Trading Places: My New View from Inside the Federal Reserve

Beth M. Hammack
President and Chief Executive Officer
Federal Reserve Bank of Cleveland

Columbia University School of International and Public Affairs and
The Bank Policy Institute
9th Annual SIPA/BPI Bank Regulation Research Conference

New York, New York
February 27, 2025

Introduction

It's great to be back in New York today. I thank Trish Mosser with Columbia University and Bill Nelson with the Bank Policy Institute for the invitation. I attended this conference during my days as a financial market participant and always enjoyed the discussions. Though I've traded places and have shifted my perspective now that I am with the Federal Reserve, I remain a big supporter of this event. We at the Cleveland Fed hold an annual Financial Stability Conference, now in its 13th year, with a similar mix of academics, market participants, and central bankers. It's important to get out of our silos and bring together different perspectives on how regulation affects market structures and economic activity. I believe that to solve tough problems, you need to take advantage of many perspectives and ensure you consider both the intended and unintended consequences of change. If my 30 years in financial markets taught me anything, it's that the regulatory rules serve as an important system of incentives and constraints and that these regulatory design choices have important consequences for credit formation and the stability of the overall financial system.[1]

The Fed has a strong interest in financial stability, not only because promoting it is one of our core functions, but also because it supports our other objectives, including fostering a safe and sound banking system, an efficient payments system, community development, and our monetary policy objectives of maximum employment and stable prices. Whether you're a scholar, a policymaker, or a banker, I think we all want our financial system looking good and feeling good.

A stable financial system is one that is resilient to shocks and in which lenders are able to provide households, communities, and businesses with the financing they need to improve economic opportunities. Even though I'm a Fed newcomer, I'm a veteran of the financial system and several episodes in recent decades when it didn't meet this definition. The global financial crisis in 2008 stands

[1] I am grateful to Doug Campbell, Denise Duffy, Nicholas Fritsch, Joseph Haubrich, and Edward Knotek for assistance with these remarks.

out as a seminal example, but the demise of Long-Term Capital Management and the pandemic along with other notable risk events serve as a reminder that the work to preserve financial stability never stops. The economy and financial system are always evolving and so, too, is the nature of the shocks we may face.

The Fed is prepared to support financial stability on two fronts: First, the Fed has designed regulations to promote financial system resilience over the longer term, thereby reducing the likelihood of the spread of a single shock into a broader crisis. Second, we have tools to contain the damage if a shock does hit the economy.

The Fed's Board of Governors controls the regulatory side of the house, and in partnership with the Federal Deposit Insurance Corporation and the Office of the Comptroller of the Currency, establishes the rules within which financial institutions operate. The Board has delegated to the 12 Reserve Banks the supervisory authority to monitor and examine financial institutions within their respective Districts, ensuring the rules are followed consistently across the Federal Reserve System. Together, regulation and supervision serve the public interest by promoting a safe and sound financial system.

My approach to the supervisory role is grounded in the principle of "value-added supervision" as described nearly 30 years ago by former Cleveland Fed president Jerry Jordan.[2] Jordan's premise was that it is impossible for any one individual or supervisory agency to fully comprehend the real-time risk profile of a diverse and complex financial institution. As a former employee of a complex institution, I can attest that this is a sound premise. Jordan called on bank supervisors to assist, rather than resist, market discipline; their job should be to ensure that markets are working effectively to evaluate financial institutions' risk-bearing capabilities and to provide the right incentives to support a safe, efficient, and

[2] Jordan (1996).

innovative financial system. In turn, banks should have clarity and predictability about how examiners are assessing their health, in other words, consistency and transparency.

Market discipline isn't a panacea, of course. Supervisors still need to conduct rigorous exams to confirm that banks are complying with regulations. But in today's fast-moving environment, supervisors and financial institutions need to work together to identify emerging trends and ensure supervisors are paying close attention to the most significant risks at institutions. The Federal Reserve's *Financial Stability Report*, released biannually, provides a comprehensive overview of the risks we are currently monitoring.[3] The latest report discusses a number of such risks: the potential for cyberattacks, software and other breakdowns at third-party providers, global trade disruptions, and unexpectedly weak economic activity, to name a few.

In my remarks today, I will focus on a couple of financial market developments that are on my personal radar: the considerable growth in private credit and hedge fund leverage. For both, it's incumbent on us to be mindful of the financial stability tradeoffs of allowing or curtailing these activities through regulation, because any time we try to fix one problem, we may end up creating another. This is what the economist Ed Kane termed the "regulatory dialectic."[4] The rules we set up through regulation have consequences; they provide financial institutions with incentives and choices in how to respond. And if there's one thing we know about profit-maximizing financial institutions, it's that they are very good at following incentives.

Finally, I will conclude with a brief overview of how I view current financial conditions and their implications for monetary policy, and I will raise a third potential financial stability risk: the likelihood

[3] Board of Governors of the Federal Reserve System (2024).
[4] Kane (1988).

that the long-term neutral real rate has shifted higher and the possibility that it may now be back above 2 percent. As always, the views I present today are my own and not necessarily those of the Federal Reserve System or my colleagues on the Federal Open Market Committee.

Private Credit

The rapid growth of nonbank financial institutions has been one of the past decade's defining trends, with the sector clocking median annual growth of 11 percent over the five years ending 2023, more than double the growth rate of the banking sector.[5] Within this segment, private credit growth stands out. Broadly defined, the private credit market encompasses direct lending by nonbank financial entities to private, usually smaller and middle-market firms. It involves debt-like instruments that are not publicly traded, and it has grown rapidly over the past 15 years, now rivaling the size of the leveraged loan and high-yield bond markets.[6]

Private-credit lenders typically hold their loans to maturity and seek higher returns than those available in public markets. For borrowers, private credit can provide an appealing alternative to syndicated bank loans and public bonds, in part because of the speed, flexibility, limited disclosure, and customization of the debt instruments. These are features that the banking system may be less well-positioned to provide under the current rule set.

The growth in private credit appears to have direct links to the adoption of stricter banking regulations and supervisory guidance in the aftermath of the 2008 global financial crisis. As for all regulations, there are both intended and unintended consequences. For example, limiting the amount of leverage banks should provide to companies and implementing stress testing had the intended consequence of reducing

[5] Financial Stability Board (2024).
[6] Cai and Haque (2024).

risky loans at banks, but also what I expect was the unintended consequence that private middle-market firms have moved much of their borrowing outside of the banking system. In fact, the North American private credit market sat at just under $1 trillion in 2023, a size which is more than one-third that of the entire US bank commercial and industrial lending market.[7]

The private-credit market appears to be filling a financing gap for relatively higher-risk, middle-market borrowers that may be too small to secure syndicated credit, hold too few tangible assets to use as collateral for traditional bank lending, or lack clean enough financials to be eligible for either.[8] Often, these loans will allow more turns of leverage than what banks should provide and also offer PIK, or payment-in-kind, features that further increase leverage in cases when borrowers can't make coupon payments.

From a financial stability perspective, private credit has some upsides. For one, private-credit lenders generally raise capital through closed-end funds, a method which limits the possibility of runs. The main investors in these funds are pensions, insurance companies, family offices, sovereign wealth funds, and high-net-worth individuals.[9] As a result, private-credit investors are largely what one might call "real money" investors and aren't funded with debt. Moreover, the existence of a sizable private-credit market means that the banking system isn't directly taking on these riskier loans.

However, there are also financial stability risks worth monitoring in this growing market. Business-development companies, a nontrivial 14 percent of the private-credit market, often allow for withdrawals, albeit with gates, and are often open to retail investors, allowing some risk of runs and contagion.[10]

---

[7] Rothman (2024).
[8] Block et al. (2023).
[9] Cai and Haque (2024).
[10] International Monetary Fund (2024).

Furthermore, private-credit markets are relatively opaque, and vulnerabilities may be difficult to detect in advance. This opacity stands in contrast to bank loans, bond markets, and broadly syndicated loans. And though middle-market firms are the segment's bread-and-butter borrowers, bigger and bigger deals are getting done as the market matures and investors seek to deploy larger amounts of capital and earn higher returns.

In a time of significant private-credit losses, some investors could face solvency issues, especially since about three-quarters of private-credit assets are held by managers associated with private equity.[11] In addition, private credit is a significant and growing part of investment strategies for both pension funds and life insurers[12]—and several private-credit managers have purchased insurers to provide predictable funding for further investment. It is worth considering what the implications of large losses at pensions and insurers during an economic downturn could be and whether these risks would spill into the broader financial system.

Finally, the banking system itself may not be immune to financial stability risks posed by private credit; banks are increasingly working with private-credit lenders, both directly providing leverage and serving as matchmakers with borrowers.[13] Private-credit firms also take on bank risk via synthetic credit-risk transfers, when banks offload credit risk to other investors such as insurance companies or pension funds without shedding the underlying loans themselves.[14] Concerningly, we have heard of banks' providing

[11] International Monetary Fund (2024).
[12] Fitch Ratings (2023).
[13] McKinsey & Company (2024).
[14] Wigglesworth (2024).

leverage on bank credit-risk transfers, a practice which could bring that risk back into the banking sector.[15]

Banks may suffer losses if private-credit firms are forced to sell assets under fire-sale conditions, and entire asset classes could see depressed prices, impair the net worth of banks that hold similar assets, and disrupt credit formation. Middle-market firms may have credit lines with banks alongside higher-risk term loans from private-credit issuers. When private-credit loans deteriorate, firms may draw on their bank lines to meet covenants.[16]

Given these trends, we need to consider the broader consequences of regulations that shift lending outside the banking sector. Would it behoove regulators to figure out a way to return some private-credit lending to the banking sector so that we could keep better tabs on it? At a minimum, the risk-mitigation agenda should include efforts to increase transparency around leverage in the sector and to integrate the interdependencies of banks and private-credit nonbank financial institutions into the financial stability research agenda.

One area to closely watch is whether we are moving into a new leveraged phase for these funds. As the rapid growth in private-credit investments compresses returns, private-credit funds may employ leverage to increase returns and ensure return of capital to investors. Doing so enables fund managers to ask investors for new money for follow-on funds, thus generating additional fee income for the managers. In other cases, leverage may be used to prop up struggling portfolio companies, while payment-in-kind features exacerbate the layered leverage at risky firms. At present, the level of private-credit fund leverage

[15] See Record of Meeting, Federal Advisory Council and Board of Governors, Thursday, December 5, 2024. https://www.federalreserve.gov/aboutthefed/files/fac-20241205.pdf.
[16] Haque et al. (2024).

appears moderate, but it has been increasing notably over the past several years, particularly at business-development companies.[17]

The private-credit market looks to be around for a while as an increasingly important factor in global financial markets, something which gives us plenty of reasons to address the known issues as soon as possible in a consistent, cross-border, and cross-sector manner.

Hedge Fund Leverage

A second area I am keeping an eye on is the surge in hedge fund leverage, particularly in US Treasury markets. Hedge funds are well known for using leverage to increase their returns on investors' capital. According to the Fed's most recent *Financial Stability Report*, average gross hedge fund leverage has reached historically high levels since the data first became available in 2013 and is highly concentrated. The top 10 hedge funds account for 40 percent of total repo borrowing and have leverage ratios of 18 to 1 as of the third quarter of 2024.[18, 19]

A body of research points to post-financial-crisis capital requirements as possibly influencing the growth of leverage outside the banking system. Some studies have suggested that capital requirements led banks to reduce basis trading because of limits on their ability to lever up, a situation which might have encouraged hedge funds to pick up the slack.

---

[17] Suhonen (2023).
[18] Data on the top 10 hedge fund leverage is as of 2024:Q3, collected from the Office of Financial Research, "Hedge Fund Monitor," https://www.financialresearch.gov/hedge-fund-monitor/. The November 2024 *Financial Stability Report* by the Board of Governors of the Federal Reserve System includes hedge fund leverage data as of 2024:Q2.
[19] Note that this is average gross leverage across all hedge funds, a broader measure that incorporates off-balance-sheet derivative exposures but which does not account for netting of offsetting exposures. See Board of Governors of the Federal Reserve System (2024).

Leverage growth in and of itself would be of interest to financial stability regulators given the size of hedge funds relative to the whole financial sector.[20] Total assets of hedge funds that file with the SEC are about 8 percent of all assets in the US financial sector as of the third-quarter of 2024. These assets have grown 13 percent year over year since 2013, more than twice the growth of the domestic financial sector.[21]

What makes hedge funds of keen interest to financial stability policymakers is the important role they play in US Treasury market functioning. Hedge funds, through their arbitrage activities, support an efficient yield curve through US Treasury cash futures basis trades, asset swaps, and relative value trading. However, recent research has highlighted hedge funds' basis trades as an emerging area of concern.[22]

The US Treasury market is the deepest and most liquid securities market in the world, an advantage that benefits our country, our capital markets, and our businesses. Basis trades enhance US Treasury market functioning by increasing liquidity and price discovery while lowering the cost of government borrowing.

However, hedge funds typically take on large amounts of leverage in basis trades in order to make these trades profitable. As the US Treasury market increases in size, so does the leverage needed to maintain the benefits of market liquidity. In fact, elevated cash-futures basis trading activity explains some of the

---

[20] Board of Governors of the Federal Reserve System (2024).
[21] This figure is based on domestic and international hedge funds that file Form PF with the SEC. Source: Z.1 Financial Accounts of the United States, Board of Governors of the Federal Reserve System. Note: Hedge fund total assets sourced from the Federal Reserve Board of Governors Z.1 Enhanced Financial Accounts, https://www.federalreserve.gov/releases/efa/efa-hedge-funds.htm.
[22] Barth et al. (2023).

recent increase in hedge fund leverage. This high leverage makes basis trade activity more vulnerable to market stress, with potentially adverse results for US Treasury market functioning. We saw this play out five years ago when losses on US Treasury cash-futures basis trades contributed to 2020 Treasury market instability.[23, 24, 25]

Constrained dealer intermediation is another key factor that contributed to market stress in 2020. Dealers' ability to intermediate hedge funds' highly levered positions is complicated by the overall growth in US Treasury debt. While total federal funds and security repurchase liabilities have grown 19 percent since 2008, this growth hasn't kept pace with outstanding US Treasury debt, which has climbed five-fold over the same period.[26, 27] Recent research has documented the potential for growth in US Treasury markets to surpass dealers' capacity to effectively and safely intermediate in both cash and repo markets.[28]

This situation suggests that we need to weigh the costs and benefits of dealer constraints such as the supplementary leverage ratio, or SLR, and Tier 1 leverage. While leverage constraints have the well-intentioned goal to improve capital ratios and, by extension, financial stability, they are insensitive to risk and thus could limit intermediation in low-risk, high-volume trading activity in US Treasury markets.[29] If highly levered entities such as hedge funds decide to unwind their positions, regulatory requirements may limit the market-making capabilities of dealers to facilitate this activity.

---

[23] Schrimpf et al. (2020).
[24] Barth and Kahn (2021).
[25] Vissing-Jorgensen (2021).
[26] See https://fred.stlouisfed.org/series/BOGZ1FL892150005Q.
[27] See https://fred.stlouisfed.org/series/FGTSL.
[28] Duffie (2020).
[29] Cochran et al. (2024).

Recent research also highlights the importance of dealers' internal-risk limits as a binding constraint when the leverage may not provide that constraint.[30] Dealers' positions are typically determined by internal models such as value-at-risk, or VaR, models. In periods of market volatility, dealers are often forced to reduce positions to comply with internal-risk limits. These circumstances mean that positions are adjusted in a procyclical nature and may amplify price movements. Hedge fund positions are often constrained by similar models. So, risks can build in an extended period of calm on both sides of the coin: an increase in volatility may force stop loss exits on leveraged positions by hedge funds, and dealers' risk capacity may not allow them to absorb these unwinds. Given the size of the market as it stands today, we should continue to carefully monitor the risks on both the dealer and hedge fund balance sheets.

The SEC's rule on central clearing of US Treasury markets may help with these plumbing issues.[31] Central clearing creates well-documented benefits such as increased transparency, standardized haircuts, and improved risk-management practices, while multilateral netting of trades can improve market liquidity and reduce fails when trading volume is large. However, there is still much to be sorted out in how US Treasury clearing models will work. Will it be more like the current sponsored models or more akin to the done-away clearing model, such as the Fixed Income Clearing Corporation's agency clearing model?[32] Who will want to provide this fixed-income prime-brokerage-like service and at what cost? And what will the implications of standardized haircuts with central counterparties be?

I'm more confident in the benefits of clearing to the broader system in the repo market—where there is some credit component—than in cash clearing. Though the Dukes may have gone out of business from trading frozen concentrated orange juice, trading on a cleared exchange allows participants to have

[30] Li et al. (2024).
[31] US Securities and Exchange Commission (2023).
[32] Hraska (2024).

confidence in any counterparty presented and that any defaults would be resolved in an orderly fashion. Expanding central clearing may come at the cost of increasing concentration risk in an already systemically important clearinghouse. While central clearing reduces financial stability risks, increased concentration leads to greater potential for procyclical risks if a central counterparty raises liquidity demands on members or if an entire central counterparty fails.[33, 34] Granted, we could increase the number of central counterparties to reduce concentration risks, but doing so would likely reduce the benefits of multilateral netting.

Required clearing of US Treasury cash transactions begins at the end of next year, on December 31, 2026, and required clearing of US Treasury repo begins only six months later.[35] Like all rule changes, we will need to watch how the market structure evolves once these rules are implemented. Once again, there will likely be both intended and unintended consequences.

One final tool to improve dealer intermediation in money markets is the standing repo facility, or SRF. The SRF supports the effective implementation of monetary policy by creating a backstop to repo rates to improve market functioning. While the SRF has not yet faced an actual market disruption, I commend the Open Market Trading Desk at the Federal Reserve Bank of New York for its recent work in testing of the SRF to understand how it can support monetary policy at busy quarter- and year-end times and in the case in which market functioning deteriorates. We should continue to test the SRF so that it is as effective as possible if and when it is needed. With the broader industry move to clearing, it is fair to review whether clearing this tool would encourage broader use of SRF operations. Clearing may reduce dealers'

[33] King et al. (2022).
[34] Program on International Financial Systems (2021).
[35] The speech as delivered indicated a required clearing date of December 31, 2025. On February 25, 2025, the SEC extended the compliance date for Rule 17ad-22(e)(18)(iv)(A) and (B) by one year. See https://www.sec.gov/newsroom/press-releases/2025-43.

reluctance to use the tool for reputational reasons while also reducing dealers' balance-sheet costs. However, I would be remiss if I didn't note that central clearing could expose the Fed to potential vulnerabilities of the central counterparty. As is the case for many of these choices, the issues are complex, and I encourage further study of how to make the SRF as effective as possible.

The growth in private credit and hedge fund leverage are examples of financial activities that, in my view, bear watching for potential threats to financial stability. While the post-GFC regulatory rules have undoubtedly made the banking system safer, they have also had the consequence of increasing risk in NBFIs. I believe today's financial system is too interconnected to be sanguine about potential spillover effects from the nonbanking sector. No one who remembers 2008 and the run on structured investment vehicles, AIG, and Lehman Brothers should think that moving risky assets to nonbanks is any guarantee of financial stability.

Financial Conditions and Monetary Policy

A well-functioning financial system is a critical component of monetary policy transmission, but broad financial conditions are also relevant to achieve the FOMC's monetary policy objectives. With that in mind, let me briefly discuss how I am interpreting the current state of financial markets, an interpretation which in turn raises a third financial stability risk that bears watching: the possibility that interest rates may remain higher going forward than they had been prior to the pandemic.

With a background in financial markets and business, I rely in large part on the Bank's team of research economists to provide a framework for understanding what the theoretical models might suggest about the impact of various policy approaches. My pragmatic approach to monetary policy pairs this analysis with empirical data and my reading of the signals businesses and markets are sending.

Right now, equity market valuations are high, and the equity risk premium is near zero. As the FOMC cut the federal funds target over the final months of 2024, long-term interest rates, including mortgage rates, moved up. This situation could reflect optimism among businesses and investors that the economy is on firmer footing than was initially perceived in September 2024. Consistent with that view, market-based expectations for the federal funds rate at the end of 2026 have increased by about 80 basis points. Model-based decompositions of 10-year US Treasury yields indicate a variety of factors have been behind the increase in long-term rates, including somewhat higher expected future real short rates, higher expected inflation, greater inflation risk, and a notably larger real term premium. Yet despite the higher term premium, it remains at a relatively low level compared with historical trends, implying a shallow upward slope to the yield curve. Even with these increases in term rates, broad financial conditions indices remain accommodative. It will be important to monitor a constellation of financial market variables including inflation expectations alongside business leaders' outlooks to ascertain whether financial conditions are broadly consistent with achieving our dual mandate objectives.

The economy's momentum heading into 2025, the healthy labor market, a disinflation process that has been uneven and has slowed, and current financial conditions push me toward two conclusions. First, I believe that monetary policy has the luxury of being patient as we assess the path forward, and this will likely mean holding the federal funds rate steady for some time. We have made good progress, but 2 percent inflation is not in sight just yet. A patient approach will allow us time to monitor the trajectories for the labor market and inflation and how the economy in general is performing in the current rate environment. I will be carefully watching for changes to the outlook coming from potential government policies and, of course, stand ready to respond as appropriate.

As long as the labor market remains healthy, I am looking for broad-based evidence that inflation is sustainably returning to 2 percent before adjusting policy further. While there are good reasons to expect that inflation will gradually come down to 2 percent over the medium term, this is far from a certainty, and upside risks to the inflation outlook abound. In addition, given the long and variable lags of monetary policy, it may take time to see the impact from last year's rate cuts, and an acceleration in activity could slow or stall the disinflationary process.

The second conclusion I draw from looking at the constellation of current conditions is that policy does not strike me as being meaningfully restrictive; or, put differently, we may be close to a neutral setting already. Going into the pandemic, there was a widespread view that neutral rates had fallen markedly in the wake of the global financial crisis. This was clearly true for short-term rates, as the FOMC's estimates of r* moved down during the last expansion from a median rate of 2-1/4 percent in January 2012 to 1/2 percent in December 2019. But there was additional downward pressure on the long end of the curve, providing incentives to reach for yield in duration and credit markets.

More recently, these trends appear to be reversing as some of the forces that weighed on neutral rates following the GFC may have finally run their course. A number of model-based estimates of neutral rates have been rising, albeit with very wide confidence bands, and survey-based estimates are moving up, too. At the long end of the curve, the term premium has also been increasing, undoing a portion of the secular downward trend in this series. Amid elevated fiscal deficits and government debt, with signs of a pickup in productivity growth, and with many long-duration securities on the Fed's balance sheet, among other factors, it is possible that the post-GFC era of low neutral rates was an extended anomaly rather than the economy's long-run steady state. In that case, neutral real short rates may now be back above 2 percent, though I will concede that there is a great deal of uncertainty over all such estimates.

Over long periods, the US economy is resilient and would adapt to a higher interest rate environment. For example, the 10-year US Treasury yield averaged more than 6-1/2 percent during the 1990s, during which time there was plenty of lending, borrowing, and M&A activity supported by banks and capital markets. A higher neutral short rate and a steeper yield curve could boost bank profitability and reduce incentives to reach for yield, things which could be positive developments for financial stability. If stretched over an extended period, then there may be little impact on the economy from the move to higher rates. But if views on rates changed suddenly, the transition path would likely be bumpy and pose short-term financial stability risks. In this case, bond and loan holders would face either paper or realized losses on low-yielding long-term holdings, while highly leveraged borrowers with floating rate debt may see increased default rates. It would likely take some time for banks and capital markets to adjust to the new rate structure. Beyond bank portfolios, it is worth considering other investment strategies with maturity mismatches, high leverage, or novel features that would be especially exposed to losses in a higher rate environment, particularly if investors were originally positioned for a different outcome.

Conclusion

To sum up, the economy and financial system are in a good place. But there are plenty of risks to keep all of us busy analyzing policy proposals and market innovations to maintain a stable and resilient financial system. I've identified a few of the risks that I'm watching closely. And I've asked several questions about whether steps to control these activities in the name of financial stability have had their desired effects, or, if like the Dukes, we would like to turn the machines (or rule changes) back on. With that, I now look forward to your questions.

References

Barth, Daniel and R. Jay Kahn. 2021. "Hedge Funds and the Treasury Cash-Futures Disconnect." Office of Financial Research, Working Paper No. 21-01. financialresearch.gov/working-papers/2021/04/01/hedge-funds-and-the-treasury-cash-futures-disconnect/.

Barth, Daniel, Jay Kahn, and Robert Mann. 2023. "Recent Developments in Hedge Funds' Treasury Futures and Repo Positions: Is the Basis Trade 'Back'?" Board of Governors of the Federal Reserve System, *FEDS Notes*. federalreserve.gov/econres/notes/feds-notes/recent-developments-in-hedge-funds-treasury-futures-and-repo-positions-20230830.html.

Block, Joern, Young Soo Jang, Steven N. Kaplan, and Anna Schulze. 2023. "A Survey of Private Debt Funds," The University of Chicago Becker Friedman Institute for Economics, *Research Briefs*. bfi.uchicago.edu/insight/research-summary/a-survey-of-private-debt-funds.

Board of Governors of the Federal Reserve System. 2024. *Financial Stability Report*. federalreserve.gov/publications/files/financial-stability-report-20241122.pdf.

Cai, Fang, and Sharjil Haque. 2024. "Private Credit: Characteristics and Risks." Board of Governors of the Federal Reserve System, *FEDS Notes*. federalreserve.gov/econres/notes/feds-notes/private-credit-characteristics-and-risks-20240223.html.

Cochran, Paul, Lubomir Petrasek, Zack Saravay, Mary Tian, and Edward Wu. 2024. "Assessment of Dealer Capacity to Intermediate in Treasury and Agency MBS Markets." Board of Governors of the Federal Reserve System, *FEDS Notes*. federalreserve.gov/econres/notes/feds-notes/assessment-of-dealer-capacity-to-intermediate-in-treasury-and-agency-mbs-markets-20241022.html.

Cohen, Charles, Caio Ferreira, Fabio Natalucci, and Nobuyasu Sugimoto. 2024. "Fast-Growing $2 Trillion Private Credit Market Warrants Closer Watch." International Monetary Fund IMF Blog. imf.org/en/Blogs/Articles/2024/04/08/fast-growing-USD2-trillion-private-credit-market-warrants-closer-watch.

Duffie, Darrell. 2020. "Still the World's Safe Haven? Redesigning the US Treasury Market after the COVID-19 Crisis." Brookings Institution Hutchins Center, Working Paper No. 62. brookings.edu/wp-content/uploads/2020/05/WP62_Duffie_v2.pdf.

Financial Stability Board. 2024. *Global Monitoring Report on Non-Bank Financial Intermediation*. fsb.org/uploads/P161224.pdf.

Fitch Ratings. 2023. "US Life Insurer Private Credit Risk Rises as Borrower Leverage Grows." fitchratings.com/research/non-bank-financial-institutions/us-life-insurer-private-credit-risk-rises-as-borrower-leverage-grows-12-10-2023.

Haque, Sharjil, and Mayer, Simon and Stefanescu, Irina. 2024. "Private Debt versus Bank Debt in Corporate Borrowing." dx.doi.org/10.2139/ssrn.4821158.

Hraska, Jim. 2024. "Finadium's Rates & Repo Event: How Central Clearing Impacts the Repo Market." DTCC Financial Services News and Insights. dtcc.com/dtcc-connection/articles/2024/november/21/how-central-clearing-impacts-the-repo-market.

International Monetary Fund. 2024. "Chapter 2: The Rise and Risks of Private Credit," in *The Last Mile: Financial Vulnerabilities and Risks*. USA: International Monetary Fund. Retrieved February 26, 2025. elibrary.imf.org/display/book/9798400257704/CH002.xml.

Jordan, Jerry L. 1996. "The Future of Banking Supervision." Federal Reserve Bank of Cleveland *Economic Commentary*. fraser.stlouisfed.org/title/economic-commentary-federal-reserve-bank-cleveland-4515/future-banking-supervision-552516/fulltext.

Kane, Edward J. 1988. "Interaction of Financial and Regulatory Innovation." *American Economic Review* 78(2): 328–334. jstor.org/stable/1818145.

King, Thomas, Travis D. Nesmith, Anna Paulson, and Todd Prono. 2022, "Central Clearing and Systemic Liquidity Risk," Board of Governors of the Federal Reserve System, *Finance and Economics Discussion Series*. doi.org/10.17016/FEDS.2020.009r1.

Li, Dan, Lubomir Petrasek, and Mary H. Tian. 2024. "Risk-Averse Dealers in a Risk-Free Market—The Role of Internal Risk Limits." dx.doi.org/10.2139/ssrn.4824250.

McKinsey & Company. 2024. "The Next Era of Private Credit." (September 24). mckinsey.com/industries/private-capital/our-insights/the-next-era-of-private-credit.

Program on International Financial Systems. 2021. *Mandatory Central Clearing for US Treasuries and US Treasury Repos*. pifsinternational.org/wp-content/uploads/2022/08/PIFS-Mandatory-Central-Clearing-for-U.S.-Treasury-Markets-11.11.2021.pdf.

Program on International Financial Systems. 2022. *Expanding Access to the Standing Repo Facility for US Treasuries*. pifsinternational.org/expanding-access-to-the-standing-repo-facility-for-u-s-treasuries/.

Rothman, Larry. 2024. "North American Private Debt Assets Expected to Continue Fast Growth—Preqin." *Pensions and Investments*. pionline.com/interactive/north-american-private-debt-assets-expected-continue-fast-growth-preqin.

Schrimpf, Andreas, Hyun Song Shin, and Vladyslav Sushko. 2020. "Leverage and Margin Spirals in Fixed Income Markets during the Covid-19 Crisis," Bank for International Settlements BIS, Bulletin No. 2. bis.org/publ/bisbull02.pdf.

Suhonen, Antti. 2023. "Direct Lending Returns." CFA Institute *Financial Analysts Journal*. 80(1): 57–83. tandfonline.com/doi/epdf/10.1080/0015198X.2023.2254199?needAccess=true.

US Securities and Exchange Commission. 2023. "Improving Risk Management and Increasing Clearing in US Treasuries," Fact Sheet. sec.gov/files/34-99149-fact-sheet.pdf.

Vissing-Jorgensen, Annette. 2021. "The Treasury Market in Spring 2020 and the Response of the Federal Reserve," National Bureau of Economic Research, Working Paper No. 29128. nber.org/papers/w29128.

Wigglesworth, Robin. 2024. "Inside Wall Street's Booming $1tn 'Synthetic Risk Transfer' Phenomenon." *Financial Times*. (December 1). ft.com/content/d91d35fc-93ab-4963-8587-7a00fe5c63b4.