

MACROECONOMIC CONSEQUENCES OF MARKET MANIPULATION

GINA-GAIL S. FLETCHER*

I

INTRODUCTION

The 2008 financial crisis exposed significant weaknesses and gaps in the regulation of the financial markets. Prior to the crisis, regulation was firm-specific and bank-centric, focusing almost exclusively on the safety and soundness of depository institutions.¹ In the wake of the crisis, lawmakers and regulators have shifted their attention to developing “macroprudential” forms of market regulation—emphasizing the health and stability of the financial markets as a whole, and enacting legislation and regulations focused more on systemic stability, firm interconnections, and market contagion. This expanded regulatory view of systemic risk is evidenced in the creation of the Financial Stability Oversight Council;² the identification of financial market utilities as being of systemic significance; and the designation of large, interconnected non-bank institutions as systemically important, among other things.³ Similarly, academics have asserted a broader conceptualization of financial stability regulation to include the use of monetary policy as a tool for financial regulation;⁴ the classification and regulation of systemically significant prices and indices;⁵ and the importance of tracking leverage used in credit derivatives to determine the effect on money supply in the markets.⁶

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* Associate Professor, Indiana University Maurer School of Law. J.D. Cornell Law School. B.A. Mount Holyoke College. I am grateful to the participants of the Law and Macroeconomics Conference at Georgetown Law on September 27–28, 2019, especially Dan Awrey and Erik Gerding. Madalyn Clary, Zoe Gyampoh, and Chen Zhang provided excellent research assistance.

1. See Steven L. Schwarcz, *Markets, Systemic Risk, and the Subprime Mortgage Crisis*, 61 SMU L. REV. 209, 212 (2008) (“Existing protections against systemic risk . . . focus almost exclusively on banks, not markets. Furthermore, general regulatory protections against market failure . . . are not directed against systemic risk per se.”).

2. 12 U.S.C. § 5321 (2018).

3. See Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010) (codified as amended in scattered sections of the U.S.C.).

4. See, e.g. Jeremy C. Stein, *Monetary Policy as Financial Stability Regulation*, 127 Q.J. ECON. 57, 58 (2012).

5. See generally Robert C. Hockett & Saule T. Omarova, *Systemically Significant Prices*, 2 J. FIN. REG. 1 (2016) (creating a general account of systemically important prices and indices and the market vulnerabilities they can create).

6. See Margaret M. Blair, *Making Money: Leverage and Private Sector Money Creation*, 36 SEATTLE U. L. REV. 417, 439, 449 (2013) (noting that “leverage matters because it determines the amount

Notably absent from these more comprehensive approaches to financial regulation are discussions of how—and to what extent—market manipulation can have macroeconomic consequences for the financial markets. On the one hand, this oversight is understandable. Although market manipulation is as old as the markets themselves, manipulative schemes are usually limited in scope and impact.⁷ Efforts to manipulate the market typically target specific assets, such as the security of a given firm or a specific commodity like oil, copper, or gold, and, therefore, the impact of these schemes is limited in time and scope. On the other hand, this oversight is problematic. Manipulation undermines the efficient allocation of capital; impairs investors' trust and, by extension, willingness to participate in the markets; and imposes significant social and financial costs on the markets. Indeed, the consequences of manipulation, despite being limited in some regard, extend beyond the capital markets, affecting interest rates, retail investors, and consumers and suppliers of goods in the real economy.⁸ Although this has always been true of manipulation, market developments have increased the impact of such schemes, forcing reconsideration of the inclusion of manipulation in the discourse on macroprudential financial regulation.

This Article offers an initial exploration of how market manipulation can contribute to instability within the financial markets. Manipulative techniques and strategies have evolved alongside the markets, expanding both the mechanisms available to wrongdoers aiming to distort the markets and the consequences of such schemes on financial stability. Recent examples of market misconduct have highlighted the far-reaching potential consequences of manipulation. More than a temporary dampening of liquidity or the short-term price inefficiency of a single asset, modern manipulation strategies can exacerbate volatility, weaken intermarket networks, and amplify asset mispricing. Manipulation, therefore, can expose systemic vulnerabilities in the markets and can have macroeconomic consequences for the markets.

To include manipulation as a consideration in a macroprudential approach to financial regulation requires analyzing *how* these schemes impact stability or expose vulnerabilities in the financial markets. Identification of the channels through which manipulation implicates system-wide concerns is important to understanding the extent to which macroprudential regulation may limit manipulation's macroeconomic consequences. This Article demonstrates that manipulation can have macroeconomic consequences when it (i) weakens intra-firm and intra-market networks, decreasing the resiliency of the markets to respond to shocks; (ii) increases market volatility, transmitting instability through the market; and (iii) results in continued asset mispricing, amplifying the impact of highly leveraged transactions. In considering the macroeconomic

of new credit that financial institutions can create, and credit, like money, provides the grease that keeps the economy humming”).

7. Gina-Gail S. Fletcher, *Benchmark Regulation*, 102 IOWA L. REV. 1929, 1940 (2017).

8. Gina-Gail S. Fletcher, *Legitimate Yet Manipulative: The Conundrum of Open-Market Manipulation*, 68 DUKE L.J. 479, 489 (2018) [hereinafter Fletcher, *Legitimate Yet Manipulative*].

consequences of manipulation, the focus of this Article is not merely on systemic risk.⁹ Rather, the emphasis is on ways in which manipulation may directly or indirectly contribute to systemic vulnerabilities, such as weakening the market's resiliency to risk or amplifying the likelihood of systemic failure. By analyzing the ways in which manipulation can expose or exacerbate systemic vulnerabilities, even if these manipulative schemes do not result in systemic failures, this Article assesses subtler ways in which such schemes can contribute to an increase in risk in the markets.

Part II lays the groundwork for understanding market manipulation. It begins with a discussion of how manipulation is identified and of burgeoning forms of manipulation that exploit modern market structure. Part II also discusses the inherent limitations of traditional manipulation schemes that restricted their impact on the broader financial market. Part III uses three market examples to explore how manipulation can have a macroeconomic impact on the financial markets. Before concluding, Part IV provides an early discussion of the potential contours of a macroprudential approach to market manipulation.

II

THE IMPACT OF MANIPULATION

Manipulation is generally viewed as a microeconomic concern—its impact is more pronounced for specific assets, individuals, or firms and less pronounced on a systemic level. This point of view is certainly valid with respect to more traditional forms of market manipulation such as corners, squeezes, wash trading, and pump-and-dump, among others.¹⁰ The impact of these types of schemes is inherently limited and unlikely to have systemic consequences for the markets. However, developments in the financial markets—and manipulative strategies—have expanded the potential scope and impact of manipulation, increasing the systemic vulnerabilities that may arise from these schemes. This Part explores more traditional forms of manipulation, and examines market changes that have expanded the potential impact of manipulation.

A. Limits on Manipulation's Impact

Although the strategies underlying traditional manipulation vary, the structure and mechanics of the schemes inherently limit their impact on the broader financial markets. A primary limitation on the scope of traditional manipulation is the type of market in which such schemes are most successful. Specifically, traditional manipulation is highly effective in illiquid,

9. Systemic risk is best defined as “the risk that (i) an economic shock such as market or institutional failure triggers (through a panic or otherwise) either (X) the failure of a chain of markets or institutions or (Y) a chain of significant losses to financial institutions, (ii) resulting in increases in the cost of capital or decreases in its availability, often evidenced by substantial financial-market price volatility.” Steven L. Schwarcz, *Systemic Risk*, 97 GEO. L.J. 193, 204 (2008).

10. See generally Tom C.W. Lin, *The New Market Manipulation*, 66 EMORY L.J. 1253 (2017) (discussing and defining both traditional and new forms of market manipulation).

informationally-inefficient markets.¹¹ The Over-The-Counter (OTC) Bulletin Boards and the Pink Sheets, for example, are smaller, illiquid markets, which feature low-value, thinly-traded stocks known as penny stocks.¹² In less liquid markets such as these, each trade is likely to impact the price of the stock because there are few counterparties with whom to trade. Additionally, the absence of required disclosure means that any information is likely to have a meaningful impact on the price of the stock. Thus, manipulators aiming to successfully distort stock prices target penny stocks because of their susceptibility to manipulation.¹³

Pump-and-dump schemes, for example, are common in penny stocks because manipulators can exploit the informational inefficiencies of the market to spread false rumors, increase the price of the stock, and sell at a profit.¹⁴ Using this basic formula on thinly traded shares has netted manipulators untold sums of illicit profits.¹⁵ These schemes are welfare-reducing and impose substantial costs on investors and the markets, but they do not introduce systemic risk to the financial markets because they target discrete, illiquid market segments. Manipulation of penny stocks, even if significant in volume and number, does not result in instability in the financial markets because penny stocks are not fundamental to the markets' operations or functions. Thus, the focus of traditional manipulation schemes on distorting illiquid markets naturally limits the potential macro-level impact of these schemes.

Relatedly, traditional manipulation schemes are limited because they target a single asset for distortion. Strategies such as fictitious trades, corners, and squeezes, for example, focus on manipulating the price of a single asset for illicit gain. With fictitious trades, such as wash trading or matched orders, a trader (either individually or as part of a group) acts as both the buyer and seller of a security, creating the illusion of more trading in the security than there is in actuality.¹⁶ Similarly, a trader may corner the market for a commodity by acquiring and exploiting a dominant position in the market. Because of her market power, the manipulator is able to set monopolistic prices for the commodity, thereby circumventing the "natural" forces of supply and demand. Regardless of the strategy employed in these instances, the manipulative scheme centers on a single commodity or security; thus, the stability of the financial markets is not threatened.

11. Fletcher, *Legitimate Yet Manipulative*, *supra* note 8, at 528–29.

12. See Lin, *supra* note 10, at 1284 (discussing penny stocks); see also Fletcher, *Legitimate Yet Manipulative*, *supra* note 8, at 528 (discussing OTC Bulletin Boards and Pink Sheets).

13. See Joseph I. Goldstein, Paul D. Ramshaw & Sarah B. Ackerson, *An Investment Masquerade: A Descriptive Overview of Penny Stock Fraud and the Federal Securities Laws*, 47 BUS. LAW. 773, 774–76 (1991) (explaining the advantages of targeting penny stocks for fraud).

14. This description is similarly applicable to the inverse scheme—the short-and-distort—in which manipulators spread false rumors to depress the price of the stock and buy at a profit.

15. See, e.g., Max de Haldevang & Justin Rohrlach, *How an Undercover FBI Sting Busted an Alleged Multimillion-Dollar Stock Fraud*, QUARTZ (July 26, 2019), <https://qz.com/1675811/how-an-undercover-fbi-sting-busted-a-multimillion-dollar-stock-fraud/> [<https://perma.cc/V3V8-FEZV>].

16. Fletcher, *Legitimate Yet Manipulative*, *supra* note 8, at 499.

Lastly, traditional manipulation schemes are typically short-term in nature. Traders face various obstacles to sustaining their manipulation, which limit the negative consequences that may arise from the misconduct. With a corner, for example, the trader must expend resources to acquire and maintain her dominant position in the market. And, if her corner involves a physical commodity, then she may need additional capital to transport and store the commodity, in addition to standard transaction fees.¹⁷ The capital-intensive nature of some forms of manipulation, therefore, limits the potential impact of such schemes on the wider financial markets.

Even schemes that are based on misinformation are unsustainable in the long-term. Setting aside informationally-inefficient markets discussed above, manipulation based on misinformation is unlikely to have systemic consequences because of the informational efficiency of robust, liquid markets. Information must be credible to affect the price of an asset and, in efficient markets, the markets can debunk false information quickly, thereby limiting the lifespan of the scheme. For example, in 2015, a fake tender offer for Avon Products, Inc. was filed with the SEC, which resulted in a twenty percent increase in Avon's stock price.¹⁸ However, the markets quickly uncovered the fraudulent nature of the filing, causing the stock price to fall to its pre-fraud tender offer levels less than twenty-four hours later.¹⁹ This result is emblematic of how the market's efficiency serves as a natural constraint on the impact of manipulation.²⁰

In sum, traditional market manipulation schemes do not expose the financial markets to systemic instability. These schemes undeniably are welfare-reducing and imposed high social costs on the markets, but they are inherently limited in impact. However, evolutions in the markets have expanded the potential scope and effect of market manipulation. Such developments have notably enhanced the potential systemic repercussions of market manipulation, increasing its importance in the discourse on financial stability regulation.

B. Market Developments & the Expansion of Manipulation's Impact

The financial markets have undergone three significant structural and technological changes that increase their efficiency and operation, and therefore directly and indirectly amplify the potential macro-level effect of market misconduct. First, the markets are more networked, both in terms of connections

17. See Craig Pirrong, *Commodity Market Manipulation Law: A (Very) Critical Analysis and a Proposed Alternative*, 51 WASH. & LEE L. REV. 945, 954 n.20 (1994) ("Marginal costs of delivery are typically increasing for 'spatial commodities.'").

18. Jonathan Stempel, *SEC Sues Over Alleged Hoax Avon Buyout Bid*, REUTERS (June 4, 2015), <https://www.reuters.com/article/us-sec-hoax-avon-idUSKBN0OK1ZD20150604> [<https://perma.cc/2PC8-KWSK>].

19. *Id.*

20. Indeed, this natural restraint is one reason Professors Daniel Fischel and David Ross argue that manipulation is self-detering in informationally-efficient markets. See Daniel R. Fischel & David J. Ross, *Should the Law Prohibit "Manipulation" in Financial Markets?*, 105 HARV. L. REV. 503, 518–19 (1991) (explaining that because manipulators face "tremendous risk" that transaction costs outweigh price increase, and there is no guarantee of sale at profit, price pressure schemes are self-detering).

between firms and between market sectors. Second, technological changes have increased the speed by which volatility can spread through the markets, potentially destabilizing numerous actors, or, alternately, large systemically important actors in the market. Third, financial innovation has increased the use of and reliance on leverage, which increases the potential for market instability in response to manipulation.

1. Networked Markets

Markets are more interconnected now than ever before—both in terms of linkages among financial institutions and market segments. As institutions borrow and lend among each other, enter into derivatives and other financial contracts as counterparties, and invest in the same asset classes, interconnections are created among them, both directly and indirectly.²¹ Similarly, old divisions between market segments are rendered less meaningful in modern markets in which a single transaction may implicate both the commodities and securities markets, for example.²² In increasingly globalized financial markets, such interconnections are expected and even necessary for their efficient function.

Yet, during times of stress these financial networks may undermine financial stability. Intra-firm and intra-market connections may become fragile during times of shock, and these networks may transmit and amplify distress among institutions and markets.²³ Thus, these linkages enhance the potential effects of manipulation because the financial distress resulting from such schemes may spill over to other markets, assets, and institutions. Price volatility and inefficiency stemming from market manipulation, for example, may spread within financial networks, setting off a chain reaction that propagates the consequences of manipulation beyond its original sphere of impact. Therefore, to the extent manipulation undermines or weakens these networks, it may have macroeconomic consequences for the financial markets.

2. Technological Advances

Technological advances have transformed the markets, expanding the potential reach of manipulative conduct. Specifically, the financial markets have become faster and more computerized. Gone are the days in which human brokers or floor traders intermediated transactions on the securities or commodities exchange. Today, computers running sophisticated algorithms are

21. DTCC, UNDERSTANDING INTERCONNECTED RISKS TO BUILD A MORE RESILIENT FINANCIAL SYSTEM 5 (Oct. 2015), <http://www.dtcc.com/news/2015/october/12/understanding-interconnectedness-risks-article/> [<https://perma.cc/9Y9T-QWH2>].

22. JOHN J. MURPHY, TRADING WITH INTERMARKET ANALYSIS: A VISUAL APPROACH TO BEATING THE FINANCIAL MARKETS USING EXCHANGE-TRADED FUNDS 3 (2012).

23. See John C. Coffee, Jr., *Bail-Ins Versus Bail-Outs: Using Contingent Capital to Mitigate Systemic Risk* 1 (Ctr. for Law and Econ. Studies, Working Paper No. 380, 2010) (explaining that the U.S. subprime mortgage crisis, a localized economic shock, nearly caused the meltdown of global capital markets.).

able to execute a high volume of transactions within a fraction of a second.²⁴ Most algorithmic trading programs are designed to exploit arbitrage opportunities in the markets, profiting on small discrepancies in asset prices, which is only feasible as a strategy if done over thousands of trades.²⁵ Another key feature of trading in the modern market is the speed with which algorithms can execute transactions. And, importantly, this speed is essential to the profitability of algorithmic trading programs: only by trading faster than competitors are traders in modern-day markets able to profit.²⁶

The integration of computers and algorithmic trading programs into the financial markets has fundamentally altered how these markets operate. Algorithmic trading accounts for upwards of fifty percent of the trading volume in the securities and commodities markets.²⁷ These technological advances have resulted in notable benefits for the markets, including increased liquidity, enhanced pricing efficiency, and reduced transaction costs.²⁸ However, the rise of algorithmic trading, specifically high-frequency trading (HFT), also amplifies the potential impact of manipulative misconduct.²⁹ HFT firms place and cancel orders rapidly, often within a milliseconds or less, relying on speed to gain an advantage in the market. HFT firms earn small gains on individual executed trades (on average a fraction of a penny), but net large profits when aggregated across thousands of trades each day.³⁰ Importantly, HFT may be utilized to manipulate the markets and, owing to its high speed and volume, it can generate systemic harm within the markets.³¹ Indeed, in the HFT-dominated markets of today, manipulators can impose significant, widescale harm more easily and more quickly than previously possible. Automated HFT programs operating in today's

24. Jonathan Keehner, *Milliseconds Are Focus in Algorithmic Trades*, REUTERS (May 10, 2007, 8:24 PM), <https://www.reuters.com/article/us-exchanges-summit-algorithm/milliseconds-are-focus-in-algorithmic-trades-idUSN1046529820070511> [<https://perma.cc/6DBH-ETYH>].

25. Michael J. McGowan, *The Rise of Computerized High Frequency Trading: Use and Controversy*, 16 DUKE L. & TECH. REV. ¶1 (2010).

26. *Id.* ¶ 3.

27. RENA S. MILLER & GARY SHORTER, CONG. RESEARCH SERV., CRS REP. R44443: HIGH FREQUENCY TRADING: OVERVIEW OF RECENT DEVELOPMENTS i (Apr. 4, 2016).

28. Charles R. Korsmo, *High-Frequency Trading: A Regulatory Strategy*, 48 U. RICH. L. REV. 523, 549–50 (2015).

29. Although there is no standard definition for HFT, the term broadly refers to a method of trading combining algorithmic trading with high-speed, high-volume trading to profit on small price discrepancies in the markets. See Andrew J. Keller, *Robocops: Regulating High Frequency Trading after the Flash Crash of 2010*, 73 OHIO ST. L.J. 1457, 1463 (2012) (broadly defining HFT as a subset of algorithmic trading characterized by its use of speed and volume to gain advantages in the market.); see also IIRC INST. & STEVENS INST. OF TECH., WHITE PAPER ON HIGH-FREQUENCY TRADING 2 (Sept. 2014) <https://web.stevens.edu/ses/documents/fileadmin/documents/pdf/Final%20Sept%202014%20HF/T.pdf> [<https://perma.cc/UES9-V2Z9>] (detailing the five characteristics the SEC uses to identify HFT, which generally describe a trading strategy using sophisticated technology to “generat[e], rout[e], and execut[e]” numerous orders).

30. Keller, *supra* note 29, at 1458.

31. See McGowan, *supra* note 25, ¶ 4 (“Today, high frequency firms . . . ‘account for 73% of all U.S. equity trading volume’ . . . [HFT]’s role now overshadows that of mainstream brokers, mutual funds and hedge funds.”).

interconnected markets can exacerbate volatility during periods of distress, thereby increasing the likelihood of systemic repercussions stemming from potential market misconduct.

3. Financial Innovation & Leverage

Financial innovation has also contributed to the amplification of manipulation's potential impact on the markets. The introduction and popularization of new financial instruments, trading processes, and financial institutions have increased market efficiency and liquidity, decreased transaction costs, and facilitated growth of the financial sector. Financial innovation has enhanced the productive allocation of capital in the markets and, similarly, the efficient allocation of risks among market actors. Oftentimes, financial innovation is geared towards increasing the supply of credit in the financial markets, especially when leverage is used.³² Leverage refers to the use of borrowed capital to make investments, which greatly increase the potential returns on an investment in good times. But, in bad times, a highly leveraged transaction can have significant, negative repercussions for an institution and the broader financial markets. The extent to which financial innovation increases leverage in the markets, therefore, can have significant macroeconomic consequences by enhancing the potential risks inherent to highly leveraged transactions.³³

A major innovation in the financial markets has been credit derivatives, particularly credit default swaps (CDS). CDS are financial instruments that allow parties to shift the risk of a debt issuer's default between themselves. In a credit default swap, one party (the protection buyer) pays periodic premiums to another party (the protection seller) and, in exchange, the seller agrees to compensate the buyer if a debt issuer defaults on an outstanding loan obligation, which is known as a "credit event."³⁴ CDS increase the credit availability in the markets directly, by providing a form of insurance against debt and freeing up capital for other investments; and indirectly, because CDS are usually highly leveraged transactions. Leverage in CDS transactions typically arises because the protection seller does not provide all the funds upfront to guarantee its future payment if there is a credit event. A protection seller, therefore, has a small percentage of the funds committed upfront, which increases potential profits from the transaction but also amplifies potential losses, which may be systemically significant if the protection seller is called upon to compensate the

32. See Margaret M. Blair, *Financial Innovation, Leverage, Bubbles and the Distribution of Income*, 30 REV. BANKING & FIN. L. 225, 229 (2010) ("[F]inancial innovation has made it possible for financial firms . . . to supply too much credit to others and to borrow too much in order to provide this credit.").

33. See Erik F. Gerding, *Credit Derivatives, Leverage, and Financial Regulation's Missing Macroeconomic Dimension*, 8 BERKELEY BUS. L.J. 29, 32 (2011) ("[C]redit derivatives and leverage also can have significant macroeconomic effects.").

34. See Gina-Gail S. Fletcher, *Engineered Credit Default Swaps: Innovative or Manipulative?*, 94 N.Y.U. L. REV. 101, 110 (2019).

protection buyer.³⁵ Thus, efforts to distort CDS in ways that impact credit events and result in risk being mispriced can expose systemic fragility because of the highly leveraged nature of these transactions.

In sum, market developments have altered the potential reach of manipulation, such that distortive schemes can have macroeconomic consequences for the market. Part III analyzes modern day manipulation schemes that exploit the new market infrastructure and instruments to assess how these schemes can expose or amplify systemic vulnerabilities in the financial markets.

III

MANIPULATION & FINANCIAL STABILITY

Key to including manipulation in the discourse on macroprudential regulation is understanding how it could translate into, or otherwise exacerbate, financial stability. Evolved manipulation schemes are no longer superficial efforts to distort a single price; rather, these schemes target structural aspects of the market in ways that can have system-wide reverberations throughout it. The ability of manipulation to impair basic market functions—and by extension, financial stability—warrants including manipulation in discussions of macroprudential forms of market regulation. Yet, for these discussions to be productive, it is necessary to understand how manipulation can impact financial stability.

This Part analyzes the channels through which manipulation can contribute to, amplify, or transmit potential financial stability. Importantly, the potential effect of modern manipulation on financial stability is on a continuum. Whereas some forms of manipulation may contribute to systemic harm, others expose vulnerabilities in the markets, weakening the market's resiliency but do not, in and of themselves, cause systemic failures. Yet, despite merely exposing vulnerabilities, it is nonetheless important to understand the linkages between manipulation and system-level vulnerabilities to effectively address the harm that can accompany these schemes.

A. Benchmark Manipulation & Vulnerable Networks

The financial market is built on interconnections among institutions, products, and markets. In considering connections within the financial market, one is most easily drawn to the linkages among financial institutions that transact with each other, acting as counterparties, guarantors, and intermediaries to each other. A less obvious connection among financial institutions stems from their reliance on the same set of benchmarks to value commodities, derivatives, and other financial obligations. Benchmarks aggregate multiple sources of market data into a single metric, such as a price or index. Importantly, benchmarks

35. See Gerding, *supra* note 33, at 41–42 (“[T]he default of a major derivative counterparty may have severe spillover effects on entire financial markets . . .”).

standardize the valuation of financial contracts, increasing the liquidity of the instrument.³⁶ Financial transactions that rely on a standardized, market-accepted benchmark to value parties' relative obligations are more easily tradable than ones that use a bespoke benchmark.

For example, interest-rate derivatives that reference the London Interbank Offered Rate (LIBOR), once considered to be the most widely-used interest rate benchmark, are more liquid and more widely-traded than other interest rate referents.³⁷ Indeed, LIBOR's use is not limited to the world of high finance, but it is used to set interest rates for consumer loans, such as mortgages and student loans.³⁸ Relatedly, some commodities are priced in relation to benchmarks. Trading in oil, for example, is primarily bilateral and OTC, making it difficult for the market to accurately gauge its price. The Brent Crude Oil Index is one of the primary benchmarks used to price oil. This index provides a benchmark against which oil can be priced for derivatives, financial obligations, and even consumer petroleum prices.³⁹ In good times, these benchmark-based linkages can lower information and transaction costs in the markets. However, in bad times, especially if the benchmark is distorted, these linkages can contribute to systemic harm in the markets.⁴⁰ Manipulation of a ubiquitous benchmark, therefore, can have consequences that extend to the broader financial markets.

In 2012, regulators uncovered systematic efforts to manipulate both LIBOR and the WM/Reuters FX Benchmark, the most popular foreign exchange benchmark.⁴¹ In both manipulative schemes, traders at the world's largest banks exploited the innately conflicted process by which the benchmarks were created so that they could profit on their derivatives positions at the expense of clients.⁴² Although there was no systemic failure that resulted from these benchmark manipulation schemes, it has been argued that these schemes exposed vulnerabilities in the markets by weakening the networks related to the manipulated benchmarks.⁴³

The macroeconomic consequences of manipulation of ubiquitous benchmarks are two-fold. First, distortion of a widely-used benchmark calls into question the valuation of derivatives that reference the benchmark. This could result in larger-than-expected margin calls for some market participants, as the value of the contract fluctuates in response to manipulation. To the extent that

36. Fletcher, *Benchmark Regulation*, *supra* note 7, at 1943–44.

37. *Understanding Investing: Interest Rate Swaps*, PIMCO, <https://europe.pimco.com/en-us/resources/education/understanding-interest-rate-swaps> [<https://perma.cc/4XAE-GN5P>].

38. *Id.* at 1931.

39. *Id.* at 1958–59.

40. Indeed, Professors Hockett and Omarova have defined some benchmarks as “systemically important prices and indices” because of their ubiquity in various aspects of the markets. Hockett & Omarova, *supra* note 5.

41. Fletcher, *Benchmark Regulation*, *supra* note 7, at 1935.

42. *Id.*

43. See generally Hockett & Omarova, *supra* note 5 (analyzing how systemically significant benchmarks can expose systemic harms in the financial markets).

multiple financial institutions have instruments and contracts on their balance sheets that reference the benchmark, they are similarly exposed to the risk of re-valuation of these transactions and, importantly, increased margin calls. The wide-scale mispricing of assets that reference the manipulated benchmark can stress the networks of actors that rely on the benchmark, resulting in multiple market actors facing similar collateral demands that may stress their financial condition. Further, as large, interconnected banks have become more involved in the storage and trading of physical commodities,⁴⁴ the manipulation of benchmarks used to value these physical commodities may result in significant losses, further weakening their resiliency within the markets. Notably, to the extent a benchmark has been adopted as an input or value referent in the real economy, it connects the real economy and the financial markets to these benchmark-related distortions, further extending the macroeconomic consequences of benchmark manipulation.

Second, discovery that a fundamental benchmark has been deliberately manipulated weakens the integrity of the benchmark. By extension, such manipulation renders instruments tied to the benchmark less attractive and, as the market moves away from the benchmark, less liquid. In fact, if the damage to the benchmark's integrity is profound enough, it may ring the death-knell for the benchmark. This would force institutions and instruments away from the benchmark, causing significant, potentially systemic, upheavals in the market.

Once again, LIBOR proves an illustrative example. In the wake of the 2012 scandal and the ensuing fallout, LIBOR is being phased out and is unlikely to exist past 2021.⁴⁵ The end of LIBOR, albeit gradual and over multiple years, is causing significant uncertainty in the markets. Financial institutions and counterparties are wrestling with how to modify their long-term positions that reference LIBOR and transition to a new benchmark.⁴⁶ Many worry that the transition away from LIBOR will cause market-wide instability, as untold amounts of financial obligations, derivatives, and other contracts are modified.⁴⁷ The necessary transition away from LIBOR is uncharted territory for the markets and, notably, underscores the macro-level consequences that may arise from the manipulation of systemically-significant benchmarks.

Given the widespread integration of benchmarks in the markets, it is not unwarranted to consider that benchmark manipulation and the fallout therefrom can have significant repercussions throughout the markets. The interconnections

44. See Saule T. Omarova, *The Merchants of Wall Street: Banking, Commerce, and Commodities*, 98 MINN. L. REV. 265, 268 (2013) (stating that large U.S. financial holding companies have “emerged as major merchants of physical commodities . . .”).

45. Katie Hoyle, *Transition Away From LIBOR: Where Are We Now?*, 8 J. INT'L BANKING & FIN. L. 520, 520 (2019).

46. Christopher J. Click, *Death of a Benchmark: The Fall of LIBOR and the Rise of Alternative Rates in the United Kingdom and United States*, 22 N.C. BANKING INST. 283, 284 (2018).

47. *Id.* Indeed, the U.K.'s Wheatley Report recommended LIBOR reform rather than transition away from it. See generally MARTIN WHEATLEY, *THE WHEATLEY REVIEW OF LIBOR: FINAL REPORT* 40 (2012).

that benchmarks create among institutions and markets mean that inaccurate valuations of financial transactions and contracts because of benchmark manipulation could produce ripple effects through the markets—resulting in increased collateral requirements, diminished asset values, and tangible losses for consumers in the real economy. Importantly, if the manipulation is severe enough, it can irredeemably destroy the reputation of the benchmark, causing the collapse of a significant market. Thus, the manipulation of ubiquitous benchmarks can render financial market networks vulnerable to systemic harm, lending support to including manipulation as a consideration with respect to macroprudential regulation.

B. HFT & Disruptive Volatility

Technological advances have played a crucial role in increasing innovation, enhancing efficiency, and improving liquidity in the markets in the past decade.⁴⁸ Of these advances, the use of HFT has fundamentally altered how the markets operate. HFT has contributed significantly to a dramatic reduction in execution time in the markets, thereby increasing liquidity and pricing efficiency in the markets.⁴⁹ The benefits of HFT notwithstanding, its emphasis on high-speed, high-volume transactions raises systemic concerns for the financial markets, especially when one factors in manipulative behavior. Some HFT firms employ trading strategies that exploit their speed and volume advantages to distort asset prices, which may have detrimental, systemic consequences for the markets. Pinging is one such strategy: it involves HFT traders placing small test orders at different price levels, then quickly exiting orders that were not filled. This strategy, which some liken to the use of sonar to detect large objects, allows the trader to gauge how it ought to adjust its position to profit on its later trades.⁵⁰ Other problematic strategies include spoofing, stuffing, and smoking, to name a few. At base, these tactics allow HFT traders to take advantage of slower traders in the markets.

These strategies also have deeper effects on the stability of the markets. While there is a generalized fear that HFT in and of itself exposes the markets to systemic harm because of excessive volatility and flash crashes, these concerns are heightened with respect to HFT-related manipulation. The 2010 Flash Crash—during which the prices of securities and derivatives dropped by almost 1,000 points in minutes—serves as an example to many of the dangers of the combination of manipulation and HFT. In May 2010, Navinder Sarao used an

48. Discussed *supra* Part II.B.2.

49. See generally Liz Moyer & Emily Lambert, *The New Masters of Wall Street*, FORBES (Sept. 2, 2009, 6:00 PM), <http://www.forbes.com/forbes/2009/0921/revolutionaries-stocks-getco-new-masters-of-wall-street.html> [<https://perma.cc/76DS-8XET>]; see also Jonathan Brogaard, Terrence Hendershott & Ryan Riordan, *High-Frequency Trading and Price Discovery*, 27 REV. FIN. STUD. 2267, 2303 (2014) (stating that HFTs contribute to price efficiency by trading in direction of permanent price changes and against transitory pricing errors).

50. Kristin N. Johnson, *Regulating Innovation: High Frequency Trading in Dark Pools*, 42 J. CORP. L. 833, 879–80 (2017).

algorithm to flood the markets with millions of dollars of orders to artificially push down the price of a futures contract on the Chicago Mercantile Exchange (CME) so that he could later buy the same contracts at an artificially depressed price.⁵¹ Sarao's attempts at price manipulation set off a chain reaction in the market in which securities prices fell and rebounded in seconds and billions of dollars were erased from the derivatives markets, creating a liquidity crisis that affected trading venues beyond the CME.⁵² HFT algorithms exacerbated the volatility of Sarao's manipulation scheme, selling positions and withdrawing from the market en masse, thereby propagating instability of the markets.

The Flash Crash illustrates two noteworthy macroeconomic consequences that arise from HFT-connected manipulation. First, HFT-related manipulation schemes can create systemic instability that can spread through the market like wildfire.⁵³ Within minutes, Sarao's traditional manipulative scheme caused market-wide volatility that was spread effortlessly throughout the markets because of the presence of other HFT traders. The interconnections among market participants, financial products, and trading venues furthered the spread raising systemic concerns. Second, many HFT programs make similar assumptions about the markets and tend to have similar investment profiles. Importantly, HFT algorithms are highly correlated in their responses in times of market stress, which worsens instability arising from HFT-related manipulation.⁵⁴ In response to deteriorating market conditions, there is likely a sudden and dramatic withdrawal of liquidity from the market, as HFT firms seek to liquidate their positions and exit the market at the same time.⁵⁵ Thus, the fire-sale-like response destabilizes the market and exposes systemic vulnerabilities within the markets.

The benefits of HFT notwithstanding, the fallout from HFT-related manipulation is a significant source of risk to the financial markets. Volatility in asset prices can impose significant losses on market participants which may ripple through the broader markets, heightening systemic concerns. For example, if many small market participants suffer significant losses, this may trigger a daisy chain of losses that undermines the market's stability and resiliency. Alternately, if the losses impact a large, systemically connected institution, it may likewise

51. Complaint at 1–5, U.S. Commodity Futures Trading Comm'n v. Nav Sarao Futures Ltd. PLC, No. 15-cv-3398 (N.D. Ill. Apr. 17, 2015); *see also* Press Release No. 7156-15, U.S. Commodity Futures Trading Comm'n, CFTC Charges U.K. Resident Navinder Singh Sarao and His Company Nav Sarao Futures Limited PLC with Price Manipulation and Spoofing (Apr. 21, 2015), <https://www.cftc.gov/PressRoom/PressReleases/pr7486-16> [<https://perma.cc/22E6-TXAX>].

52. Johnson, *supra* note 50, at 836–37; *see also* Roger Kenny et al., 'Flash Crash' a Perfect Storm for Markets, WALL ST. J. (May 6, 2015, 10:00 AM ET), <http://graphics.wsj.com/flash-crash-timeline> [<https://perma.cc/5QXS-XEJG>] (describing how Sarao's spoofing scheme caused extreme volatility in the New York Stock Exchange (NYSE) and other exchanges linked to NYSE's Arca Exchange).

53. *See* Linsey C. Crump, *Regulating to Archive Stability in the Domain of High-Frequency Trading*, 22 MICH. TELECOMM. & TECH. L. REV. 161, 173 (2015) ("HFT-related errors and negligence can have large-scale market ramifications.").

54. Johnson, *supra* note 50, at 859–60.

55. *Id.* at 860.

have system-wide reverberations. HFT-related manipulation, therefore, can have detrimental macro-level consequences for the markets, as the ensuing volatility can have destabilizing consequences for the markets and market participants.

C. Engineered Credit Default Swaps & Risk Mispricing

As seen in the 2008 financial crisis, even in the absence of any distortion CDS can heighten systemic risk concerns in the financial markets. CDS create interconnections among large financial institutions that increase counterparty risk—the risk that one party to the CDS may default on its obligations. Because of the highly leveraged nature of these transactions, the networks created through CDS raise concerns that failure of a large, leveraged entity may lead to a chain reaction of multiple financial institutions collapsing causing systemic failure.

An important factor in minimizing CDS counterparty risk and the potential contagion that may follow is the accurate pricing of the underlying insurer's default risk. To the extent the parties can reliably price the issuer's risk of default, they ought to set collateral and premiums for the transaction to reflect the risks of the transaction. However, miscalculating risk in a CDS transaction may result in lower collateral demands, which increases the leverage of the transaction and lower premiums being charged. Altogether, these factors can expose the protection seller to larger-than-anticipated losses, raising potential concerns for financial stability based on the size and interconnection of the protection seller. Mispriced CDS risk, therefore, affects both the value of the CDS and the losses CDS counterparties suffer in the event of larger than anticipated losses.

Recently, CDS counterparties have engaged in transactions to “engineer” the default of the underlying issuer to a CDS, which causes risk mispricing in CDS. Specifically, counterparties are collaborating with issuers to engineer a profitable outcome by guaranteeing their preferred CDS outcome—that is, forcing or preventing an issuer's default in order to profit on their CDS positions.⁵⁶ For example, the protection buyer may offer the issuer financing in exchange for the issuer's promise to voluntarily default on an upcoming interest payment. Or, the protection seller may offer the issuer financing so that the issuer restructures its debts to be held by a subsidiary, preventing the issuer from defaulting in the future. Engineered transactions render CDS risk calculations and pricing moot as the issuer's risk is no longer connected to its fundamental financial condition. This disconnect can expose the markets to systemic vulnerabilities.⁵⁷

Voluntary issuer defaults raise concerns of systemic failures of interconnected, leveraged counterparties to the transaction. CDS are priced to reflect the risk of the issuer's default based on its existing financial condition, historical models, and market expectations. When the issuer voluntarily defaults as part of a negotiated transaction with the protection buyer, the credit risk of

56. See generally Fletcher, *supra* note 34.

57. *Id.*

the CDS has been mispriced. This is because, *ex ante*, it did not price the risk of a voluntary default that is unconnected to the issuer's credit deterioration. Failure to predict and price the default of the issuer may result in significant losses to the protection seller. To the extent that the protection seller is unable to meet its obligations, this may lead to losses to the protection buyer, triggering a domino-like cascade of failures. These losses can have macroeconomic consequences, which would be amplified if the transaction is highly leveraged and links several parties together in a network of purchase and sale of credit protection. Negotiated and unexpected defaults on CDS, therefore, can result in cascading and unexpected losses on counterparties that, in aggregate, may introduce systemic harms into the markets.

Additionally, counterparties' collaboration with issuers to prevent future default can also have macroeconomic consequences for the markets. First, restructuring the issuer's debt such that it is being held by a subsidiary and, therefore, beyond the scope of the CDS does not make the issuer safer. Rather, it eliminates the opportunity of debt investors to hedge their risk using CDS. If the issuer later defaults on its subsidiary-held debt, debt investors are worse off for having paid for credit protection but not having the actual benefit of protection. Again, this could result in significant financial losses for parties which, if it affects many market actors, could have system-wide reverberations.

Indirectly, these engineering strategies can reduce economic liquidity—that is, the supply of money and credit—in the markets. Scholars such as Margaret Blair and Erik Gerding have identified how leverage and CDS increase the effective supply of money by creating substitutes for money in the financial markets.⁵⁸ To the extent fewer parties participate in the CDS markets for fear of being on the losing end of one of these transactions, engineered transactions can decrease economic liquidity in the broader markets. Even if one considers the reduction in credit in the markets to be beneficial,⁵⁹ that leverage and CDS *can* impact economic liquidity points to the macroeconomic scope of engineered transactions on the financial markets, albeit indirectly.

Lastly and relatedly, engineered transactions weaken the integrity and, by extension, viability of the CDS market. Fearing being on the losing end of an engineered transaction, market actors may elect to enter into fewer transactions, which may have destabilizing effects on the CDS markets. Not knowing which issuers are collaborating with CDS counterparties, potential participants in the CDS markets may refrain from transacting broadly. As fewer “honest” counterparties remain in the markets, the CDS markets may devolve into a classic “lemons market.”⁶⁰ Thus, taken to its extreme, though logical, conclusion,

58. See Gerding, *supra* note 33, at 32 (explaining that credit derivatives increase liquidity which increases the effective supply of money); see also Blair, *Financial Innovation*, *supra* note 32, at 231 (“[E]xcessive leverage in the system as a whole has increased the effective supply of money and credit.”).

59. See Blair, *supra* note 32, at 229.

60. In a lemons market, buyers do not know which cars are worth their asking price and those that are not (i.e., lemons). Thus, the buyer will simply treat all cars like lemons. The result will be that worthy car sellers will leave the markets, being unable to get an accurate price for their product and lemon sellers

engineered transactions may so weaken the CDS market as to make it no longer viable.

In sum, failure of the CDS markets to accurately price issuers' risk of default upends allocative efficiency of the markets, introducing vulnerabilities into the broader markets, and potentially triggering cascading failures of interconnected counterparties. Additionally, engineered CDS transactions can impair the integrity of the CDS market to the point that the market is no longer viable, further extending the direct and indirect consequences of engineered CDS transactions to the wider financial markets. As the above discussion demonstrates, modern-day manipulation can expose significant vulnerabilities and contribute meaningfully to systemic risk in the financial markets. The interconnectedness of the markets and the way in which new forms of manipulation exploit and weaken these networks lends support for manipulation being included in the discourse on macroprudential forms of market regulation. Part IV explores, in broad strokes, what that can mean for regulators and the markets going forward.

IV

MACROPRUDENTIAL REGULATION & MANIPULATION: PRELIMINARY THOUGHTS

Changes to the structure and operation of the markets have similarly altered the potential impact and scope of modern-day market manipulation schemes. Today, manipulation can expose significant vulnerabilities, rendering interconnected institutions and markets susceptible to systemic harms. To properly account for the systemic risk that accompanies manipulation schemes, it is necessary to include manipulation in the discourse regarding macroprudential regulation. Practically, this means including manipulation and the fallout therefrom as a potential source of destabilization risk in the markets. As discussed above, manipulation can contribute to market destabilization either directly, by intensifying volatility in the market, or indirectly, because parties withdraw from the markets to limit their exposure to manipulation. Thus, efforts to truly identify sources of systemic risk in the markets must account for the potential for, and consequences of, manipulation on the financial system.

Beyond merely including manipulation in the larger conversation on the regulation of systemic risk, it is also fruitful to consider changes that could be made to regulatory design to account for the macroeconomic consequences of manipulation. Existing manipulation regulations are microprudential: they focus on specific or individual harm of manipulative conduct on institutions, investors, or assets. Embracing a macroprudential focus, such that the anti-manipulation framework is aimed at both minimizing manipulation and reducing systemic risk, would shift the philosophy of regulators towards manipulation and expand the

will remain in the market. George A. Akerlof, *The Market for "Lemons": Quality Uncertainty and the Market Mechanism*, 48 Q.J. ECON. 488, 489–90 (1970).

tools used to address it. Although largely undeveloped in academic literature, a macroprudential approach to manipulation would require that regulators adopt regulations that (i) *ex ante* minimize the potential of manipulative conduct to cause or amplify systemic harms in the financial markets; and (ii) *ex post* ensure that the financial system is robust enough to mitigate negative consequences if and when they occur.

A. Ex Ante Regulations

Much of anti-manipulation law and regulation is focused on enforcement after misconduct has occurred. For traditional manipulative schemes, which have a limited impact on the financial markets, *ex post* regulation is efficient. It allows the markets to operate without restrictions that may be over or under-inclusive and may chill legitimate activity. An *ex post* regulatory approach also allows regulators to deploy scarce resources only when they have more accurate information about misconduct that has already occurred. However, for manipulative conduct that can have systemic consequences, an *ex post* approach can be detrimental to the markets. Regulating after the misconduct occurred exposes the markets to systemic vulnerabilities for which enforcement actions offer an unsatisfying balm and do little to prevent future iterations of similar harms.

Macroprudential regulation of manipulation requires a focus on prescriptive regulation, especially of processes, products, or actors at the heart of potentially manipulative behavior. Such *ex ante* regulation should aim to decrease information asymmetry and make more apparent the interconnections among institutions and markets that can facilitate the spread of instability throughout the market. For example, benchmarks that can be classified as systemically important ought to be subject to greater regulatory oversight to minimize conflicts of interests that undermine their accuracy and reliability in the market. Similarly, a robust regulatory framework to monitor HFT firms in the market would reduce the likelihood of such firms exposing the markets to excessive volatility. *Ex ante*, macroprudential regulation would complement, rather than supplant traditional, *ex post* regulation, thereby better protecting the markets from systemic vulnerabilities. Considerations of what the scope, content, and theoretical framing of such prescriptive regulation and the extent to which it may effectively safeguard the markets is an area for future research.

B. Structural Safeguards

A macroprudential focus on manipulation would mean paying attention to the ways in which manipulation affects and is amplified by intra-market networks. In this regard, macroprudential regulation should aim to ensure that a trader's misconduct does not result in "manipulative contagion" that can expose structural vulnerabilities in the financial markets and exacerbate systemic risk. *Ex post* macroprudential regulations, therefore, would consider how manipulation impacts the safety and soundness of the financial system given the

increased interconnections among institutions and across market segments. Thus, within a macroprudential framework, anti-manipulation laws and regulations would consider how and to what extent manipulative conduct can introduce or contribute to endogenous and exogenous shocks to the market.

Key to adopting a macroprudential approach to manipulation regulation will be to employ tools and strategies that enhance the resilience of intra-firm and intra-market networks. The networks that connect the markets act as conduits of contagion, therefore making it crucial to consider ways to disrupt the channels through which manipulation can transmit systemic harms. In focusing on how to limit or reduce the structural vulnerabilities that accompany manipulation, macroprudential regulation could consider how to mitigate against herding, thereby potentially limiting the systemic consequences of manipulation. Again, exploration of these and other strategies would be valuable grounds for future research on the intersection between manipulation and financial stability.

V

CONCLUSION

This Article is a preliminary exploration of the potential macroeconomic consequences of market manipulation in the markets. Understanding and appreciating how manipulation may increase systemic vulnerabilities is key to the development of a thoughtful macroprudential regulatory framework for the financial markets. Although manipulation is typically limited in its reach, in recent years the scope and impact of manipulative schemes have expanded such that manipulation can have macroeconomic consequences. The evolution and development of market manipulation have made it increasingly important to consider the linkages between manipulation and financial stability. Manipulative schemes can transmit and amplify systemic harms in the market by weakening intra-market networks, increasing volatility, and mispricing risk. As financial regulation moves towards a more macroprudential approach, this Article encourages inclusion of manipulation in the discourse, recognizing that it may contribute to systemic vulnerabilities and be a source of macro-level market harm.