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The New Mechanisms of Market Inefficiency

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Abstract

Mechanisms of market inefficiency are some of the most important and least understood institutions in financial markets today. A growing body of empirical work reveals a strong and persistent demand for "safe assets," financial instruments that are sufficiently low risk and opaque that holders readily accept them at face value. The production of such assets, and the willingness of holders to treat them as information insensitive, depends on the existence of mechanisms that promote faith in the value of the underlying assets while simultaneously discouraging information production specific to the value of those assets. Such mechanisms include private arrangements, like securitization structures that repackage cash flows from debt instruments to produce new financial instruments that are less risky and more opaque than the underlying debt, and public ones, like the rules allowing many money market mutual funds to use a net asset value of $1.00. This essay argues that recognizing these mechanisms of market inefficiency as such is a critical first step in devising policy interventions that achieve desired aims. This runs counter to the instincts of many market regulators, like the Securities and Exchange Commission, and academics who have often assumed that markets should be structured to promote information generation and efficiency.

The essay further shows, however, that defenders of the information-insensitive paradigm have failed to provide a robust institutional account of how those mechanisms can remain robust across different states of the world or the government support required if they cannot. When an adverse shock or other signal raises questions about the value of the assets underlying an information-insensitive instrument, market participants can refuse, en masse, to treat those instruments as safe. Unless the government or some other actor can provide credible information about the value of the underlying assets or financial support that renders such information irrelevant, widespread market dysfunction can follow. When that happens, the very mechanisms of market inefficiency that had enabled a market to develop can exacerbate dysfunction. Following Ronald Gilson and Reineer Kraakman's admonishment that institutions always matter, this essay calls for the development of rich institutional accounts of how the mechanisms of market inefficiency work, when and how they can fail, and what these dynamics reveal about the role regulators should play in these domains.

Keywords: money markets, debt, market structure, information-insensitive, securitization, efficiency

JEL Classifications: D82, E41, E50, G01, G14, G21, K22

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Very few scholars could write an article about the efficient market hypothesis (EMH) that could be widely cited while the notion was in vogue and remain influential as the notion has fallen out of vogue. In *The Mechanisms of Market Efficiency* (MOME), Ronald Gilson and Reinier Kraakman achieved just this feat.[1] Moreover, they did so not by some clever sleight of hand that glosses over issues of whether or when the EMH holds, but precisely because of their willingness to dive into those tricky questions.

At the time they published *MOME*, in 1984, financial economists, lawyers, and others had widely, and often uncritically, embraced the notion of market efficiency. Against this background, Gilson and Kraakman brought a note of caution. Not so fast, they warned. Markets are not magic places where everything just always works out in the end; policies and theories that assume as much are destined to fail. Institutions matter. Information is costly to access and costly to analyze. Market efficiency, therefore, is not a simple concept that can be assumed to hold across time and space. Rather, it is a theory that means little without an institutional account of how markets become more efficient and the conditions required to achieve that outcome.

Circumstances have changed significantly in the intervening 35 years. The rise of behavioral economics, stock market bubbles, the Enron and WorldCom scandals, and the 2007–2009 financial crisis (Crisis) are but a few of the developments that have chastened EMH enthusiasts. Paul Krugman expressed the sentiment of many in 2009, when he accused economists of "mistaking beauty for truth." In his telling, economists had failed to foresee the crisis because "[t]he field was dominated by the 'efficient-market hypothesis,' . . . which claims that financial markets price assets precisely at their intrinsic worth given all publicly available information."[2] For many readers, the natural implication was that the EMH is wrong and should be left for dead.[3]

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[1] *See* Ronald J. Gilson & Reinier H. Kraakman, *The Mechanisms of Market Efficiency*, 70 VA. L. REV. 549 (1984) [hereinafter MOME].

[2] Paul Krugman, *How Did Economists Get It So Wrong?*, NEW YORK TIMES MAGAZINE, Sept. 2, 2009, at MM36, https://www.nytimes.com/2009/09/06/magazine/06Economic-t.html.

[3] Gilson and Kraakman were among those who feared the crisis might lead to a premature death of the EMH, one that would hamper policy making and efforts to improve resilience. *See* Ronald J. Gilson & Reinier Kraakman, *Market Efficiency After the Financial Crisis: It's Still a Matter of Information Costs* 1–2 (Stanford John M. Olin Program in Law & Econ., Working Paper No. 458; Columbia Ctr. For Law & Econ. Studies, Working Paper No. 470; European

Against this background, too, Gilson and Kraakman can again be seen as providing a note of caution. The stylized version of the EMH that Krugman depicts may well be dead, and rightfully so, but *MOME* revealed that version was never anything more than a caricature. There was and remains a real creature underneath, one more nuanced, but lively just the same. To disregard the EMH altogether is no less foolish than to embrace it blindly. Again, institutions matter. Information is costly to obtain and costly to process, but the returns can be great for those who gain an informational advantage. So long as the system rewards getting information earlier than others, or making more accurate probabilistic assessments than others, information generation is going to be part of the game, and part of financial asset pricing.

Moving past the specific mechanisms they set forth in 1984 to the core ideas they espouse makes clear that *MOME* is about the institutions that tend promote a particular outcome, efficiency, not the outcome itself. Hence, the first aim of this essay is to return to the *MOME* and to make plain the diamond that lies at its core. The essay draws out and affirms the *MOME*'s key insights that information costs, incentives, and institutions always matter.

Uncloaking this diamond lays the foundation for revealing fundamental and as yet unanswered questions about the health and functioning of today's capital markets: What to do about the rise of mechanisms of market inefficiency—mechanisms specifically designed to deter information generation so that certain assets can be treated as "information insensitive"—in the capital markets? Can anyone provide an institutional account, comparable to that provided in the original *MOME*, for how mechanisms of market inefficiency and information-insensitive assets can reside stably alongside information sensitive-ones, particularly given that the former are produced from the latter? What does that account reveal about the types of shocks that might disrupt the bifurcation between these classes of financial assets and the market dysfunction that can follow? Is more or different ex ante regulation warranted? If perfect stability is not possible or pragmatic, what institutions are needed to address the fragility that results? The aim of this essay is

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Corp. Governance Inst., Law Working Paper No. 242/2014, 2014), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2396608 [hereinafter *After the Crisis*].

not to try to answer these questions but to argue for their importance and illuminate why they have yet to receive the attention they desperately deserve.

To understand why these questions are *the* questions, a little background is helpful. A striking feature of the last decade of debate about how to avoid another financial crisis is how often policy makers and academics assume either that informational efficiency is almost always normatively desirable or that information insensitivity is normatively desirable and should be protected for a large swathe of financial assets. Debates between these two positions or close examination of their motivating assumptions are less common.

Gilson and Kraakman are among those who tend to assume that efficiency is normatively desirable, even if far from costless to obtain and variable in practice. In a post-crisis essay, they explain how the framework provided in *MOME* can be used to assess how relatively efficient a market is likely to be, and how this can serve as prognosticator of trouble spots. They point out that an institutional assessment of the layered primary markets through which cash flowed through collateralized debt obligations and mortgage-backed securities (MBS) to fund home loans across the country should have made it clear that there were reasons to doubt the efficiency of these markets long before the crisis hit. Their conclusion? More and better disclosure to enrich the informational environment, improve price accuracy, and reduce fragility.

Other esteemed academics adamantly disagree. A number of economists take the position that mechanisms that impede market efficiency can be welfare enhancing.[4] In this view, instruments that are "information insensitive," in the sense of being priced and traded in ways that assume the irrelevance of marginal information, play distinct and socially useful purposes. Traditionally, bank deposits were the predominant form of privately issued information-insensitive instruments, but such instruments now pervade the capital markets as well.

[4] See infra Part II. For some background on safe assets, see Gorton, Gary, Stefan Lewellen, and Andrew Metrick. The Safe-Asset Share, 102 *American Economic Review* 101 (2012); Anna Gelpern & Erik F. Gerding, Inside Safe Assets, 33 Yale J. on Reg. (2016).

In making strong assumptions in favor or against the normative desirability of mechanisms of market inefficiency without directly engaging the threshold question of their use in capital markets, both sides have tended to skip over critical questions of just how well these mechanisms work and what happens when they break down. To make this more concrete, putting government guarantees to the side, "information insensitivity" is often achieved via overcollateralization. This means that in order to produce some assets that are insensitive to information, markets also produce other subordinated assets that are backed by the same pool of assets and that are very sensitive to changes in the value of those assets. As a result, domains of "information insensitivity" are almost always nested on top of information sensitive domains and the border between the two is far from stable. What has yet to be produced—outside of banks—is an institutional account of *how* these two domains can co-exist, where fragilities lie, and the appropriate ex ante and ex post role for regulators in addressing the positive and negative externalities that can result. Examining the institutions used to create information insensitivity through the institutional lens that *MOME* places front and center reveals fundamental, unresolved questions about how market-based intermediation works and how best to regulate it.

The essay proceeds as follows: Part I revisits the original *MOME* to identify its most important and lasting contributions. It seeks to return us to 1984, and to the context in which they spoke, to peel away the outer layers addressed to contemporaries and uncover the article's core. Part II uses the core insights unearthed in Part I to examine the frictions that exist in many of today's markets and the reasons for those frictions. Its aim is to distinguish between two related, but distinct, lines of thought, one focused on the inevitability of frictions in the movement of information in real-world markets and a second on the desirability of information-insensitive assets, and hence the utility of intentionally designed mechanisms of market inefficiency. Distinguishing between these schools of thought, and taking the latter seriously, reveals that a fundamental, and yet unanswered, question is the institutional design needed to enable information-insensitive assets to be issued in capital markets without posing an excessive threat to financial stability.

I. The Contribution

It is helpful to start by clarifying what Gilson and Kraakman were *not* doing in *MOME*, as the intervening decades have bred some confusion on this front. They were not seeking to introduce the EMH to legal academics and lawyers who were otherwise ignorant of recent developments in corporate finance. The piece has in time sometimes come to stand for the EMH, a handy law-review citation for the proposition that markets are efficient. This may add marginally to the citation count, but it is an unfortunate development for purposes of the informed debate they sought to foster.

As they explain in *MOME*, that there was something called the EMH was not news to most lawyers and legal academics. The problem was just the opposite. Lawyers had heard of the EMH, and they had embraced the idea. Markets are efficient? Prices reflect all relevant information? Sounds good to us, had been the implicit response of many, including some in policy making roles. Thus, one aim of the piece was to temper and add critical institutional nuance to the "legal culture's remarkably rapid and broad acceptance of an economic concept that did not exist twenty years ago."[5] This was critical, then as now, because the nature of the embrace was not "matched by an equivalent degree of understanding" of what the EMH really means or the conditions in which it might hold.[6] If lawyers, whether judges or regulators at the SEC, are going to insist on relying on the EMH to craft decisions and policy, they ought at least have some understanding of the institutional underpinnings required to make it work.

But there was also a second audience to whom the piece was addressed, a group no less eager than lawyers to embrace a thin account of the EMH as right and complete on its own terms: financial economists. As Gilson and Kraakman explained, they were writing at a time when the "outpouring of empirical research demonstrating market efficiency . . . greatly outpaced efforts to explain the phenomenon."[7] The function of the article, thus, was not to introduce anyone to the idea of the EMH but instead to provide a much-needed institutional account of the EMH. They sought to ensure that the lawyers relying on it and the economists testing it and invoking it actually understood that of which they spoke.

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[5] MOME, *supra* note 1, at 550.
[6] *Id.*
[7] *Id.* at 551.

Reviving this context helps to explain the lens through which they knew the piece would be read. With the benefit of hindsight, it is clear that Gilson and Kraakman were writing at a high-water mark for the EMH and faith in markets generally. They were rubbing some salt into the icy sheen that had allowed the EMH to be more accepted than understood by their contemporaries. And in the process, they had the pleasure of revealing that a "paradox" identified by two prominent economists was nothing of the sort.[8] But rather than trying to melt the glimmering ice statue that was the EMH of 1984, their aim was to use salt to refine and explain what allowed the figure to hold. They saw salt as the critical addition needed to stop lawyers, economists, and others from projecting false images onto the sheen of the outer layer of ice, and to recognize the importance of the underlying bones upon which the ice had accumulated.

The stated reason for the article was to provide "a general explanation for the elements that lead to—and limit—market efficiency."[9] That last part is worth repeating, "lead to," "and limit," "lead to," and thereby "limit." Thus, although frequently cited for the proposition of market efficiency, the aim of the article was instead to temper that embrace and put it on a footing both more solid and contingent.

By situating the piece in context, and recognizing that they had a broader perspective than many of their contemporaries but were not immune from the environment in which they were writing helps clarify the article's most important and lasting contributions: that information is costly to generate and costly to analyze, that seeming truisms are never self-executing, and that institutions matter. Institutions matter in explaining empirical findings, in showing the limits of empirical findings, in reconciling and making sense of insights growing out of formal analysis, and in trying to translate any economic insight or finding into policies that actually work. Institutions matter. They shape the frictions that impede the flow of information, and the grease that shapes how and where it flows. Institutions matter. Information does not flow of its own accord, even today.

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[8] *Id.* at 622–25 (discussing Sanford J. Grossman & Joseph E. Stiglitz, *On the Impossibility of Informationally Efficient Markets*, 70 AM. ECON. REV. 393 (1980)).
[9] *Id.* at 553.

As obvious as these lessons might seem, history shows they are anything but. The lesson remains relevant precisely because it is so often forgotten or ignored. Sometimes this is innocent; sometimes it is not. As they explain in their own subsequent work, one reason for the continued misunderstanding of the EMH is the way a simplified, institution-free account was used by public and private actors to push a deregulatory agenda. This was among the reasons that the EMH was so quickly hoisted onto what seemed to be its own petard when the fallacy of the simplified version was made apparent over time, again and again.

Many market actors had also been too ready to embrace an account of the EMH not weighed down by the institutional detail that *MOME* identifies as key. The shock and awe that many displayed when the prices of particular types of assets proved grossly inaccurate in 2007 and 2008 was but one of the many indications that they too had uncritically accepted the EMH, as Gilson and Kraakmam's post-crisis autopsy shows how the very structure of many of these markets invited massive information gaps, and potential distortions.[10] Throughout all of this, Gilson and Kraakman have provided a reliable and constantly insightful tune: Institutions matter, information is costly to generate, analyze, and transfer, and, in more recent work, frictions abound.

II. Putting that Insight to Work

Having clarified what I see as the core contribution of *MOME*, the question then becomes how to put it to work given all that has changed, in practice and understanding, in the intervening thirty years. This section argues that among the core questions that remain unanswered is to what extent mechanisms specifically designed to impede market efficiency may be justified in the capital markets and the tools needed to promote resilience once they are allowed. Grappling with the institutional detail that *MOME* reveals to be key serves as a foundation for showing their importance. A theory about an outcome, whether its informational efficiency or insensitivity, means little without a robust institutional account of how that outcome is achieved and when it may fail. Given the

[10] *See After the Crisis*, *supra* note 3; Kathryn Judge, *Fragmentation Nodes: A Study in Financial Innovation, Complexity, and Systemic Risk*, 64 STAN. L. REV. 657 (2012); Kathryn Judge, *Information Gaps and Shadow Banking*, 103 VA. L. REV. 411 (2017).

confusion and disagreement that persist, this section begins by cabining off related but distinct questions about the application of *MOME* given the complexities of modern financial markets and instruments.

A. Complexity, Limits to Arbitrage, and Other Frictions

Shifting from the lasting contributions of *MOME* to the detailed institutional account of the mechanisms enabling efficiency that Gilson and Kraakman promulgated in *MOME* reveals that even they were not immune to the idealism of the 1980s. Their own writings are a good place to start the needed updating. When reassessing *MOME* twenty years later, Gilson and Kraakman confess that they "were painfully naïve about the level of frictions affecting the professionally-informed trading mechanism" when they first wrote.[11] Given the subsequent research on the limits of arbitrage and what Enron and WorldCom revealed about the ways compensating management with equity could compromise management incentives to provide accurate information, they concede to having "implicitly underestimated the institutional complexities that attend the production, processing, and verification of market information, as well as its reflection in share prices."[12] They themselves thus acknowledge that the specific set of mechanisms they set forth in 1984, though helpful in their way, were a "stylized" account of the institutional dynamics needed to achieve even relative efficiency. Without disowning the core of *MOME*, they acknowledge that the institutions that their original analysis suggests are critical are more complicated and imperfect than they first appreciated.

They took a similar, but yet again more refined, view after the 2007–2009 financial crisis. As they explain, "[a] perfect market is one in which prices are fundamentally and informationally efficient. But such a market" has never existed, it is instead nothing more than "a helpful construct . . . from which to begin the investigation of real markets with

[11] Ronald J. Gilson & Reinier Kraakman, *The Mechanisms Of Market Efficiency Twenty Years Later: The Hindsight Bias,* 28 J. Corp. L. 715, 735-36 (2003). At this same conference, Lynn Stout provided a far more critical assessment of both *MOME* and market efficiency. As this paper does, she played on the notion of "mechanisms of market inefficiency, but she used the term to deride the possibility of efficiency rather than to capture the idea of tools that might create value via facilitating information-insensitive treatment of financial assets. Lynn A. Stout, *The Mechanisms of Market Inefficiency: An Introduction to the New Finance,* 28 J. Corp. L. 635 (2003).

[12] *Id.* at 736.

numerous frictions (or imperfections) . . . ."[13] Their contribution to this effort and to the discussion on market regulation "has been to show that the informational efficiency of market prices must be understood as relative rather than absolute" and that the "ECMH should be understood as a theory about the relative informational efficiency of market prices, which is inherently a context specific inquiry."[14]

Other work further illuminates the limits of the original *MOME.* As Dan Awrey explains, *MOME* and much of the literature and policy relying on it, was focused on "the highly regulated, order-driven, and extremely liquid markets for publicly traded stocks."[15] But other markets, like the market for over-the-counter (OTC) derivatives that are the focus of much of his work, look very different. Some of these differences arise from the nature of the financial instruments. Derivatives, for example, create counterparty risk. This could affect pricing, even though it has nothing to do with the expected value of the instrument referenced. Other differences arise from market structure. The bilateral, opaque nature of the OTC market impedes transparency even apart from the complications of trying to parse out the various elements embedded in price. As a result, efforts to assess whether and to what extent such markets are efficient are not easily wedged into the frame originally designed for public equity markets.

My own work on securitization has explored how the structure of complex mortgage-backed securities (MBS) and collateralized debt obligations (CDO) backed by MBS led to large, and ultimately fragility-exacerbating, information gaps.[16] The mortgages underlying MBSs and CDOs were idiosyncratic, the representations and warranties pursuant to which those mortgages were sold by the originator for inclusion in a securitization transaction varied by deal and evolved over time, and the waterfalls establishing the cash flow rights of the different tranches of MBSs and CDOs issued in a particular transaction were specific to that transaction. As MBS became more complex, the amount of new information beyond the quality of the underlying mortgages that the

[13] *After the Crisis*, *supra* note 3, at 8.
[14] *Id.* at 9.
[15] Dan Awrey, The Mechanisms of Derivatives Market Efficiency, 91 N.Y.U. L. Rev. 1104, 1107 (2016).
[16] Kathryn Judge, Information Gaps and Shadow Banking, 103 Va. L. Rev. 411 (2017); Kathryn Judge, Fragmentation Nodes: A Study in Financial Innovation, Complexity, and Systemic Risk, 64 Stan. L. Rev. 657 (2012).

process of securitization made relevant to the value of the securities issues increased. At the same time, as CDOs increasingly acquired the middle MBS tranches that had been among the more information sensitive, the incentives anyone had to meaningfully evaluate that information declined. Although these dynamics need not have resulted in a price bias one way or another, they did produce massive information gaps—pools of potentially pertinent and knowable information not actually known by anyone. And when signals, like the widespread downgrades of subprime MBS which revealed ratings to be less accurate than previously believed, made the information in these gaps more important, no one could readily produce it. This is one of the ways that limits in the efficacy of MOME ended up exacerbating fragility in ways that are not at odds with, but also not addressed by, Gilson and Kraakman's original work.

Aspects of Awrey's analysis, my previous work, and work by other scholars following Gilson and Kraakman's admonishment to take institutions and information costs seriously, fit within the overall frame they provide. This body work suggests that the world may be even messier than Gilson and Kraakman's subsequent work suggests, and casts doubt, sometimes grave, on whether and to what extend markets are efficient.

That markets are messy, however, does little to undermine the importance of MOME. Taking institutions and information costs serious means that markets will only be efficient, even on a relative basis, when the institutional setup enables such efficiency. The mechanisms must be in place, and those mechanisms take time to develop and can interact in complex ways. Focusing on mechanisms can go a long way in explaining where markets appear to be relatively efficient and where they do not. Markets may be less efficient than *MOME* envisioned, but that makes its core contributions more, not less, important. It allows *MOME* not only to provide the institutional account needed to explain the empirical phenomenon of informational efficiency, but also to serve a second and no less vital role in explaining why frictions so often impede efficiency.

B. Information Insensitivity as a Virtue

There are, however, a second set of issues that Awrey, I, and other peers have grappled with as we try to bring the core insights of *MOME* to bear on new and different

markets. Many of these challenges can be traced to the idea that information insensitivity may be a benefit, a distinct feature for which holders of financial assets will pay a premium because it enables the assets to serve qualitatively different purposes than investment alone. "Safe assets," "information insensitive assets," "money-like assets," and "money" are among the overlapping terms used for assets that serve a distinct set of purposes, including facilitating delayed consumption, serving as collateral, and functioning as a medium of exchange. Recent research demonstrates empirically the premia holders are willing to pay when an instrument has such a character. Other work suggests that there may be some persistent level of demand for such assets.[17]

Awrey's claim is different in its details but similar in spirit. As he explains it, in order to improve relative efficiency with respect to the relationship between the expected performance of an underlying and the price of derivatives referencing it, it is helpful for another otherwise relevant dimension of a particular derivative's price—dealer creditworthiness—to be rendered irrelevant. These various lines of reasoning all suggest that it may at times be normatively desirable not just to reduce, but to practically eliminate, efficiency as a relevant concept in certain domains.

This raises a first-order question: Is there a place for mechanisms that are designed to impede information generation in the capital markets? What role, if any, should there be for mechanisms of market inefficiency?

One response is that there should of course be a place for such mechanisms, and for reasons that *MOME* anticipates. Because information is costly to generate, instruments that require less information generation or verification can yield cost savings. This has long been one explanation for debt financing. One benefit of debt relative to equity is that there is no need, at the time of origination or payoff, for the issuer and holder of debt to reach agreement with respect to the value of assets underlying an instrument. One implication is that under the "pecking order" theory of capitalization structure, firms prefer

[17] *See, e.g.*, Arvind Krishnamurthy & Annette Vissing-Jorgenson, *The Aggregate Demand for Treasury Debt*, 120 J. POL. ECON. 233, 235 (2012); Gary B. Gorton, *The History and Economics of Safe Assets* 1–2, 9, 20 (Nat'l Bureau of Econ. Research, Working Paper No. 22210, 2016), http://www.nber.org/papers/w22210; Bengt Holmstrom, *Understanding the Role of Debt in the Financial System* 3 (Bank for Int'l Settlements, Working Paper No. 479, 2015), https://www.bis.org/publ/work479.htm.

to issue debt than equity if they need external financing because "debt minimizes the managers' information advantage."[18] This line of reasoning highlights that the payoff structure of debt creates different information-related incentives and challenges, and it takes frictions in the movement of information seriously.

These ideas pose little threat, however, to the core normative assumptions in *MOME*. There is still a difference between recognizing the benefits of forms of financing reduce the effective cost of existing frictions than saying those frictions are normatively desirable. The pecking-order theory and variants suggest that there may be advantages to not requiring the issuance of instruments that maximize information generation, but their aim is to accommodate existing asymmetries and frictions, not create new ones.

Shifting from the various schools of thought on how and why firms determine capitalization to a traditional source of debt financing—banks—gets us one step closer to the nub. One of the defining features of banks is that they use short-term debt, traditionally deposits, to fund long-term, illiquid assets like mortgages and loans to small and medium-sized enterprises. This makes banks inherently fragile, as no bank has sufficient liquid assets to pay off all depositors should they demand their money back at the same time—a run. Given the social costs of runs and the pervasiveness of banks across so many different financial systems, this structure has been a matter of fascination and inquiry. Of the range of rationales for this inherent fragility in the banking literature, two predominate.

The first suggests that banks' reliance on short-term debt and the fragility that results is a virtue, not just a bug. Under this line of reasoning, the short-term nature of the debt that banks issue exerts a distinct and sometimes beneficial form of discipline, one that can reduce agency costs and facilitate financing.[19] This school of thought does not see banks' short-term liabilities as informationally efficient, even in a relative sense. Depositors respond to information, but their response is binary—withdraw everything or nothing—and they make that decision based on incomplete information. Nonetheless, this

[18] Stewart C. Myers, *Chapter 4: Financing of Corporations*, *in* 1 HANDBOOK OF THE ECONOMICS OF FINANCE 215, 234 (George Constantinides et al. eds., 2003).

[19] *See, e.g.*, Douglas W. Diamond & Raghuram G. Rajan, *Liquidity Risk, Liquidity Creation, and Financial Fragility: A Theory of Banking*, 109 J. POL. ECON. 287, 289 (2001); Charles W. Calomiris & Charles M. Kahn, *The Role of Demandable Debt in Structuring Optimal Banking Arrangements*, 81 AM. ECON. REV. 497, 497 (1991).

school of thought is relevant in that it supports the view that transparency and discipline can be beneficial, even for banks.[20] Not all banking scholars assume information generation and market discipline are normatively undesirable.

There is, however, a second view, with different policy implications. Economic historian Gary Gorton is one of the more vocal proponents of this position. This line of reasoning starts with the premise that society's need for information-insensitive assets has always exceeded the government's willingness and capacity to issue such instruments. Historically, banks filled this gap. In this view, bank fragility is more of a bug than feature, but one that can be justified by the utility of the short-term debt banks issue.

As Gorton explains it, "[t]he output of a bank is its debt, which is used as money," that is, banks exist primarily to produce deposits and other short-term liabilities that can be used as money.[21] The ability for that short-term debt to function effectively as money depends on its being traded at par, without holders having to exert any meaningful effort to assess whether that is in fact the right price for it. And opacity is the best way to achieve this. In Gorton's view, "[a] call for transparent banks is… oxymoronic," as "such an entity would be unable to serve the fundamental functions of a bank." Instead, banks are "*optimally opaque*" and "much of the financial regulatory infrastructure is precisely intended to make banks opaque to outsiders."[22]

So now we have two views of banks, neither of which see the short-term debt like deposits as informationally efficient and neither of which sees informational efficiency as something to be aspired to, but which nonetheless have very different normative implications when it comes to issues like discipline and transparency. It might seem like all of this is a pointless tangent. Gilson and Kraakman recognize banks as different. They have never suggested that the EMH, which they carefully choose to denote as the Efficient Capital Market Hypothesis (ECMH), emphasizing that they are indeed talking only about the capital markets, holds for bank deposits, the predominant form of short-term funding

[20] This debate is well summarized in Chen et al., Bank Transparency and Deposit Flows (working paper, 2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3212873, which also provides some useful empirical insight into how depositors use information.
[21] Gary Gorton, *The Development of Opacity in U.S. Banking*, 31 YALE J. REG. ON REG. 825, 827.
[22] *Id.* at 826–27.

used by banks. So why this tangent? Why after living comfortably side by side are legal scholars increasingly finding their work and policy proposals criticized by economists who ascribe to this view of banks and banking?[23]

The answer lies in market-based intermediation, aka 21st century "shadow banking." As is now widely recognized, in the decades leading up to the crisis, the maturity and liquidity transformation and "money" creation that had once been the bastion of banks increasingly took place through an interconnected web of market-based entities and instruments. Individuals and firms would park cash in money market mutual funds, which issued instruments akin to the bank deposits that Gorton identifies as so distinct and useful. Through asset-backed commercial paper conduits, special purpose vehicles sponsored by banks, banks themselves, and other structures, those funds became linked to, and backed by the MBS that proliferated in the decade leading up to 2008. "Banking" was now happening not just outside banks, as it had with the trust companies in the panic that triggered the creation of the Federal Reserve, but outside of individual entities that could be made subject to prudential regulation. It is largely this system, which evolved but did not go away after the crisis, that gives rise to much of the consternation and contestation.

It is not by chance that it is activities and instruments issued in this space that led to one of the more critical responses to Gilson and Kraakman's post-crisis adherence to disclosure and efficiency as the right policy tool and aim.[24] Bengt Holmstrom, who has written with Gary Gorton at times on these topics, argued that their paper embodies a fundamental misunderstanding of the markets and instruments at issue. In a paper that is in part a response to Gilson and Kraakman, Holmstrom argues that their claim for greater transparency and other friction-reducing interventions suggests a category error. As he sees it, "the logic behind transparency in stock markets," "does not apply to money markets. The purpose of money markets is to provide liquidity" and "[t]he cheapest way to do so is by using over-collateralised debt that obviates the need for price discovery."[25] In

[23] Gorton uses Bartlett's proposal for improving bank transparency as the target for his defense of bank opacity. *See id.* at 826 (citing Robert Bartlett, *Making Banks Transparent*, 65 VAND. L. REV. 293, 298–99 (2012)).
[24] *After the Crisis*, *supra* note 3, at 79.
[25] Holmstrom, *supra* note 17, at 3.

his assessment, "[o]pacity is a natural feature of money markets and can in some instances enhance liquidity."[26]

Putting these pieces together, we now see a more fundamental tension that is not just about the need to add dimensions or complicate MOME, but one that questions the normative desirability of the type of efficiency that MOME is meant to promote. Implicit in *MOME* and subsequent work by Gilson and Kraakman and a host of other scholars is an assumption that frictions are welfare reducing. In the Gorton and Holmstrom line of reasoning, those same frictions are welfare enhancing. In the Gilson and Kraakman view, the primary role of regulation is to reduce information asymmetries and frictions, allowing price signals to facilitate discipline and discipline to reduce the probability and size of crises. In the Gorton and Holmstrom view, opacity is a feature, not a bug, of a large class of assets—including overcollateralized debt instruments issued into the capital markets and sales and repurchase agreements that are overcollateralized—which the government should be fine having market participants treat as if insensitive to information. Although stylized a bit for effect, this is the tension. Should mechanisms of market inefficiency be encouraged? Discouraged? Contained? What to make of situations where regulators implement mechanisms of market inefficiency, as the SEC long did with its rules enabling all money market mutual funds to use a $1.00 net asset value so long as the value of the underlying assets remained with an allowable band of that price?

c. *The* Question

Stepping back from the conflicting normative assumptions of Gilson and Kraakman, on the one hand, and Holmstron and Gorton, on the other, reveals the importance of engagement between these two schools of thought to answer these and other questions. For reasons Gilson and Kraakman illuminate well, the mechanisms pushing toward market efficiency remain powerful and important whenever there is a chance to profit off of information. MOME, therefore, remains just as important—even if for very different reasons—when efficiency is not the aim. Powerful market forces should not be ignored and often cannot be easily contained. Those comfortable with mechanisms of market

[26] *Id.*

inefficiency, because of the utility of the information-insensitive assets that result, have provided accounts of how information insensitivity can be achieved, but they have yet to show how those mechanisms can remain robust over the credit cycle or when doubts start to rise, as they inevitably sometimes will, about the quality of underlying assets or the creditworthiness of a counterparty. For reasons *MOME* spells out, these are the critical institutional dynamics that must be flushed out.

On the other hand, defenders of information insensitive assets are drawing attention to market demand is real, and ignored at equal peril. As I've explored in other work, regulators misfire when they fail to understand investor preferences for certain types of assets, like safe assets.[27] A frequent result is policies that fail to achieve intended aims. The SEC's reforms to money market mutual funds, for example, were lauded as likely to improve market discipline. Instead, investors fled from the funds that were supposed to be the site of this new discipline, and went into government funds, resulting in an indirect loss of market discipline that had previously existed and an inadvertent expansion of the government safety net.[28] Even more troubling, particularly when not understood, is when the market responds by introducing new mechanisms of inefficiency that change the structure of the market in ways that further increase complexity and exacerbate fragility. Ignoring market demand for safe assets does not make it go away.

Recognizing this demand and the way markets accommodate it, however, does not mean regulators should necessarily stand idly by as mechanisms of market inefficiency proliferate, or that they should provide such mechanisms themselves to accommodate that demand. Information insensitivity and safe assets are terms of art that elide the way all financial assets are sensitive to some information and none are fully safe.[29] The information gaps that grow larger in the presence of mechanisms of market inefficiency can exacerbate market dysfunction and impede effective government intervention when such dysfunction takes hold.[30] Acknowledging the pervasiveness and importance of mechanisms of market inefficiency is a necessary step forward in efforts to understand

[27] Judge & Awrey, infra note 37; Kathryn Judge, Investor-Driven Innovation, 8 Harv. Bus. L. Rev. 219 (2018).
[28] Judge & Awrey, infra note 37.
[29] Gelpern & Gerding, supra note 4.
[30] Judge, Information Gaps, supra note 16.

how markets today function and why they take the structures that they do. It exposes, rather than answers, core policy issues.

As Gilson and Kraakman make clear, institutions matter, always and everywhere, and those institutions cannot change course on a dime. Whether designed to promote or impede efficiency, market outcomes are achieved through a complex set of interactions. Understanding the institutional underpinning through which a particular pricing outcome is achieved is crucial to understanding contingencies required to achieve that outcome and the other, less desirable outcomes that could result should things go wrong. At the same time, as the work by Gorton, Holmstrom and others make clear, one cannot provide the needed institutional account without an accurate understanding of what market participants want and how particular market structures have evolved to satisfy those demands. Disclosure does little if no one has the incentive or desire to process the information provided. And, some of the time, there can be value in allowing market participants to hold and exchange certain types of assets at face value.

It is beyond the scope of this essay to provide any answers to this series of quandaries. In putting the two views next to each other, however, and showing how each reveals limitations in the other, the essay exposes the contours of some of the challenges that lie ahead. There are important areas of agreement. Both views affirm the insights identified here as the true core of MOME—information costs are critically important and institutions matter. Both also reveal a powerful, constitutive relationship between information-related dynamics and the institutions that emerge over time. Where they diverge is with respect to the nature of that relationship and the aims and means of government intervention.

Juxtaposing these two views reveals fundamental questions about the long-term viability and fragility of market-based systems that nest the issuance of "safe assets" or "money" in a market-based system when there are necessarily loss-absorbing, and hence information sensitive, instruments, underneath. It has only been through decades of trial and error that we have begun to devise crude but workable set of tools to achieve this with respect to banks. Although no feature is universally embraced, most recognize some combination of capital requirements, supervision, and deposit insurance for small

denomination, short-term liabilities as useful. One way of understanding these design features is as enabling safe asset creation alongside the issuance of loss-absorbing claims in ways that do not engender excessive systemic risk. Deposit insurance is a mechanism of market inefficiency. It deters coordination-based or information-driven runs by making much short-term funding information insensitive in more states of the world. Supervision provides ongoing monitoring, reducing information gaps, and potentially forcing timely corrections if a bank takes excessive risk. Capital requirements improve the information-related incentives of equity holders by ensuring that they have adequate skin in the game and reduces the probability of default and the associated externalities. Discipline thus gets funneled in a way that is productive and that produces signals supervisors can use and respond to long before a crisis takes hold. The system is far from perfect, and fails often in practice, but the components come together in a way that enables information-insensitive instruments and information sensitive ones to be issued simultaneously and in a way where the latter need not pose a systemic threat.[31]

There is still nothing similar, and nothing under serious consideration, with respect to market-based intermediation.[32] Some academics have proposed structural reforms intended, in their way, to address these issues. The call by Adam Levitin and others for safe banking and Morgan Ricks' proposal to radically limit who can issue short-term debt and have the government insure all such debt are two such proposals.[33] Each of these proposals tries to identify a discrete portion of the market where the proponent sees government support as inevitable. Each proposal then seeks to impose far more onerous restrictions on those sectors, with the assumption that the rest of the market can then generally fend for itself. The challenge for such proposals, apart from the very high transition costs, is that purely ex ante regimes have a poor track record given the inevitable

[31] For more on these dynamics, see Judge, Information Gaps, supra note 16.

[32] Gary Gorton and Andew Metrick proposed a way to regulate shadow banks not long after the crisis. This could serve as a helpful starting point for this conversation, but it far from resolves the myriad issues at stake. *See* Gary Gorton & Andrew Metrick, *Regulating the Shadow Banking System* (Brookings Papers on Econ. Activity, Fall 2010), https://www.brookings.edu/bpea-articles/regulating-the-shadow-banking-system-with-comments-and-discussion/. In a very different spirit, Anna Gelpern and Erik Gerding have provided a good starting point for the work that lies ahead in an article on how law backstops the production of safe assets and that problematizes the very notion of safety as used in these discussions. See Gelpern & Gerding, supra note 4.

[33] Adam Levitin, Safe Banking: Finance and Democracy, 83 U. CHIC. L. REV. 357 (2016); Morgan Ricks, The Money Problem: Rethinking Financial Regulation (2016).

gamesmanship that occurs in modern financial markets. So long as there are negative externalities, in the form of adverse effects on the real economy, it will be nearly impossible and ill-advised for the government to adhere strictly to a no-intervention policy when activity and fragilities migrate outside the designated domains.

I have argued in previous work that these challenges warrant giving the Treasury Department broad, but time-limited, authority to guarantee financial claims anywhere in the financial system.[34] Guarantees are one of the only tools that have the effect of quickly restoring "information-insensitive" status to a class of instruments, and restoring that treatment is often the short-term intervention required to quell the market dysfunction that can adversely affect the real economy. Focusing on information dynamics and how quickly they can change helps to explain the value of having a guarantor of last resort. Nonetheless, this remains a backstop. It is critical so long as innovation is allowed and there are positive returns in normal times to the production of "safe assets," but it is not an answer to the threshold challenge of how and when to allow mechanisms of market inefficiency to take hold and to shape capital markets.

None of this is meant to condemn market-based intermediation or the mechanisms of market inefficiency needed to enable it. Banks are bloated and complex in ways that impede even internal discipline and supervision.[35] Market-based alternatives may well be an important complement, and check, on banks. Market-based intermediation can also serve as that helpful "spare tire," reducing the macroeconomic consequences of weaknesses in the banking system. But real challenges arise once there is no lasting way to bifurcate domains as either safe or risky. In today's capital markets, the safe are built on top of the risky and the risky enable the safe. This means that there are strong incentives to produce information that will inevitably, some of the time, be relevant to the safe assets that are designed to deter just such diligence.

This creates a persistent challenge for reasons that *MOME* makes clear—the mechanisms needed to achieve any semblance of efficiency are multi-layered, interactive,

[34] *See* Kathryn Judge, *Guarantor of Last Resort*, 97 TEX. L. REV. 707 (2019).
[35] *See* Jacopo Carmassi & Richard Herring, *The Corporate Complexity of Global Systemically Important Banks*, 49 J. FIN. SERVS. RESEARCH 175 (2016).

and difficult to create in a short time frame. There is no way for a class of instruments to transition smoothly from being information insensitive to information sensitive. When people start asking questions regarding instruments meant to be "safe," market dysfunction is often not far behind.

The failure to address, head-on, the question of how best to sow mechanisms of market inefficiency in capital markets has had the additional, unintended and adverse, consequence of increasing the government's role in backstopping the financial system. Post-crisis, bank regulators have become wearier of ways that banks can provide implicit (or explicit but inappropriately priced) backstops. Such backstops played a critical role enabling the particular forms of market-based intermediation that spread prior to the crisis by contributing to the willingness of market participants to treat certain assets as "safe." Market participants too have become wearier of the risks that can arise from the questions they don't ask. Both of these developments have produced a system of market-based intermediation that is somewhat tamer today than in 2007, even if questions lurk regarding its long-term resilience.

In the process, however, the government has gone from providing implicit insurance for tail risks to explicit insurance for a much broader swathe of the financial instruments flowing through the system. One manifestation is the way agency MBS, issued by government-sponsored enterprises like Fannie Mae and Freddie Mac, have squeezed out the private MBS that were at the heart of the last crisis.[36] Another manifestation is the growing role of the Federal Home Loan Banks, another government-sponsored enterprise. One of the most significant actual effects of the money market mutual fund reforms has been to increase the size of the FHLBank system and the amount of liquidity risk it has assumed.[37]

Ultimately, insights from both *MOME* and its progeny and Gorton, Holmstrom and others who have explored the demand for safe assets a will be needed to answer the range of questions this essay sets forth. To forge a smoother road ahead, policy makers and

[36] Tobias Adrian, Shadow Banking and Market Based Finance, Sept. 14, 2017, at https://www.imf.org/en/News/Articles/2017/09/13/sp091417-shadow-banking-and-market-based-finance

[37] Daniel Awrey & Kathryn Judge, *Eastern Medicine for Western Finance*, working paper.

scholars must examine the interactions between mechanisms meant to enable efficiency and those meant to impede it, and how those interactions vary over time. This will not be an easy row to hoe, but as *MOME* made clear, the easy path is often not the right one.

Conclusion

It may seem that any article endures if reduced to principles as simple as those to which I have reduced *MOME*. Sure, information is costly and institutions matter. Of course, understanding the specific set of mechanisms at play in a given domain is critical to understanding the information embedded in the prices at which financial assets change hands in that domain. Nonetheless, the rapid ascent of information-insensitivity paradigm bears an eerie resemblance to the rise of the efficient market hypothesis four decades ago. Outside of the banking sector, empirical and formal work has outpaced production of real-world accounts of the contingencies underlying the production of information-insensitive assets and the fragilities that result. As Mark Twain is believed to have said, history does not repeat itself, but it does rhyme. In focusing on mechanisms of market inefficiency, this essay has brought to the fore all of the ways that today is different than 1984, but in call for more attention to the institutional underpinnings, it also recognizes just how much of the core challenge remains the same.

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