21, 2016). https://www.financialresearch.gov/briefs/files/OFRbr_2016-04_Credit-Ratings.pdf

64. Daniel K. Tarullo, “Thinking Critically About Nonbank Financial Intermediation” (speech at the Brookings Institution, Washington, DC, November 17, 2015). <http://www.federalreserve.gov/newsevents/speech/tarullo20151117a.htm#pagetop>.

65. Edward R. Morrison, Mark J. Roe, and Christopher S. Sontchi, “Rolling Back the Repo Safe Harbors,” *The Business Lawyer* 69 (August 2014). https://dash.harvard.edu/bitstream/handle/1/17988346/Roe_793.pdf?sequence=1

66. Brian Begalle, Antoine Martin, James McAndrews, and Susan McLaughlin, “The Risk of Fire Sales in the Tri-Party Repo Market,” Federal Reserve Bank of New York Staff Report 616 (May 2013). https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr616.pdf

67. Darrell Duffie, “Financial Regulatory Reform After the Crisis: An Assessment” (paper invited for presentation to the 2016 ECB Forum on Central Banking, Sintra, Portugal, June 2016). <http://www.darrellduffie.com/uploads/policy/DuffieSintraJune2016.pdf>

68. Edward R. Morrison, Mark J. Roe, and Christopher S. Sontchi, “Rolling Back the Repo Safe Harbors,” *The Business Lawyer* 69 (August 2014). https://dash.harvard.edu/bitstream/handle/1/17988346/Roe_793.pdf?sequence=1

69. The safe harbor does not apply to regulated banks administered by the FDIC. That is, the FDIC is authorized to impose a 24-hour stay to allow itself time to transfer qualified financial contracts (QFCs) to a bridge bank. Title II of the Dodd-Frank Act established a 24-hour stay for SIFIs, similar to the stay applicable to banks. If the special resolution rules of Title II are triggered, the short stay is imposed to allow the FDIC to undertake the process described above. See Darrell Duffie and David A. Skeel Jr., “A Dialogue on the Costs and Benefits of Automatic Stays for Derivatives and Repurchase Agreements,” *Faculty Scholarship*, Paper 386 (2012). http://scholarship.law.upenn.edu/faculty_scholarship/386

Concerns have been raised that the reach of the stay as contemplated under Title II may not extend across jurisdictions. At the urging of regulators, bank dealers have voluntarily added language in their QFCs as part of the International Swaps and Derivatives Association protocol that has the effect of the stay described above. See Darrell Duffie, “Financial Regulatory Reform After the Crisis: An Assessment” (paper invited for presentation to the 2016 ECB Forum on Central Banking, Sintra, Portugal, June 2016). <http://www.darrellduffie.com/uploads/policy/DuffieSintraJune2016.pdf>

In addition, the Federal Reserve proposed a rule that requires US and foreign GSIBs and their nonbank subsidiaries to engage only in QFCs whose default and cross-default rights and restrictions are consistent with the Dodd-Frank Act and the FDIA. <https://www.federalreserve.gov/newsevents/press/bcreg/bcreg20160503b1.pdf>

70. Daniel K. Tarullo (speech at the Center for American Progress and Americans for Financial Reform Conference, Washington, DC, July 12, 2016). <https://www.federalreserve.gov/newsevents/speech/tarullo20160712a.htm>

71. Daniel K. Tarullo, “Thinking Critically About Nonbank Financial Intermediation” (speech at the Brookings Institution, Washington, DC, November 17, 2015). <http://www.federalreserve.gov/newsevents/speech/tarullo20151117a.htm#pagetop>.

72. Viktoria Baklanova, Cecilia Caglio, Marco Cipriani, and Adam Copeland, “The U.S. Bilateral Repo Market: Lessons from a New Survey,” Office of Financial Research Brief Series (January 13, 2016). https://www.financialresearch.gov/briefs/files/OFRbr-2016-01_US-Bilateral-Repo-Market-Lessons-from-Survey.pdf

73. Viktoria Baklanova, Adam Copeland, and Rebecca McCaughrin, “Reference Guide to US Repo and Securities Lending Market,” Federal Reserve Bank of New York Staff Report 740 (September 2015). https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr740.pdf

74. Office of Financial Research, *Financial Stability Report, 2015*, 28. https://financialresearch.gov/financial-stability-reports/files/OFR_2015-Financial-Stability-Report_12-15-2015.pdf

75. Ibid., 61. https://financialresearch.gov/financial-stability-reports/files/OFR_2015-Financial-Stability-Report_12-15-2015.pdf

76. Daniel K. Tarullo (speech at the Center for American Progress and Americans for Financial Reform Conference, Washington, DC, July 12, 2016). <https://www.federalreserve.gov/newsevents/speech/tarullo20160712a.htm>
77. For a full discussion of MMFs, see John Crawford, “Memorandum on the Asset Management Industry” (issue paper prepared for the Volcker Alliance and released with this report).
78. Thomas M. Hoenig and Charles S. Morris, “Restructuring the Banking System to Improve Safety and Soundness,” Federal Deposit Insurance Corporation paper (November 2013). <https://www.fdic.gov/about/learn/board/hoenig/Restructuring-the-Banking-System,Hoenig,Morris,Nov.2013.pdf>
- See also Edward R. Morrison, Mark J. Roe, and Christopher S. Sontchi, “Rolling Back the Repo Safe Harbors,” *The Business Lawyer* 69 (August 2014). https://dash.harvard.edu/bitstream/handle/1/17988346/Roe_793.pdf?sequence=1
79. Federal Reserve System, Notice of Proposed Rulemaking, Restrictions on Qualified Financial Contracts of Systemically Important U.S. Banking Organizations and the U.S. Operations of Systemically Important Foreign Banking Organizations; Revisions to the Definition of Qualifying Master Netting Agreement and Related Definitions, 12 CFR Parts 217, 249, and 252. <https://www.federalreserve.gov/newsevents/press/bcreg/bcreg20160503b1.pdf>
80. Economists at the Federal Reserve Bank of New York suggested this approach for the triparty repo market. Brian Begalle, Antoine Martin, James McAndrews, and Susan McLaughlin, “The Risk of Fire Sales in the Tri-Party Repo Market,” Federal Reserve Bank of New York Staff Report 616 (May 2013). https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr616.pdf
81. As previously noted, this structural measure shares elements with Morgan Ricks in *The Money Problem* (Chicago: The University of Chicago Press, 2016). However, the essence of the Ricks plan is to ban the issuance of short-term debt by nonbank financial institutions and provide unlimited FDIC insurance for banks. The proposed measure would apply to only a subset of nonbanks, which would be permitted to issue a nominal amount of short-term debt relative to their total liabilities; banks would be restricted to using nondeposit short-term debt to finance only high-quality assets; and FDIC insurance would not be extended.
82. Mervyn King, *The End of Alchemy: Money, Banking, and the Future of the Global Economy* (New York City: W. W. Norton, 2016). While this measure shares elements of the King plan, there are significant differences as well. The most important difference is that while the King plan applies only to deposits and unsecured short-term debt, this structural measure applies to all forms of short-term debt – secured and unsecured.
83. *Ibid.*, 274.
84. *Ibid.*, 275.
85. While we focus on the Greenwood, Hanson, and Stein proposal in this report, there has been significant scholarship in this and related areas. See Gary Gorton, “Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007” (paper prepared for the Federal Reserve Bank of Atlanta’s 2009 Financial Markets Conference: Financial Innovation and Crisis, May 11-13, 2009). <https://www.frbatlanta.org/-/media/Documents/news/conferences/2009/financial-markets-conference/gorton.pdf>
- Gary Gorton and Andrew Metrick, *Regulating the Shadow Banking System*, Brookings Papers on Economic Activity, Economic Studies Program, Brookings Institution, vol. 412 (Fall 2010): 261–312. https://www.brookings.edu/wp-content/uploads/2010/09/2010b_bpea_gorton.pdf
- Gary Gorton, Stefan Lewellen, and Andrew Metrick, “The Safe-Asset Share,” *American Economic Review* 102, no. 3 (May 2012): 101–06. <https://www.aeaweb.org/articles?id=10.1257/aer.102.3.101>
- Arvind Krishnamurthy and Annette Vissing-Jorgensen, “The Impact of Treasury Supply on Financial Sector Lending and Stability,” *Journal of Financial Economics* 118, no. 3 (April 2015): 571–600. <http://faculty.haas.berkeley.edu/vissing/Shortdebt.pdf>
- Adi Sunderam, “Money Creation and the Shadow Banking System,” *Review of Financial Studies* 28, no. 4 (2015): 939–977. https://www.newyorkfed.org/medialibrary/media/research/conference/2013/stable_funding/Paper_Sunderam.pdf
- Gary Gorton, “The History and Economics of Safe Assets,” NBER Working Paper No. 22210 (April 2016). <http://www.nber.org/papers/w22210>
- Mark Carlson, Burcu Duygan-Bump, Fabio Natalucci, Bill Nelson, Marcelo Ochoa, Jeremy Stein, and Skander Van den Heuvel, “The Demand for Short-Term, Safe Assets and Financial Stability: Some Evidence and Implications for Central Bank Policies,” *International Journal of Central Banking* (December 2016). <http://scholar.harvard.edu/files/stein/files/shorttermsafeassets.pdf>
86. Robin Greenwood, Samuel G. Hanson, and Jeremy Stein, “The Federal Reserve’s Balance Sheet as a Financial-Stability Tool” (paper prepared for the Federal Reserve Bank of Kansas City’s 2016 Economic Policy Symposium, Jackson Hole, WY, September 2016), 1. <https://www.kansascityfed.org/~media/files/publicat/sympos/2016/econsymposium-greenwood-hanson-stein-paper.pdf?la=en>
87. The authors considered the possibility of the Treasury issuing more short-term bills, but argued against this option because of the auction risk involved.
88. Robin Greenwood, Samuel G. Hanson, and Jeremy Stein, “The Federal Reserve’s Balance Sheet as a Financial-Stability Tool” (paper prepared for the Federal Reserve Bank of Kansas City’s 2016 Economic Policy Symposium, Jackson Hole, WY, September 2016), 1. <https://www.kansascityfed.org/~media/files/publicat/sympos/2016/econsymposium-greenwood-hanson-stein-paper.pdf?la=en>

See also Robin Greenwood, Samuel G. Hanson, and Jeremy C. Stein, “A Comparative Advantage Approach to Government Debt Maturity,” *Journal of Finance* 70 (2015): 1683–1722., http://scholar.harvard.edu/files/stein/files/greenwood_hanson_stein_jf_2015_o.pdf

Adi Sunderam, “Money Creation and the Shadow Banking System,” *Review of Financial Studies* 28, no. 4 (2015): 939–977. https://www.newyorkfed.org/medialibrary/media/research/conference/2013/stable_funding/Paper_Sunderam.pdf

Arvind Krishnamurthy and Annette Vissing-Jørgensen, “The Impact of Treasury Supply on Financial Sector Lending and Stability,” *Journal of Financial Economics* 118, no. 3 (April 2015): 571–600. <http://faculty.haas.berkeley.edu/vissing/Shortdebt.pdf>

Mark Carlson, Burcu Duygan-Bump, Fabio Natalucci, Bill Nelson, Marcelo Ochoa, Jeremy Stein, and Skander Van den Heuvel, “The Demand for Short-Term, Safe Assets and Financial Stability: Some Evidence and Implications for Central Bank Policies,” *International Journal of Central Banking* (December 2016). <http://scholar.harvard.edu/files/stein/files/shorttermsafeassets.pdf>

89. For example, they argue that the supplementary leverage and liquidity coverage ratios have affected collateralized debt markets and increased demand for high-quality assets. This plan would alleviate some of those pressures.

90. Other researchers argue that a large balance sheet may help with transmission of monetary policy. Darrell Duffie and Arvind Krishnamurthy, “Passthrough Efficiency in the Fed’s New Monetary Policy Setting” (paper invited for presentation at the Federal Reserve Bank of Kansas City symposium, Jackson Hole, WY, August 26, 2016). <http://www.darrellduffie.com/uploads/policy/DuffieKrishnamurthyAugust2016.pdf>

91. See Steven Cecchetti and Enisse Kharroubi, “Reassessing the impact of finance on growth,” Bank for International Settlements Monetary and Economic Department Working Paper 381 (2012). <http://www.bis.org/publ/work381.pdf>

Luigi Zingales, “Does Finance Benefit Society?” National Bureau of Economic Research Working Paper 20894 (January 2015). <http://faculty.chicagobooth.edu/luigi.zingales/papers/research/finance.pdf>

Rana Foroohar, *Makers and Takers: The Rise of Finance and the Fall of American Business* (New York City: Crown Business, 2016).

92. German Lopez-Espinosa, Antonio Moreno, Antonio Rubia, and Laura Valderrama, “Short-Term Wholesale Funding and Systemic Risk: A Global CoVar Approach,” IMF Working Paper 12/46 (February 2012). <https://www.imf.org/external/pubs/ft/wp/2012/wp1246.pdf>

93. Arvind Krishnamurthy and Annette Vissing-Jørgensen, “Short-Term Debt and Financial Crises: What We Can Learn from the U.S. Treasury Supply,” National Bureau of Economic Research (March 2013). <https://www.aeaweb.org/conference/2015/retrieve.php?pdfid=605>

94. Markus K. Brunnermeier and Martin Oehmke, “The Maturity Rat Race,” *Journal of Finance* 68, no. 2 (March 2013): 483–521. <http://ideas.repec.org/a/bla/jfinan/v68y2013i2p483-521.html>

95. Jeremy C. Stein, “Monetary Policy as Financial Stability Regulation,” *Quarterly Journal of Economics* 127, no. 1 (January 2012): 57–95. <http://qje.oxfordjournals.org/content/127/1/57.abstract>

See also Ricardo Caballero and Arvind Krishnamurthy, “Global Imbalances and Financial Fragility,” *American Economic Review* 99, no. 2 (May 2009): 584–88. <http://ideas.repec.org/a/aea/aerev/v99y2009i2p584-88.html>

96. Adair Turner, *Between Debt and the Devil* (Princeton, NJ: Princeton University Press, 2016), 203–204.

97. John Crawford, Timothy Karpoff, Angela Allen, Nicole Allen, and Michael Margolis, *Memorandum Concerning the Securities and Exchange Commission and the Commodity Futures Trading Commission*, Volcker Alliance, New York City (April 2015). https://www.volckeralliance.org/sites/default/files/attachments/Background%20Paper%203_Memorandum%20Concerning%20The%20Securities%20and%20Exchange%20Commission%20and%20The%20Commodity%20Futures%20Trading%20Commission.pdf

98. Insurance companies like AIG sold a tremendous amount of CDS protection on mortgage-related CDOs to some of the largest commercial and investment banks globally on a bilateral basis. When the mortgage market collapsed in 2008 and the value of the CDOs fell, the insurers’ ratings were downgraded; their counterparties demanded additional collateral, which they were unable to provide. Chaos ensued as derivatives counterparties engaged in runs, which were fueled by the lack of transparency in these entangled markets. Market participants had no way of truly understanding the credit exposures they faced from their own derivatives counterparties or indirectly through other market participants.

99. G20 Leaders’ Statement from the Pittsburgh Summit, September 2009. https://www.treasury.gov/resource-center/international/g7-g20/Documents/pittsburgh_summit_leaders_statement_250909.pdf

100. Ibid. https://www.treasury.gov/resource-center/international/g7-g20/Documents/pittsburgh_summit_leaders_statement_250909.pdf

101. Robert R. Bliss and Robert S. Steigerwald, “Derivatives Clearing and Settlement: A Comparison of Central Counterparties and Alternative Structures,” Federal Reserve Bank of Chicago, *Economic Perspectives* 30, no. 4 (November 2006). <https://www.chicagofed.org/publications/economic-perspectives/2006/4qtr2006-part2-bliss-steigerwald>

102. Multilateral netting allows a complex network of obligations to be simplified by eliminating transactions that are economically redundant in the aggregate. See Ivana Ruffini, “Central Clearing: Risks and Customer Protections,” Federal Reserve Bank of Chicago, *Economic Perspectives* 39 (fourth quarter, 2015). <https://www.chicagofed.org/publications/economic-perspectives/2015/4q-ruffini>

103. Jerome H. Powell, “OTC Market Infrastructure Reform: Opportunities and Challenges” (speech at the Clearing House 2013 Annual Meet-

ing, New York, November 21, 2013). <http://www.federalreserve.gov/newsevents/speech/powell20131121a.htm>

104. These concerns have been acknowledged by international authorities. “The Basel Committee on Banking Supervision (BCBS), the Committee on Payments and Market Infrastructures (CPMI), the Financial Stability Board (FSB), and the International Organization of Securities Commissions (IOSCO) (the “Committees”) agreed on a workplan to coordinate their respective international policy work aimed at enhancing the resilience, recovery planning and resolution of CCPs, and to work in close collaboration. To support these efforts, the Committees also agreed to establish a joint study group to identify, quantify and analyze interdependencies between CCPs and major financial institutions and any resulting systemic implications. The workplan focuses on CCPs that are systemic across multiple jurisdictions.” Basel Committee on Banking Supervision, Committee on Payments and Market Infrastructures, Financial Stability Board, and International Organization of Securities Commissions, *Progress Report on the CCP Workplan* (August 2016). <http://www.bis.org/cpmi/publ/d150.pdf>

105. Ownership structure varies, but many clearinghouses are owned by large, publicly traded exchange conglomerates in which clearing members mutualize default risk but do not share in the ownership profits.

106. Arshadur Rahman, “Over-the-counter (OTC) derivatives, central clearing and financial stability,” Bank of England, *Quarterly Bulletin* (third quarter, 2015). <http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2015/q306.pdf>

The author notes that as of his writing, LCH Swapclear had ninety-seven clearing members and ICE Clear Europe had twenty-one. Clearing percentages for new OTC transactions are for end of 2013 through first-half 2015.

107. Phillip Stafford, “Clearing houses get insurance policy,” *Financial Times*, March 11, 2015. How well such insurance arrangements would work in a systemic crisis is unclear. They could replicate the AIG situation, which suggested that a private lender of last resort is untenable in a systemic crisis. <https://www.ft.com/content/08c69574-c7f1-11e4-8210-00144feab7de>

108. Options Clearing Corporation, *2015 Annual Report*, 41. <http://www.optionsclearing.com/about/corporate-information/annual-reports/>

109. The OCC has stated that as of the end of March 2016, only “20.5% of investment grade and 16.8% of noninvestment grade transactions were centrally cleared.” Office of the Comptroller of Currency, *Quarterly Report on Bank Trading and Derivatives Activities, First Quarter, 2016* (June 2016). <https://www.occ.gov/topics/capital-markets/financial-markets/derivatives/dq116.pdf>

110. Jon Gregory, *Central Counterparties* (Chichester, UK: Wiley Finance Series, 2014).

111. Office of Financial Research, *Financial Stability Report, 2015*, 96. https://financialresearch.gov/financial-stability-reports/files/OFR_2015-Financial-Stability-Report_12-15-2015.pdf

112. “[L]et’s remember that the clearing house is typically part of a profit-maximizing group. ... As such, we should expect it to behave in a procyclical way in the management of its risks—shading margins to the downside during normal times to help sustain market growth or market share, and tightening sharply as and when conditions deteriorate. As described, the clearing house will not behave like a system-risk monitor and manager.” Paul Tucker, “Are Clearinghouses the New Central Banks?” (speech at Over-the-Counter Derivatives Symposium, Chicago, April 11, 2014). <https://www.chicagofed.org/~media/others/events/2014/annual-over-the-counter-derivatives-symposium/tucker-clearinghouses-new-central-banks-tucker-2014-pdf.pdf>

113. See for example Nicole Abruzzo and Yang-Ho Park, “An empirical analysis of futures margin changes: determinants and policy implications,” Board of Governors of the Federal Reserve System, Finance and Economics Discussion Series, no. 86 (October 2014). <https://www.federalreserve.gov/econresdata/feds/2014/files/201486pap.pdf>; and Dietrich Domanski, Leonardo Gambacorta, and Cristina Picillo, “Central clearing: trends and current issues,” *Bank of International Settlements Quarterly Review* (December 2015). http://www.bis.org/publ/qtrpdf/r_qt1512g.htm

114. The original device of clearinghouses—private market counterparty credit risk management in securities trades and similarly short-lived transactions—is complicated when applied to longer-lived transactions such as OTC derivatives and to systemic risk.

115. Daniel K. Tarullo, “Advancing Macroprudential Policy Objectives” (speech at the Office of Financial Research and Financial Stability Oversight Council’s Fourth Annual Conference on Evaluating Macroprudential Tools: Complementarities and Conflicts, Arlington, VA, January 30, 2015). <http://www.federalreserve.gov/newsevents/speech/tarullo20150130a.htm>

116. In November 2016, the CFTC staff designed and performed stress testing of five clearinghouses registered with the CFTC located in the US and in the UK. This was a laudable step, and such stress testing should be incorporated as a recurring element of the agency’s program of oversight of clearinghouses. Such stress testing should be expanded to include liquidity, operational, and cyber-risk. See “CFTC Staff Issues Results of Supervisory Stress Test of Clearinghouses,” Press Release PR7483-16 (November 16, 2016). <http://www.cftc.gov/PressRoom/PressReleases/pr7483-16>

117. Department of the Treasury, “Financial Regulatory Reform—A New Foundation: Rebuilding Financial Supervision and Regulation,” Washington, DC (January 2009). https://www.treasury.gov/initiatives/Documents/FinalReport_web.pdf

Government Accountability Office, “Financial Regulation: A Framework for Crafting and Assessing Proposals to Modernize the Outdated U.S. Financial Regulatory System,” Washington, DC (January 2009) GAO-09-216. <http://www.gao.gov/products/GAO-09-216>

Timothy Geithner, *Stress Test: Reflections on Financial Crises* (New York: Crown Publishers, 2014); and Henry M. Paulson Jr., *On the Brink: Inside the Race to Stop the Collapse of the Global Financial System* (New York: Hachette, 2013).

Government Accountability Office, “Financial Regulation: Complex and Fragmented Structure Could Be Streamlined to Improve Effectiveness,” Washington, DC (March 2016) GAO-16-175. <http://www.gao.gov/products/GAO-16-175>

Paul Tucker, “The Design and Governance of Financial Stability Regimes: A Common-resource Problem That Challenges Technical Know-How, Democratic Accountability and International Coordination,” *Centre for International Governance Innovation Essays on International Finance*, vol. 3 (September 2016). https://www.cigionline.org/sites/default/files/financial_essay_vol.3_web.pdf

118. The term “systemwide” is intended to be synonymous with “macroprudential,” which has been explained as follows: “In practice, there are two uses of the term ‘macroprudential supervision.’ The first relates to the supervision of the financial system as a whole, with an emphasis on interactions among financial markets and institutions. The second relates to the use of regulatory or other non-interest-rate tools of policy to deal with problems arising from the behavior of asset prices.” Federal Reserve Vice Chairman Stanley Fischer (Martin Feldstein Lecture, National Bureau of Economic Research, July 10, 2014). <http://www.federalreserve.gov/newsevents/speech/fischer20140710a.htm>.

119. “Structural macroprudential tools are put in place as a part of the ongoing regulatory structure, but they are designed specifically from a systemic, as opposed to a firm- or asset-specific, perspective.” Daniel K. Tarullo (speech at the Office of Financial Research and Financial Stability Oversight Council’s Fourth Annual Conference on Evaluating Macroprudential Tools: Complementarities and Conflicts, Arlington, VA, January 30, 2015). <http://www.federalreserve.gov/newsevents/speech/tarullo20150130a.htm>

120. Binyamin Appelbaum, “Policy Makers Skeptical on Preventing Financial Crisis,” *The New York Times*, October 4, 2015. http://www.nytimes.com/2015/10/05/business/economy/policy-makers-skeptical-on-preventing-financial-crisis.html?_r=0

121. William C. Dudley, “Is the Active Use of Macroprudential Tools Institutionally Realistic?” (panel remarks during the Macroprudential Monetary Policy Conference, Federal Reserve Bank of Boston, October 3, 2015). <http://www.newyorkfed.org/newsevents/speeches/2015/dud151003.html>.

122. Daniel K. Tarullo, “Thinking Critically About Nonbank Financial Intermediation” (speech at the Brookings Institution, Washington, DC, November 17, 2015). <http://www.federalreserve.gov/newsevents/speech/tarullo20151117a.htm#pagetop>

123. Eric Rosengren, “Broker-Dealer Finance and Financial Stability” (speech at Conference on the Risks of Wholesale Funding, sponsored by the Federal Reserve banks of Boston and New York, August 13, 2014). <http://www.bostonfed.org/news/speeches/rosengren/2014/081314/081314text.pdf>.

124. Robert Mintz, “MF Global’s collapse: a familiar tale of regulatory failure,” *The Guardian*, November 11, 2011. <https://www.theguardian.com/commentisfree/cifamerica/2011/nov/11/mf-global-collapse-regulatory-failure>

Commodity Futures Trading Commission, “CFTC Charges MF Global Inc., MF Global Holdings Ltd., Former CEO Jon S. Corzine, and Former Employee Edith O’Brien for MF Global’s Unlawful Misuse of Nearly One Billion Dollars of Customer Funds and Related Violations,” Press Release PR6626-13, (June 27, 2013). <http://www.cftc.gov/PressRoom/PressReleases/pr6626-13>

125. International Monetary Fund, Financial Sector Assessment Program, United States, IMF Country Report 15/170 (July 2015), 76. <http://www.imf.org/external/pubs/ft/scr/2015/cr15170.pdf>

126. *A Joint Report of the SEC and the CFTC on Harmonization of Regulation* (October 16, 2009), 16. <http://www.sec.gov/news/press/2009/cftcjointreport101609.pdf>

127. The Department of the Treasury, *Blueprint for a Modernized Regulatory Structure* (March 2008), 11. <https://www.treasury.gov/press-center/press-releases/Documents/Blueprint.pdf>

128. John Crawford, Timothy Karpoff, Angela Allen, Nicole Allen, and Michael Margolis, *Memorandum Concerning the Securities and Exchange Commission and the Commodity Futures Trading Commission*, Volcker Alliance, New York City (April 2015). https://www.volckeralliance.org/sites/default/files/attachments/Background%20Paper%203_Memorandum%20Concerning%20The%20Securities%20and%20Exchange%20Commission%20and%20The%20Commodity%20Futures%20Trading%20Commission.pdf

129. Examples range from esoteric instruments to common structures. For example, a CDS written on a narrow-based index of loans would be a security-based swap subject to SEC jurisdiction, but a total return swap written on the same index would be a swap subject to CFTC jurisdiction. These closely related transactions would be subject to very different regulations. Similarly, exchange-traded funds mimicking the S&P 500 are SEC products, while the e-mini—a futures contract based on the S&P 500—is a CFTC product. A similar situation exists with Treasury securities and Treasury futures or interest rate swaps. John Crawford, Timothy Karpoff, Angela Allen, Nicole Allen, and Michael Margolis, *Memorandum Concerning the Securities and Exchange Commission and the Commodity Futures Trading Commission*, Volcker Alliance, New York City (April 2015). https://www.volckeralliance.org/sites/default/files/attachments/Background%20Paper%203_Memorandum%20Concerning%20The%20Securities%20and%20Exchange%20Commission%20and%20The%20Commodity%20Futures%20Trading%20Commission.pdf

130. *Reshaping the Financial Regulatory System: Long Awaited, Now Crucial*, Volcker Alliance, New York City, 2015. <https://www.volckeralliance.org/sites/default/files/Reshaping%20the%20Financial%20Regulatory%20System%20-%20The%20Volcker%20Alliance.pdf>

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