

Hearing on “Emerging Threats to Stability: Considering the Systemic Risk of Leveraged Lending”
Before the U.S. House of Representatives Committee on Financial Services,
Subcommittee on Consumer Protection and Financial Institutions

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Executive Summary

- ¶ Risk is building in the leveraged loan and collateralized loan obligation (“CLO”) markets.
- ¶ These two markets are connected: leveraged loans are being repackaged into CLOs just as mortgages and mortgage-backed securities were used to create collateralized debt obligations (“CDOs”), the financial products at the heart of the financial crisis 11 years ago.
- ¶ There are important differences but also troubling parallels between the leveraged loan/CLO markets and the earlier mortgage/CDO markets.
 - One alarming similarity is the decline in leveraged loan underwriting standards: the market is now dominated by “covenant-lite loans.” Covenant-lite loans permit greater leverage by borrowers and remove an early warning system for lenders.
 - Purchases of CLOs by banks and other regulated financial institutions made in order to game crucial regulatory capital requirements remain a significant concern.
- ¶ Like mortgages and CDOs, leveraged loans and CLOs form a pipeline or system. Disruptions at either end of the system can cause financial havoc on the other end and then ricochet back. This is akin to a coiled spring or “crisis accordion.”
- ¶ Losses or disruptions in the leveraged loan/CLO markets, even if they do not approach the levels of mortgages/CDOs in the global financial crisis could still be significant.
 - They could amplify a recession.
 - We should be humble about our ability to predict the upper bound of financial market disruptions or crises.
- ¶ In my research surveying the CLO market, I have spent hours interviewing market participants. I have found that:
 - Some tranches of CLO securities appear not to trade actively; and
 - Many CLO securities trade on opaque markets lacking transparent prices.
- ¶ A lack of trading of CLO securities undermines the economic rationale of these securities, as well as their safety and favorable regulatory treatment.
- ¶ A lack of transparent prices means that neither the marketplace nor regulators can rely on prices to police risk-taking in the CLO market.
- ¶ Regulators must monitor and analyze data on leveraged loans and CLO markets.
 - I therefore support the three bills being considered today.
 - The OFR needs cooperation from other financial regulators in assessing risk in these markets. Lack of data sharing among financial regulators remains a crucial weakness.
 - The OFR needs an independent source of funding. We cannot wait until it is time to man the lifeboats to fully fund the iceberg patrol.
 - Regulators need minimum standards in assessing bank exposure to leveraged loans.
- ¶ I would also recommend:
 - Stress testing of financial markets, not just individual institutions;
 - Requiring financial regulators to conduct war games to prepare for market disruptions;
 - Underscoring that the burden is on financial institutions to prove that leveraged loans and CLOs are safe rather than on regulators to prove that they are unsafe.
- ¶ If data gathering reveals significant systemic risk in leveraged lending/CLO markets, regulators should use a mix of tools, including limiting bank investments in CLOs, enhanced and countercyclical capital requirements, and the Volcker Rule “covered funds” provisions.

Mr. Chairman Meeks, Ranking Member Luetkemeyer, and Members of the Committee:

Thank you for inviting me to testify at today's hearing on "Emerging Threats to Stability: Considering the Systemic Risk of Leveraged Lending."

My testimony today will focus on the connection between leveraged lending and financial products called collateralized loan obligations (or "CLOs"), which are a kind of asset-backed security. I will explain these terms in a moment. My testimony will also detail the preliminary results of two years of in-depth interviews of participants in CLO markets on the nature of investments and trading in these markets.

I am a law professor at the University of Colorado Law School. My teaching and research focus on securities regulations, financial institutions, financial markets, and financial crisis. I have authored numerous articles on asset-backed securities, financial institutions, and financial crises. My 2014 book, *Law, Bubbles, and Financial Regulation* examined the ways in which regulatory changes, including deregulation, declining enforcement levels, and deteriorating legal compliance, can contribute to, and be reinforced by, asset price bubbles. These regulatory dynamics have contributed to the most severe financial crises in history.

Before joining the faculty at the University of Colorado, I was on the faculty at the University of New Mexico School of Law and served as a visiting professor at the University of Georgia School of Law. Before becoming an academic, I practiced for eight years at Cleary, Gottlieb, Steen, and Hamilton, where my practice included securitization transactions.

I have not received any Federal grants or any compensation in connection with this testimony, and I am not testifying on behalf of any organization. The views expressed in my testimony are solely my own.

1. CLOs: Their Purpose and Connection to Leveraged Loans

The Financial Stability Oversight Council has identified leveraged loans as one of the most significant threats to financial stability.¹ This threat exists even though the size of the leveraged loan market represents a small but significant portion of the overall \$42 trillion in fixed income instruments outstanding. According to a March 2019 report of the Securities Industry and Financial Markets Association, there are \$1.7 trillion in leveraged loans outstanding.² The significance of this market owes to several factors beyond just size, including the following:

These loans are made to high risk corporate borrowers: Leveraged loans are made to risky companies whose credit quality is below investment grade.³ More than half the new leveraged loans in 2018 were borrowed by companies to finance mergers and acquisitions and leveraged buyouts, pay dividends, and buy back shares from investors.⁴ One group of economists characterized these purposes as follows: "in other words, for financial risk-taking rather than plain-vanilla productive investment."⁵

The size of the market has mushroomed: New leveraged loans issued in the United States increased from approximately \$200 billion in 2011 to over \$500 billion in each of 2017 and 2018.⁶

Underwriting standards have deteriorated: The share of leveraged loans that are “covenant-lite” has increased dramatically from under 30% in 2011 to approximately 80% in 2018.⁷ As an additional reference point, the percentage of U.S. leveraged loans that were covenant-lite in 2007 was approximately 30%.⁸ Covenant-lite means the loans lack many standard agreements that the borrower maintain certain defined levels of financial health. Without these covenants, lenders lack both important early warning alarms that a borrower’s financial position is deteriorating and the ability to call a default if those triggers are met. Lenders face enormous competitive pressure to negotiate away these covenants. If they insist on these provisions, they may lose business. Relaxing covenants and underwriting standards has led to a dramatic spike in corporations making adjustments to earnings and borrowing more for mergers and acquisitions and leveraged buyouts.⁹ This deterioration in credit underwriting standards has troubling parallels to the decline in mortgage underwriting standards in the years leading up to the global financial crisis. Indeed, according to a 2018 report, average recovery rates for defaulted loans have fallen to 69 percent from the pre-crisis average of 82 percent.¹⁰

Banks hold a sizeable portion of leveraged loans: According to federal financial regulators, banks hold approximately 45% of the total loans reviewed by the regulators.¹¹ This means losses on those loans would impact the regulated financial sector.

The regulated financial sector is further exposed to the risk of leveraged loans, because many of those loans are purchased by securitization vehicles and repackaged to create complex financial products called collateralized loan obligations (“CLOs”). As explained below, CLOs are close cousins of the mortgage-related collateralized *debt* obligations (“CDOs”) that were at the heart of the global financial crisis 11 years ago. According to financial industry estimates, CLOs now hold \$615 billion in leveraged loans (roughly 1/3 of the leveraged loans outstanding).¹² Banks, insurance companies, and registered investment funds hold a significant portion of senior CLO securities. Globally, banks own approximately 50% of senior CLO securities, and the majority of CLO securities are held by U.S. entities.¹³ Insurance companies and pension funds also hold significant stakes in CLOs, including in more junior, riskier securities.¹⁴ Banks and other regulated entities are also exposed to risk in CLO markets via lending and derivatives transactions with other CLO investors.¹⁵

Industry studies estimate that the CLO market increased 119% between January 2013 and March 2019, when its size topped \$600 billion.¹⁶ Despite financial industry fears of a slowdown in the market, new U.S. CLO issuances sold to investors from January 1 through April 19 of 2019 totaled \$39.4 billion, slightly above the amount sold over the same period in 2018.¹⁷ 2018 saw a record amount of \$128.1 billion in new CLOs arranged.¹⁸

I focus my testimony on how securitization transmits risks in the leveraged loan market to CLO investors, including regulated entities. Securitization creates a complex and troubling transmission line between risky credit markets and markets in complex financial products purchased by regulated financial institutions and others. Even if the potential magnitude of impacts on financial institutions, markets, and the broader economy is not as large as the devastation wrought by the collapse of the mortgage-related securitization markets, warning signs for financial instability now flash.

A. *Explaining CLOs and Securitization*

CLOs are a complex version of securitization. Securitization is the process by which financial firms arrange for the collection (or “pooling”) of large numbers of loans, which are then used to create securities that are sold to investors in capital markets. The cash flow on the original loans funds the payment of interest and principal on those securities. Securitization proceeds in a number of steps. These steps can be simplified and described as follows:

- ¶ *Loan origination:* Lenders make loans to individual or commercial borrowers. These lenders are called “originating lenders.”
- ¶ *Sale to a securitization vehicle:* The originating lenders then sell groups of their loans to an investment vehicle.¹⁹ This investment vehicle typically purchases groups of loans from multiple originating lenders. It may also purchase other assets.
- ¶ *Issuance of asset-backed securities to investors:* The securitization vehicle then creates bond-like securities that an underwriter sells to investors in capital markets. The cash flows from the loans and other assets that the vehicle purchased fund the interest and principal payments on the securities.

A financial institution, often an investment bank, “arranges” the overall transaction; it does the following:

- ¶ helps create the overall structure of the transaction;
- ¶ identifies (or selects a money manager that will identify) the pools of loans that will be securitized;
- ¶ coordinates the logistics of the transaction; and
- ¶ underwrites or places the resultant asset-backed securities with investors.

The party arranging a securitization receives a fee for these services.

Securitization can involve a wide array of types of loans, including mortgages, student loans, consumer credit card debt, and automobile loans. CLOs involve the securitization of corporate debt, including leveraged loans. CLOs are one version of collateralized debt obligations (CDOs), which involve the securitization of fixed-income assets, such as high-yield debt (often called “junk bonds”) or asset-backed securities. CDO markets fueled the residential real estate boom in the early 2000s and then exacerbated the global financial crisis that followed. The CDOs at the heart of the crisis involved the re-securitization of mortgage-backed securities, which, in turn, were the product of securitizing residential mortgages. One of the most pressing questions involving the CLO market is whether its risk is markedly different than that of CDOs based on mortgage-backed securities. I turn to this later in my testimony.

B. *The Benefits of Securitization to Participants*

Securitization transactions offer benefits to both originating lenders and investors. These transactions offer a way for originating lenders to offload risky loans and to convert illiquid assets (*e.g.*, mortgages or leveraged loans) into liquid assets (cash). Originating lenders can then use this

cash to make fresh loans. Purchasers of asset-backed securities can invest in lucrative lending markets without having to make or collect on loans themselves. Securitization, including CLOs, offers investors several ways to mitigate the risk associated with the underlying assets, including the following:

- ¶ *Diversification through pooling:* Securitization vehicles purchase pools of loans and other assets from multiple parties. This reduces the exposure of investors to the risk of default on any particular loan. This assumes, however, that losses on loans are not highly correlated.
- ¶ *Portfolio diversification:* Asset-backed securities investors purchase only a small slice of the total securities. This allows them to balance the risk associated with the underlying pool of assets with other investments in their portfolio.
- ¶ *Tranching:* Most securities issue more than one class of securities. Instead, they issue multiple classes of securities (or “tranches”), with senior classes of securities having priority rights to the cash flows on the underlying assets. This means that investors in these senior classes or tranches face a much lower risk of default on their securities than investors in more junior tranches. The risk of default on the underlying assets is thus concentrated in the junior tranches.

Asset-backed securities also mitigate risk in that they are designed to be tradeable. Investors who do not like the riskiness of their securities or who need cash can *theoretically* sell their assets for cash and exit the market.²⁰ I will return in a moment to the question of how and how much CLO securities actually trade.

Credit rating agencies play a crucial role in CLO and securitization markets. In theory, they help investors assess the credit risk of asset-backed securities. In practice, when credit rating agencies give an investment grade rating to senior tranches of a CLO or other securitization, they allow banks, insurance companies, and other regulated financial institutions to purchase those securities. Without those ratings, banking, insurance, or other regulations would preclude these institutions from making these investments.

C. *Securitization as Shadow Banking*

Securitization’s conversion of illiquid underlying assets into theoretically tradeable securities underscores how asset-backed securities markets represent a core part of the “shadow banking system.” Many economists use this term to describe particular capital markets that provide the same core economic functions as depository banks, albeit without being subject to banking regulations. These functions include:

- ¶ *Credit intermediation:* Just as banks borrow from depositors and other lenders and lend to households and businesses, CLOs and other securitization transactions “borrow” by issuing fixed-income bond-like securities to investors and providing cash to originating lenders to make new loans.

- ¶ *Credit transformation:* Just as banks make risky loans to borrowers and offer low risk deposits and other investments to their customers, CLOs and other securitization structures can use leveraged loans or other risky assets to create senior investment grade securities (as well as more junior securities that are riskier).
- ¶ *Maturity/liquidity transformation:* Just as banks have long-term assets (loans to borrowers) and issue short-term liabilities (deposits that are withdrawable upon demand), CLOs and other securitization vehicles convert illiquid assets (like leveraged loans) into theoretically liquid asset-backed securities that could be traded for cash.

By performing these three functions, particularly the final one, banks become fragile and susceptible to runs. In 2007 and 2008, the global financial crisis revealed that asset-backed securities markets can also suffer from run-like behavior; when investors sought to exit these markets and liquidate their investments *en masse*, fire sale behavior caused markets to freeze.²¹ Scholars have described runs on other shadow banking markets, such as repos and money market mutual funds.²² These markets performed these same three economic functions and proved vulnerable to the same kind of liquidity crisis. Unlike banks, however, securitization and other shadow banking markets were not subject to the same intensive regulatory regime that governs banks.

Note that the benefits and economic functions described above do not imply that securitization always provides a net social benefit. Securitization may provide more capital to credit markets, but it is important to ask how that credit is being used and how sustainable any credit boom is. Securitization may theoretically provide liquid investments to capital markets investors, but it is important to ask how much liquidity exists in actuality. Securitization can become incredibly complex and thus more fragile, as investors become more distant from the risks in the underlying credit markets to which they are exposed. The global financial crisis revealed that instead of transferring risk to parties that could understand and optimally bear it, securitization has the potential to transfer risk to investors with inadequate information and poor risk-bearing capacity.

D. *Regulatory Treatment*

CLO and securitization markets exist in large part because of statutory and regulatory changes that permit banks, insurance companies, and other regulated financial institutions to invest in asset-backed securities. Starting in the 1980s, changes in these “permissible investment” rules fueled the growth of securitization markets. They also created potential transmission lines between banking and capital market crises.²³ Moreover, regulators wrote regulatory capital rules that gave favorable treatment to asset-backed securities, particularly when compared to more direct financial institution investments in the underlying asset markets.²⁴ This set the stage for financial institutions to engage in regulatory capital arbitrage, a gaming of these important capital rules that are supposed to provide a cushion against financial institution failure and systemic risk. I will return to regulatory capital arbitrage in a moment.

i. *Exception to Dodd-Frank Securitization Rules*

The Dodd-Frank Act²⁵ mandated that federal financial regulators pass a number of rules to fix significant flaws and sources of risk in securitization. However, a federal appeals court and regulators have carved a number of important exceptions to these rules for CLOs. For example:

Skin in the Game Exceptions: The Dodd-Frank Act mandated that federal financial regulators pass rules to require that originating lenders retain a portion of the risk of assets they sell into securitizations.²⁶ This was intended to address the skewed incentives of lenders to sell poor credit quality assets and leave asset-backed securities investors exposed to “lemons.” However, in 2018, a panel of the U.S. Court of Appeals for the D.C. Circuit ruled that the risk retention rules did not apply to CLOs because the judges found the agencies’ interpretation of the Dodd-Frank Act to be unreasonable.²⁷

Volcker Rule Exceptions: The Volcker Rule provisions of the Dodd-Frank Act mandated that federal financial regulators write rules prohibiting not only proprietary trading by banks, but also bank investments in certain “covered funds” deemed to be too risky. When federal financial regulators wrote the final rules implementing this statutory provision,²⁸ they included a number of exceptions and exemptions to permit bank investments in CLOs that met certain criteria. The most important exception was incorporated into SEC Rule 3a-7, which allowed bank investments if the CLO invested only in certain pools of loans as opposed to high yield bonds or other assets.²⁹ This exception permitted the securitization structure and interconnected markets we see today: CLOs backed by leveraged loans. (Late last year, the Loan Syndications and Trading Association, the trade group for CLOs and similar products, asked regulators to widen this exception to allow CLOs to hold “non-loan assets,” including “bond buckets.”)³⁰

It is not a coincidence that CLOs backed by leveraged loans later mushroomed in the gaps in the legal regime for securitization created by court opinion and rulemaking.

ii. *2013 Leveraged Loan Guidance and Withdrawal*

Regulators have not been blind to the risks that the leveraged loan markets pose for banks and other regulated financial institutions. In 2013, the Office of the Comptroller of the Currency (“OCC”), the Federal Reserve Board, and the Federal Deposit Insurance Corporation (“FDIC”) issued interagency guidance on leveraged loans (the “2013 Interagency Guidance on Leveraged Lending”).³¹ This guidance set minimum standards for regulator review of leveraged lending activities of financial institutions supervised by the three agencies. These standards included criteria for reviewing the following with respect to leveraged loans:

- ¶ underwriting considerations;
- ¶ assessing and documenting enterprise value;
- ¶ risk management expectations for credits awaiting distribution;
- ¶ stress-testing expectations;
- ¶ pipeline portfolio management; and
- ¶ risk management expectations for exposures held by the institution.³²

However, in 2017, the General Accountability Office determined that this interagency guidance constituted a “rule” that must be reviewed by Congress under the Congressional Review

Act.³³ Then, in 2018, the Comptroller of the Currency announced that national banks, the largest lenders in the leveraged loan markets, would no longer be subject to the 2013 Interagency Guidance on Leveraged Lending.³⁴ The Comptroller's decision degraded the ability of federal regulators to monitor the buildup of risk in the leveraged loan market – and, by extension, the CLO market which securitizes those loans – and banks' exposure to that risk.

2. The Buildup of Risk In the CLO Market

A. *How are CLOs Similar to Pre-Crisis CDOs? What is the Risk of a Crash?*

CLOs bear numerous similarities to CDO securities in the years leading up to the financial crisis. Both markets involve the securitization of debt and the same basic features of a complex securitization: tranching, a reliance on credit rating agencies, and (as explained later in this statement) thin trading and opaque pricing of at least some tranches and some issues. The leveraged loans being sold into CLO structures result from much looser underwriting standards. As mentioned above, “covenant-lite” loans now represent a sizeable share of both the leveraged loan market and the loans being sold into CLOs. Without these covenants, lenders or CLO investors – whose securities depend on the cash flow from these loans – have fewer early warning alarms that a corporate borrower's financial health is deteriorating and default is looming. The covenant-lite trend has clear parallels to the decline in underwriting standards in both residential mortgages and mortgage-backed securities in pre-crisis years.

These similarities between contemporary CLOs and pre-crisis CDOs presents an urgent question: what is the risk that CLO markets will suffer disruptions or even a crash similar to CDO markets in 2007-2008? The CLO market participants I have interviewed thus far in my research have presented strong arguments that there are sufficient differences in the CLO market that make a repeat of the global financial crisis unlikely. Nevertheless, almost all interviewees admitted that the risk of a more localized market disruption that would lead to a crash in CLO prices was a concern.

Interviewees pointed to differences between contemporary CLO markets and pre-crisis CDO markets. One interviewee said that contemporary CLOs had more conservative structures (*e.g.*, overcollateralization tests) than pre-crisis CDOs, and that these mechanisms provided greater protection to senior CLO securities. Other interviewees disputed that CLOs had markedly more conservative structures. However, many interviewees pointed to other significant differences, most notably the much larger size of the pre-crisis CDO market and the fact that those CDOs were backed by real estate and not corporate debt. Those factors, according to interviewees and many economic analyses, mean that potential economic shocks would have a smaller impact on the CLO market compared to the unraveling of the CDO market in the global financial crisis. Interviewees did *not* note a countervailing factor that may make securitization of leveraged loans relatively *more* risky than securitizing mortgages: numerous Dodd-Frank provisions and rulemakings under that statute have regulated the risk of mortgage lending and mortgage securitization. Leveraged lending was not similarly addressed.

In addition, commentators have argued that the sophistication of leveraged loan borrowers compared to pre-crisis residential mortgage borrowers means that leveraged loan terms are less onerous and should lead to less defaults. It is hard to evaluate this particular claim, as other factors

may push towards greater leveraged loan defaults, such as “agency costs,” *i.e.*, the fact that corporate managers are managing the corporation’s money not their own.

Even though many interviewees perceived the risk and potential severity of a crash in the CLO market to be much lower compared to risks in the pre-crisis CDO market, most interviewees were nonetheless very concerned about a market downturn that could cause losses. Some described it as “what keeps me up at night.” Several buy-side interviewees (those working at firms investing in CLO securities) described planning for ways to mitigate losses, and, in one case, to make a profit, from a severe downturn in the CLO market. Most buy-side interviewees expressed a view that they had superior information compared to other investors in the market, and that this would allow them to exit the market before a downturn accelerated or to otherwise mitigate their risk of losses.

These responses track many behavioral finance models of asset price bubbles, which bifurcate financial markets into “smart money” (informed and sophisticated investors who analyze information on a security’s fundamental value) and “noise traders” (less sophisticated investors who do not analyze fundamentals but chase trends). Of course, every investor in CLO markets cannot be smarter than average, and economic research has documented that even financially sophisticated investors can be overconfident in their abilities and overoptimistic about market events.³⁵

B. Crisis Accordion

A crisis could propagate in leveraged loan markets in multiple ways. It is important to remember that leveraged loan and CLO markets are tightly connected in a system. This means that the initial shock could hit at either end of the pipeline – leveraged lending or CLO investing – and quickly cascade to the other side of the market. The most common concern among the individuals I interviewed, as well as among scholars and market analysts, is that an economic shock will cause a wave of defaults on leveraged loans. Again, looser underwriting standards (covenant-lite loans) mean that lenders and investors will have less warning of any deterioration in the financial health of borrowers. Covenant-lite loans also enable higher leverage of borrowers, which makes them more vulnerable to losses.

A surge in leveraged loan defaults would reduce the cash flows to CLO securities, and impact junior CLO securities first. A larger wave of defaults could affect more senior CLO securities, such as the middle or “mezzanine” tranches. In the wake of the global financial crisis, economists noted how even small errors in calculating the risks affecting underlying assets can be magnified each time the cash flows from those assets are securitized and re-securitized.³⁶ It is not just losses, but correlated losses that threatens securitization. When losses are unexpectedly correlate, the diversification upon which securitization depends offers less protection to investors.³⁷ The spread of covenant-lite loans has troubling parallels to the spread of exotic mortgages pre-crisis; not only are borrowers more likely to default, they might default at the same time with the same economic shock.

It is not only actual loan defaults and cash flow shortages that can affect asset-backed securities, however. Indeed, the global financial crisis demonstrated that uncertainty about defaults on underlying collateral would affect asset-backed securities can trigger fire sales, crashes and freezes in securitization markets. The unraveling of CDO markets in 2007-2008 stemmed not only from actual defaults on mortgages and mortgage-backed securities, but also from investor uncertainty

about how defaults on those assets would affect their CDO securities through multiple layers of securitization.³⁸

A crisis in CDO markets could also begin at the other end of the pipeline. If CLO investors decide to cut back on new CLO investments, less cash will flow back to originating lenders. This would tighten lending markets, prevent borrowers from refinancing existing loans, and potentially trigger a spike in defaults. Originating lenders may then be left with risky leveraged loans on their balance sheets that they expected to be able to sell into a CLO securitization. This represents “warehousing risk.”³⁹ Risk can suddenly appear on an originating lender’s balance sheet. This problem can be magnified because of the timing of many sales. Research into pre-crisis securitizations revealed that many originating lenders carry loans on their balance sheet for a significant portion of a financial quarter. They sell the loans into a securitization shortly before the end of the quarter when the balance sheet “snapshot” of the lender’s assets, liabilities, and shareholders’ equity is taken. This means that balance sheets do not capture the full risk that the lender bore over the entire quarter.⁴⁰ This risk can suddenly manifest if demand by CLOs for leveraged loans were to dry up.

Whether a securitization crisis starts from the originating lender or investor end, a shock can ricochet back and forth through the pipeline. The 2007-2008 crisis in mortgage-related CDOs illustrated the power of feedback effects. As CDO markets unraveled, the credit crunch intensified, driving up interest rates. Many borrowers became unable to make payments on mortgages that reset to higher market rates and were unable to refinance. A fresh wave of defaults then further damaged securitization markets and the financial institutions that invested in them.⁴¹ The leveraged loan/CLO pipeline has the potential to act like a spring or “crisis accordion,” with losses and risk moving in waves back and forth between the two markets.

In describing how crises propagate between lending and securitization markets, one subtle but important point merits underscoring: use of the term “economic shock” can sometimes be misleading. It suggests that the threats to the financial system come from external forces (what economists call “exogenous factors”). However, the financial system often creates the very economic conditions that later threaten its stability. In the leveraged loan and CLO market, risky lending and investment can create an unstable credit boom.

C. The Potential Economic Impact of Disruptions to the Leveraged loan and CLO Markets

If the risk build up in leveraged loan and CLO markets results in severe market losses, disruptions, or crashes, the pressing question becomes what would be the impact on the broader economy. The leveraged loan and CLO markets are smaller than their pre-crisis mortgage and CDO counterparts. Moreover, the collapse of the residential mortgage and CDO markets had an outsized economic impact because of the vital importance of housing markets to households and the macroeconomy. The most likely outcome of disruptions or even a crash in the leveraged loan and CLO markets would be amplification of a recession. Financial institutions suffering losses because of leveraged loans or CLO investments would likely curtail lending, which would throttle back economic growth. Of course, disruptions in these financial markets might combine with other macroeconomic factors to increase the severity of a recession.

We should be humble about our ability to predict financial market disruptions, particularly about our capacity to place an upper bound on the expected severity of any crisis in a particular financial market. The timing and impacts of market disruptions on the financial system and the broader economy are often non-linear. Panics, fire sales, and market freezes result from herd dynamics that are in part psychological and thus difficult to model. Connections among different financial markets and between the financial system and the broader economy change constantly and are often poorly mapped. In short, we should remain wary of underestimating the likelihood and severity of financial disruptions.

3. Why Do Investors Purchase CLOs? How Liquid Are the Secondary Markets for CLOs?

A. Preliminary Data

Beyond seeking to identify whether the current CLO market poses different systemic risk concerns than the CDO market thirteen years ago, my current research focuses on CLO investors and the secondary market for these assets. I am currently surveying the market to answer several questions, including: who is investing in the various tranches of CLOs, what are their investment objectives, how often do various tranches of CLOs trade and why, and how is trading conducted.

My research indicates that the identity of investors varies greatly by tranche. Senior tranches are generally purchased by regulated financial institutions, such as banks, insurance companies, and registered investment funds. Multiple interviewees noted the prevalence of Japanese banks as investors in the most senior tranches. However, statistics indicate that U.S. banks purchase 50% of senior CLO securities, and other regulated U.S. financial institutions purchase a sizeable share of senior and mezzanine securities.⁴² Several interviewees noted a tendency of banks, particularly Japanese banks, to pursue “buy and hold” strategies in which they would buy an entire tranche and not seek to sell any of the securities. Some interviewees noted that European financial institutions also purchased senior tranches.

B. Regulatory Capital Arbitrage and Rating Agencies

Several interviewees believed that many investors in senior tranches were engaging in investment strategies to obtain “capital relief” or to engage in “regulatory capital arbitrage.” Understanding regulatory capital arbitrage requires understanding how bank capital requirements function. U.S. and foreign regulations generally limit banks and other regulated financial institutions to investing only in investment-grade debt instruments. Regulations also subject these institutions to regulatory capital requirements. Regulations that follow the Basel II international accord among financial regulators place assets into different risk “buckets.” Riskier assets require that a financial institution have more capital (*i.e.*, fund themselves with a higher degree of equity). Higher capital requirements translate into lower degrees of leverage for the financial institutions. Lower leverage, in turn, can reduce the magnitude of returns for a firm’s equity holders (as well as lowering the magnitude of investment losses).⁴³

In order to achieve a higher return for shareholders, banks and other regulated financial institutions have strong incentives to lower the impact of, or game, capital requirements. Regulatory capital arbitrage involves investment strategies that seek more returns for a specified level of required capital. Of course, if markets have even rudimentary levels of efficiency, investors cannot

obtain higher returns without taking on more risk. In regulatory capital arbitrage, financial institutions, often with the assistance of investment banks, lawyers, and accountants, select and structure investments that have higher returns and risks for a given level of regulatory capital. If successful, the true economic risk of an asset may be much greater than that assumed by the regulatory capital requirement.⁴⁴

As other scholars and I have described, asset-backed securities and various derivatives provide ideal instruments for regulatory capital arbitrage as they slice and dice the risk of underlying assets into various tranches. Parties can structure CLOs and other securitizations to stuff as much risk into senior tranches as possible while still achieving an investment grade rating. This requires, in turn, the acquiescence of credit rating agencies.⁴⁵

Some interviewees noted that credit rating agencies face intense pressure from the investment banks structuring CLO transactions and from investors to provide investment grade ratings. Given that credit rating agencies are paid by the issuer and only if CLO transaction closes, “ratings shopping” remains a concern. Some interviewees also noted that the investment bankers and other parties structuring a deal have strong incentives and capacities to “reverse engineer” a credit rating agency’s methodology in assessing the risk of different CLO tranches. There is evidence that, similar to practices before the global financial crisis,⁴⁶ this reverse engineering can lead to transactions structured to stuff more risk into the investment grade tranches purchased by regulated financial institutions.

Some prominent economists believe that pre-crisis securitization became more about evading capital requirements than actual productive credit risk transfer. Professors Acharya and Richardson explain that this evasion of capital regulations was the driving force behind securitization in the years leading up to the crisis. They write:

[E]specially from 2003 to 2007, the main purpose of securitization was not to share risk with investors, but to make an end run around capital adequacy regulations. The net result was to keep the risk concentrated in the financial institutions—and, indeed, to keep the risk at a greatly magnified level, because of the over-leveraging it allowed.⁴⁷

Regulatory capital arbitrage can have severe consequences. Regulatory capital requirements aim to provide a greater buffer that protects financial institutions from failure. They represent one of the most important tools in mitigating systemic risk. Regulatory capital arbitrage reduces the effectiveness of these important defenses. Moreover, it camouflages a financial institution’s true economic risk from the marketplace and policymakers. Investors, counterparties, and regulators can thus be caught unaware about the fragility of financial institutions.⁴⁸

C. Thin Trading and Opaque Prices

Many, but not all, interviewees viewed secondary trading of many CLO tranches as thin or, in some cases such as Japanese banks buying and holding an entire tranches, non-existent. Some interviewees expressed a contrary view that some, but not all, tranches were actively traded and provided industry studies to support their view. Most interviewees noted that trading is much more primitive than in corporate bond markets and prices of CLO securities are opaque. Many interviewees provided a similar account of how investors obtained prices and conducted trades.

Prices are obtained and most trading occurs via dealers, not on exchanges or trading platforms. Instead of consulting an electronic terminal for a market price, investors call a dealer and obtain a “price indication.” A price indication is evidently different than a price quote, a “bid,” or an “ask.” It is often more of a theoretical price than a price on which a trade could be quickly executed. If an investor want to buy or sell a particular CLO security, she typically does so through the dealer, who might be selling from the dealer’s own inventory or matching a trade with another customer. In short, pricing of CLOs appears to be very opaque.

When asked why investors accept this primitive pricing and trading structure, interviewees provided a range of answers. Some interviewees explained this as a function of bespoke transactions and the small sizes of CLO issuances. These responses, however, raise a number of questions, including how bespoke are CLO transactions and why CLOs could not purchase larger pools of collateral to generate larger issuances. Indeed, other interviewees dismissed the bespoke and small size explanation for opaque pricing.

Some interviewees offered “supply side” explanations, namely that the investment banks that structure CLO transactions and act as dealers do not want to create more liquid and transparent markets, as this would undermine their ability to charge a spread on buying and selling securities. One interviewee offered a detailed historical explanation that focused on investment banks moving over the decades from one fixed-income product to another; as regulations required greater price transparency in the markets for different bonds (such as the TRACE system)⁴⁹, profits from dealing in those markets eroded. According to this interviewee’s account, investment banks gravitated towards more opaque markets that would preserve their ability to enjoy larger spreads, with CLO markets being the latest stage in this evolution.

The supply side explanation, however, appears incomplete. Several electronic trading platforms advertise their capacity to handle trading of complex asset-backed securities. If CLO investors wanted more liquid markets with more transparent prices, they could move their securities to these platforms and bypass dealers. Several interviewees offered “demand side” explanations of why many CLO investors have little appetite for more transparent pricing. The incentives vary by type of investor. Some interviewees explained that some banks and other regulated financial institutions that purchase senior CLO tranches may not want either active trading or transparent prices. Transparent prices would force these investors to mark their investments to market, which could cause them to realize losses on investments, take away their flexibility in financial accounting, and require higher levels of regulatory capital. Other interviewees focused on hedge fund investors who purchase more junior tranches. According to these explanations, hedge fund investment strategies exploit information inefficiencies in these markets. Opaque pricing can then help these investors earn trading profits. Some interviewees expressed a view that hedge funds could adapt and earn profits even if markets were more transparent, but did not want to push for these changes as it might cause dealers to limit their access to existing markets.

D. The Implications of Thin Trading and Opaque Pricing

To the extent that trading in various CLO tranches is thin or even non-existent, the implications for financial regulation are significant. As explained above, the economic rationale of CLOs and securitization is based in large measure on liquidity transformation, that is, the conversion

of illiquid assets (leveraged loans) into liquid ones (tradeable asset-backed securities). When the resultant securities do not trade, this rationale appears hollow. Moreover, thin trading undermines the “safety” of these investments, as investors cannot easily exit a market. This is compounded by the danger that liquidity can evaporate quickly in securitization markets.⁵⁰ A lack of active trading in CLO markets calls into question the favorable regulatory treatment that is premised in large measure on the ability of investors to exit their investments easily.

Opaque pricing also has financial stability implications. A lack of transparent pricing means that investors, their own shareholders, creditors, and counterparties, and policymakers cannot adequately rely on a market price discovery mechanism to assess the risks of CLO investments. This frustrates risk management by regulated financial institutions investing in these markets, it erodes market discipline, and it places enormous burdens on regulators overseeing these institutions.

4. Policy Responses to Mitigate Risks to Financial Stability

Information is the first order of business for any policy response to the financial stability risks posed by leveraged loans and CLOs. Both market participants and policy makers need a better understanding of the risks posed by these financial products and their potential impacts on other financial markets and the broader economy.

As noted above, credit rating agencies play a pivotal role in assessing the credit risk of CLO securities. By determining whether senior CLO securities merit an investment grade rating, credit rating agencies serve as gatekeepers for whether banks, insurance companies, and many investment funds may invest in these markets. However, fixing the incentive structure of credit rating agencies remains perhaps the biggest unfinished business of financial reform.⁵¹ It has been almost two decades since the Enron era highlighted the flaws in the “issuer pays” business model of credit rating agencies. These flaws again became apparent with the failures of credit rating agencies in detecting risk in the mortgage-backed securities and CDO markets in the lead-up to the global financial crisis. Regulators have yet to develop comprehensive, sustained, and effective responses to Congress’s commands in the Dodd-Frank Act for the Securities and Exchange Commission to develop alternatives to the issuer pays model⁵² and for financial regulators to develop alternatives to rating agencies determinations for use in financial regulation.⁵³ Fundamental reform of credit rating agencies deserves its own hearings and testimony, followed by sustained action by Congress and regulators.

Neither Congress nor financial regulators can rely on credit rating agencies alone to police financial institution risk-taking in CLO or other securitization and shadow banking markets. Congress needs to be assured that federal financial regulators are gathering, sharing, and analyzing crucial data about systemic risk in both CLO markets and other shadow banking markets.

A. Support for Bills Under Consideration by the Committee

In my opinion, the three bills under consideration by the Subcommittee at today’s hearing represent crucial steps towards these objectives. Therefore, I support each of them. I offer additional thoughts on each bill below:

The Leveraged Lending Data and Analysis Act: This bill directs the Office of Financial Research (“OFR”) to study and report to Congress on risks in the leverage lending and CLO markets. Only armed with this information can Congress decide whether additional laws or regulations are needed to mitigate systemic risk emanating from these markets. I hope that some of the information that the OFR would need would already be collected by federal financial regulators in their supervision and examination of banks, broker-dealers, and other regulated entities. (The Leveraged Lending Examination Enhancement Act, discussed below, would push at least bank regulators to collect this data).

The pressing need, then, is to force federal financial regulators to gather and share information with the OFR. A lack of data sharing among federal financial regulators remains one of the biggest weaknesses in the government’s monitoring and response to emerging sources of systemic risk. This problem has become particularly acute with financial products, like asset-backed securities, that involve banks and generate banking like risks, but are bought and sold on securities/capital markets. These products thus straddle or fall in the cracks between oversight by bank regulators and capital market regulators, such as the Securities and Exchange Commission, and the Commodity Futures Trading Commission.

I recommend that, among the data that OFR and financial regulators collect and analyze, are information on the following:

- ¶ *The identity of investors, particularly regulated financial institutions:* this will help map potential transmission lines between disruptions in CLO markets and the regulated financial sector;
- ¶ *How CLOs were structured to lower the effectiveness of capital requirements:* this will help regulators assess the extent to which the effectiveness of regulatory capital requirements has been undermined; and
- ¶ *The depth of trading in different CLO tranches:* This will help regulators assess the liquidity and safety of CLO securities, particularly whether they are meeting expectations built into regulatory capital rules and other prudential regulations.

I also believe this bill’s approach should ultimately be extended to other shadow banking markets. I therefore would recommend the following:

- ¶ *Requiring that federal financial regulators share data on leverage lending and CLO markets that they have collected when requested by the OFR;* and
- ¶ *Ultimately requiring OFR to analyze data on other large shadow banking markets:* These would include other large securitization markets, repo markets, money market mutual funds, and other investment funds that engage in maturity/liquidity transformation.

On this second point, I understand that incremental steps can be necessary, but would support future bills in this regard. This current bill is a crucial first step and is urgent because of the mushrooming size of the leveraged loan and CLO markets and the decline in underwriting

standards. The current bill also serves as a template for future legislation requiring analysis of other segments of the shadow banking system.

The Protecting the Independent Funding of the Office of Financial Research Act: Tasking the OFR with data collection, analysis, and reporting is of little avail if the OFR is hollowed out. This bill would ensure that it is not and that the OFR can achieve its original promise. The creation of the OFR was one of the most important yet underappreciated accomplishments of the Dodd-Frank Act. The OFR promised to serve as a government research organization devoted to studying systemic risk and an “early warning” system for emerging threats to financial stability. Its research is critical to ensuring that the Financial Stability Oversight Council can adequately perform its missions, including identifying non-bank firms that should be considered for designation as “systemically important financial institutions” and recommending prudential regulations to other federal financial regulators. The crucial mission of the OFR can and is being compromised when the Treasury Secretary decides to cut its budget or slash staffing levels. Giving the OFR Director the power to set the organization’s budget and setting a floor for that budget are essential steps to assure that the OFR’s vital role is not compromised by the Secretary of the Treasury’s political calculus or neglect.

I would support further steps to make the OFR completely independent from the Department of the Treasury. This would support an independent mission and organizational culture. Watchdog agencies within the legislative branch, such as the Government Accounting Office and Congressional Budget Office, serve as examples. The independence of funding and staffing levels in this bill, however, represent the most important pieces of agency independence. Detecting and mitigating systemic risk and collecting vital information should be a nonpartisan mission.

The Leveraged Lending Examination Enhancement Act: This bill would require the Financial Institutions Examination Council to establish uniform procedures for examining the leveraged lending activities of regulated financial institutions. The bill sets minimum standards for these procedures. The criteria that the bill sets forth in the minimum standards section would reverse the mistake the Comptroller of the Currency made in lifting the 2013 Interagency Guidance on Leveraged Lending, which degraded the ability of regulators to monitor the buildup of systemic risk in the leveraged lending and CLO markets.

Although I believe these factors are covered by the broad criteria listed in the “Minimum Expectations” subsection of the bill, I would recommend adding the following:

- ¶ *Warehousing risk:* As I note above, lenders that sell leveraged loans into a securitization run the risk of being unable to offload that risk if demand from securitization markets drops. Financial regulators need to track changes in this risk.
- ¶ *Secondary markets:* In order to gauge warehousing risks, financial institutions and their regulators need to track potential disruptions to secondary markets, including securitization markets like CLOs.
- ¶ *Timing of sales:* As I note above, research into securitization practices indicates that many originating lenders sell loans into securitizations shortly before the end of a financial

quarter. Their balance sheets thus do not reflect the risk that these firms bore for much of the quarter. This risk can suddenly materialize if lenders are unable to sell these loans. Examiners should thus gather data on the timing of sales of leveraged loans, whether into a securitization or otherwise.

This bill ensures that federal financial regulators have minimum standards for examining the risks of leveraged lending to regulated financial institutions. Writing these standards into statute rather than relying on agency guidance or rulemaking ensures that these minimum standards will not be diluted or deleted because of political whims. The required reports ensure that Congress can ably oversee federal financial regulators in the performance of their duties to examine financial institutions and regulate their safe and sound leveraged lending activities.

B. *Stress Testing Markets*

I urge Congress to consider other steps to ensure that federal financial regulators understand the risks in CLO and other shadow banking markets. In particular, I recommend that Congress require that the Federal Reserve, with the required cooperation of the OFR and other federal financial regulators, conduct stress tests of key shadow banking markets.⁵⁴ This would extend the approach of stress testing individual financial institutions to entire markets.⁵⁵ Stress testing should start with markets for CLOs and other complex asset-backed securities, as well as other important shadow banking markets (*e.g.*, repos) which engage in credit intermediation, credit transformation, and liquidity/maturity transformation. Other financial regulators must be required to collect and share data with the Federal Reserve for these tests to be effective.

Rationale: Stress testing markets is crucial, as it is the interactions and herd behavior of the many financial institutions creating, purchasing, and trading these financial products that generates bubbles, fire sales, and market freezes. Relying *only* on stress testing financial institutions one-by-one runs the risk of missing:

- ¶ dynamic interactions among firms;
- ¶ correlated risk-taking by and herd behavior of firms, large and small; and
- ¶ contagion effects.⁵⁶

Additional Benefits: These stress tests would not only increase Congress's and regulators' understanding of systemic risk across financial markets, it would also force federal financial regulators to cooperate in sharing and analyzing data. As I note above, the evolution of shadow banking markets has exposed the gaps between regulatory silos. Financial institutions have structured activities to fit within these gaps, and this is where systemic risk has festered. Shadow banking has also exposed the weakness of banking, securities, and derivatives regulators in cooperating in sharing and analyzing data and coordinating a response. Stress testing markets would help remedy this vulnerability.

Stress testing might also inform the design of new legislation and rules that would give regulators the tools to address systemic risks in markets and not just systemic risks in individual institutions. The Administration has recently moved to change the FSOC's mission to deemphasize

designating and regulating systemically important institutions and towards “activity-based” regulation. This seems cynical, as scholars have pointed out that the FSOC does not have the power to regulate activities, and the overall architecture of much of federal financial regulation is designed to address risks in individual financial institutions, not market-wide risks.⁵⁷ However, activities-based regulation might ultimately serve as a valuable complement to institution-based regulation. It might address the risks of herd behavior in shadow banking and other financial markets that institution-based regulation alone cannot adequately address. Stress testing markets would provide Congress and regulators valuable information for the design of these new tools.

C. War Games: Preparing Regulators for Crises in Financial Markets

Congress should also consider mandating that federal financial regulators conduct “war games” to plan their collective responses to potential crises in CLO and other financial markets.⁵⁸ This would help regulators be much more prepared and coordinated than they were when financial crisis began erupting in 2007 and accelerated in 2008. War games would allow regulators to identify systemic risks and potential weaknesses in the legal regime. As with stress testing markets, war games would force siloed financial regulators to cooperate. Regulators should report to Congress on the results of and lessons learned in these exercises.

D. Restricting Purchases of CLO Securities

Should the three bills being considered by the Committee as well as stress testing and war games provide Congress with evidence of excessive risk building in CLO or other asset-backed securities markets, then Congress has several avenues for action. Congress could then mandate that financial regulators adapt existing rules to limit the exposure of regulated financial institutions to CLO markets. These tools would include the following:

The Volcker Rule: Congress could mandate that federal financial regulators reverse their earlier decision to include a carveout to the “covered funds” part of the Volcker Rule that exempted CLOs backed by bank loans. As discussed above, banks and investment banks then structured CLOs to be backed by leveraged loans instead of bonds. Congress could reverse this regulatory decision, which would restrict the ability of banks to invest in CLOs backed by leveraged loans.

Capital Requirements: Congress could also mandate that regulators set higher capital requirements for bank investments in CLOs. These capital requirements would ensure banks have a larger cushion should these investments suffer losses. Congress could consider two different kinds of triggers for enhanced capital requirements:

- ¶ *Lack of Trading:* Capital requirements should be higher for any given CLO tranche if there no evidence of recent active trading in that tranche; or
- ¶ *Countercyclical Requirements:* Congress could mandate that federal financial regulators implement countercyclical rules that require higher capital if there is evidence that underwriting standards for the underlying assets have declines (*e.g.*, the percentage of covenant-lite loans increases).

Capital requirements may have to be set higher to account for the corrosive effect of regulatory capital arbitrage or the gaming of these rules.

Quantitative Requirements: Congress could also mandate that federal financial regulators impose quantitative restrictions on bank investments in CLO.

E. Resetting the Burden of Proof

Given the disastrous unravelling of the CDO market in the global financial crisis, policymakers should not be afraid to ask tough questions about the social value of CLOs and other complex financial instruments. It is worth asking whether the complexity and risk of these instruments is justified by the additional credit provision and liquidity these markets provide. Furthermore, policymakers should ask what this credit is used for and whether the liquidity in investments actually exists. Finally, the global financial crisis should force policymakers to rethink the unspoken presumption that the burden constantly rests on critics to prove that financial instruments are unsafe rather than on regulated financial institutions to prove that these products are safe.⁵⁹

¹ FINANCIAL STABILITY OVERSIGHT COUNCIL, 2018 ANNUAL REPORT 11-12 (2018) available at <https://home.treasury.gov/system/files/261/FSOC2018AnnualReport.pdf> (last visited June 1, 2019). See also OFFICE OF FINANCIAL RESEARCH, ANNUAL REPORT TO CONGRESS 18-20 (2018) available at <https://www.financialresearch.gov/annual-reports/files/office-of-financial-research-annual-report-2018.pdf> (last visited June 1, 2019).

² Securities Industry and Financial Markets Association, Leveraged Lending FAQ & Fact Sheet (Mar.1, 2019) available at <https://www.sifma.org/resources/research/leveraged-lending-faq-fact-sheet/> (last visited June 1, 2019).

³ *Id.*

⁴ Tobias Adrian et al., Sounding the Alarm on Leveraged Lending, Int'l Monetary Fund Blog (Nov. 15, 2018) available at <https://blogs.imf.org/2018/11/15/sounding-the-alarm-on-leveraged-lending/> (last visited June 1, 2019).

⁵ *Id.*

⁶ *Id.*

⁷ *Id.*

⁸ *Id.*

⁹ *Id.*

¹⁰ *Id.*

¹¹ SIFMA, *supra* note 2.

¹² SIFMA, *supra* note 2.

¹³ Mayra Rodriguez Valladares, *Big Banks Are Very Exposed To Leveraged Lending And CLO Markets*, Forbes.com (Apr. 15, 2019) available at <https://www.forbes.com/sites/mayrarodriguezvalladares/2019/04/15/big-banks-are-very-exposed-to-leveraged-lending-and-clo-markets/#6e4e407c7309> (last visited June 1, 2019).

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ Kristen Haunss, *US CLO Market Crosses US\$600bn Outstanding as Spreads Remain Challenged*, REUTERS (Apr. 22, 2019) available at <https://www.reuters.com/article/clos-600bn/us-clo-market-crosses-us600bn-outstanding-as-spreads-remain-challenged-idUSL1N22410A> (last visited June 1, 2019).

¹⁷ *Id.*

¹⁸ *Id.*

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- ¹⁹ This description simplifies most securitization transactions, in which there are usually a series of transfers involving at least two investment vehicles between the originating lender and the securities issued to investors. The use of multiple vehicles decreases the probability that the loans sold into the securitization would be clawed back in the event of the bankruptcy of an originating lender. For an early primer on securitization, see Steven L. Schwarcz, *The Alchemy of Asset Securitization*, 1 STAN. J. L. BUS. & FIN. 133 (1994).
- ²⁰ See Leon T. Kendall, *Securitization: a New Era in American Finance*, in A PRIMER ON SECURITIZATION 13, 13-5 (Leon T. Kendall & Michael J. Fishman eds., 1997).
- ²¹ See Markus K. Brunnermeier, *Deciphering the Liquidity and Credit Crunch 2007–2008*, 23 J. ECON. PERSP. 77 (2009).
- ²² E.g., Gary Gorton, *Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007*, Nat'l Bur. Econ. Res. Working Paper (May 9, 2009) available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1401882; Gary Gorton & Andrew Metrick, *Securitized Banking and the Run on Repo*, 104 J. FIN. ECON. 425 (2012).
- ²³ Erik F. Gerding, *Bank Regulation and Securitization: How the Law Improved Transmission Lines Between Real Estate and Banking Crises*, 50 GA. L. REV. 89 (2015).
- ²⁴ *Id.* at 106-8.
- ²⁵ Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat 1376, 1774-1802 (2010).
- ²⁶ Dodd-Frank Act § 941 (codified at 15 U.S.C. § 78o-11).
- ²⁷ Loan Syndications & Trading Assoc. v. SEC, 882 F.3d 220 (D.C. Cir. 2018). See also Kristen Haunss, *CLO Market Cheers End of Risk-retention Rules*, REUTERS (Feb. 18, 2018) available at <https://www.reuters.com/article/us-marketreaction-clodecision/clo-market-cheers-end-of-risk-retention-rules-idUSKCN1FX29C> (last visited June 1, 2019).
- ²⁸ Prohibitions and Restrictions on Proprietary Trading and Certain Interests in, and Relationships with, Hedge Funds and Private Equity Funds, 79 Fed. Reg. 5536 and 79 Fed. Reg. 5807 (Jan. 31, 2014). 12 C.F.R. Parts 44 (OCC), 248 (Federal Reserve) and 351 (FDIC); 17 C.F.R. Parts 75 (SEC) and 255 (CFTC).
- ²⁹ 17 C.F.R. § 270.3a-7.
- ³⁰ Kristen Haunss, *Loan Market Asks Regulators to Allow CLOs to Hold Bonds*, REUTERS (Oct. 18, 2018) available at <https://www.reuters.com/article/regs-closbonds/loan-market-asks-regulators-to-allow-clo-to-hold-bonds-idUSL2N1WY1GR> (last visited June 1, 2019).
- ³¹ Office of the Comptroller of the Currency, Federal Reserve System, Federal Deposit Insurance Corporate, “Interagency Guidance on Leveraged Lending,” 78 Fed. Reg. 17,766 (Mar. 22, 2013).
- ³² The three agencies wrote that the focus of agency review of a financial institution’s leveraged lending activities would be to ensure that the institution developed and maintained the following:
- ¶ “Transactions structured to reflect a sound business premise, an appropriate capital structure, and reasonable cash flow and balance sheet leverage. Combined with supportable performance projections, these elements of a safe-and-sound loan structure should clearly support a borrower’s capacity to repay and to de-lever to a sustainable level over a reasonable period, whether underwritten to hold or distribute;
 - ¶ A definition of leveraged lending that facilitates consistent application across all business lines;
 - ¶ Well-defined underwriting standards that, among other things, define acceptable leverage levels and describe amortization expectations for senior and subordinate debt;
 - ¶ A credit limit and concentration framework consistent with the institution’s risk appetite;
 - ¶ Sound MIS that enable management to identify, aggregate, and monitor leveraged exposures and comply with policy across all business lines; Strong pipeline management policies and procedures that, among other things, provide for real-time information on exposures and limits, and exceptions to the timing of expected distributions and approved hold levels; and
 - ¶ Guidelines for conducting periodic portfolio and pipeline stress tests to quantify the potential impact of economic and market conditions on the institution’s asset quality, earnings, liquidity, and capital.”
- 78 Fed. Reg. at 17771.
- ³³ General Accountability Office, Letter to Senator Pat Toomey B-329272 (“Office of the Comptroller of the Currency, Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation--

Applicability of the Congressional Review Act to Interagency Guidance on Leveraged Lending”) (Oct. 19, 2017) available at <https://www.gao.gov/assets/690/687879.pdf> (last visited June 1, 2019).

³⁴ OCC Head Says Banks Need Not Comply with Leveraged Lending Guidance, ROPES & GRAY (March 1, 2018), available at <https://www.ropesgray.com/en/newsroom/alerts/2018/03/OCC-Head-Says-Banks-Need-Not-Comply-with-Leveraged-Lending-Guidance> (last visited June 1, 2019).

³⁵ For overviews of how behavioral biases and cognitive limitations afflict financial investors, see Nicholas Barberis & Richard Thaler, *A Survey of Behavioral Finance*, in 1B HANDBOOK OF THE ECONOMICS OF FINANCE 1054 (George M. Constantinides, Milton Harris, and René M. Stulz, eds. 2003). For scholarship discussing cognitive limitations of even sophisticated investors, see e.g., Troy A. Paredes, *Blinded by the Light: Information Overload and Its Consequences for Securities Regulation*, 81 WASH. U. L.Q. 417 (2003); Steven L. Schwarcz, *Rethinking the Disclosure Paradigm in a World of Complexity*, 2004 U. ILL. L. REV. 1.

³⁶ Joshua Coval et al., *The Economics of Structured Finance*, 23 J. ECON. PERSP. 3 (2009).

³⁷ *Id.*

³⁸ See Brunnermeier, *supra* note 21; Erik F. Gerding, *Code, Crash, and Open Source: The Outsourcing of Financial Regulation to Risk Models and the Global Financial Crisis*, 84 WASH. L. REV. 127, 165 (2009).

³⁹ John D. Martin, *A Primer on the Role of Securitization in the Credit Market Crisis of 2007*, in LESSONS FROM THE FINANCIAL CRISIS: CAUSES, CONSEQUENCES, AND OUR ECONOMIC FUTURE 199, 203 (Robert W. Kolb ed. 2010).

⁴⁰ E.g., Patricia M. Dechow & Catherine Shakespeare, *Do Managers Time Securitization Transactions To Obtain Accounting Benefits?*, 84 ACCT. REV. 99 (2009).

⁴¹ For an accessible account of these crisis dynamics, see Brunnermeier, *supra* note 21.

⁴² Rodriguez Valladares, *supra* note 13.

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⁴³ For detailed explanations of how and why financial firms engage in regulatory capital arbitrage, see David Jones, *Emerging Problems with the Basel Capital Accord: Regulatory Capital Arbitrage and Related Issues*, 24 J. BANKING & FIN. 35 (2000); Erik F. Gerding, *The Dialectics of Bank Capital: Regulation and Regulatory Capital Arbitrage*, 55 WASHBURN L.J. 357 (2016).

⁴⁴ Sources *supra* note 44.

⁴⁵ Sources *supra* note 44.

⁴⁶ Gretchen Morgenson & Louise Story, *Rating Agency Data Aided Wall Street in Deals*, N.Y. TIMES, Apr. 23, 2010 at A1.

⁴⁷ Viral V. Acharya & Matthew Richardson, *Causes of the Financial Crisis*, 21 CRIT. REV. 195, 201 (2009). For research that produces evidence of widespread regulatory capital arbitrage, see, e.g., Viral V. Acharya et al., *Securitization Without Risk Transfer*, (Nat'l Bureau of Econ. Research Working Paper No. 15730, 2010); Viral V. Acharya et al., *Capital, Contingent Capital, and Liquidity Requirements*, in REGULATING WALL STREET: THE DODD-FRANK ACT AND THE NEW ARCHITECTURE OF GLOBAL FINANCE 143, (Viral V. Acharya et al. eds., 2011).

⁴⁸ Sources *supra* note 44.

⁴⁹ The TRACE system is governed by FINRA Rules 6710 *et seq.*

⁵⁰ Brunnermeier, *supra* note 21.

⁵¹ See Alice M. Rivlin & John B. Soroushian, *Credit Rating Agency Reform is Incomplete*, Brookings Report (Mar. 2017) available at <https://www.brookings.edu/research/credit-rating-agency-reform-is-incomplete/> (last visited June 1, 2019). There has been little regulatory progress in rating agency reform since this report was issued.

⁵² Dodd-Frank Act § 939F (codified at 15 U.S.C. § 78o–9).

⁵³ Dodd-Frank Act § 939A.

⁵⁴ Anna Gelpern & Erik F. Gerding, *Inside Safe Assets*, 33 YALE J. ON REG. 363, 415-6 (2016).

⁵⁵ Some economists have begun work in this vein. For example, one group has explored stress testing financial networks by focusing on central counterparties. Richard Berner et al., *Stress Testing Networks: The Case of Central Counterparties*, Nat'l Bur. Econ. Res. Working Paper No. w25686 (Mar. 2019) available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3359486 (last visited June 1, 2019).

⁵⁶ See e.g., Kieran Dent, Ben Westwood, & Miguel Segoviano, *Stress Testing of Banks: An Introduction*, BANK OF ENGLAND Q. BULL. 2016 Q3 130 (Sep. 5, 2016) available at <https://www.bankofengland.co.uk/quarterly-bulletin/2016/q3/stress-testing-of-banks-an-introduction> (last visited June 1, 2019) (highlighting the narrow institutional focus of the prevailing supervisory stress tests, and arguing for the need to expand their scope beyond banks, and to incorporate amplification and feedback mechanisms in future stress tests); MORRIS GOLDSTEIN, BANKING'S FINAL EXAM: LESSONS FROM U.S. AND E.U.-WIDE BANK STRESS TESTS, Ch. 3 (2017) (reviewing academic and policy critiques of bank stress tests as inadequate to identify potential contagion dynamics).

⁵⁷ Jeremy C. Kress, Patricia A. McCoy, & Daniel Schwarcz, Regulating Entities and Activities: Complementary Approaches to Nonbank Systemic Risk, *S. CAL. L. REV.* (forthcoming) available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3238059 (last visited June 1, 2019).

⁵⁸ Mehrsa Baradaran, *Regulation by Hypothetical*, 67 VAND. L. REV. 1247 (2014) (discussing “war games” as a means to improve prudential regulation of financial institutions); John Crawford, *Wargaming Financial Crises: the Problem of (In)experience and Regulator Expertise*, 34 REV. BANKING & FIN. L. 111 (2014-15) (proposing war games as a means to improve policymaker preparedness for financial crises).

⁵⁹ A number of prominent legal scholars across the political spectrum have advocated licensing regimes that put the burden on the financial industry to demonstrate that financial products do not pose excessive systemic risk concerns. Compare Saule T. Omarova, *License to Deal: Mandatory Approval of Complex Financial Products*, 90 WASH. U. L. REV. 63 (2012) with Eric A. Posner & E. Glen Weyl, *An FDA for Financial Innovation: Applying the Insurable Interest Doctrine to Twenty-First-Century Financial Markets*, 107 NW. U. L. REV. 1307 (2015).