Written Testimony of

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"Fintech: Examining Digitization, Data, and Technology"

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Dear Chairman Crapo, Ranking Member Brown, Members of the Committee:

Thank you for inviting me to testify at this hearing. My name is Saule Omarova. I am Professor of Law at Cornell University, where I teach subjects related to U.S. and international banking law and financial sector regulation. Since entering the legal academy in 2007, I have written numerous articles examining various aspects of U.S. financial sector regulation, with a special focus on systemic risk containment and structural aspects of U.S. bank regulation. Prior to becoming a law professor, I practiced law in the Financial Institutions Group of Davis Polk & Wardwell. I also served in the George W. Bush Administration as a Special Advisor on Regulatory Policy to the U.S. Treasury's Under Secretary for Domestic Finance. I am here today solely in my academic capacity and am not testifying on behalf of any entity. I have not received any federal grants or any compensation in connection with my testimony, and the views expressed here are entirely my own.

Fintech – an umbrella term that refers to a variety of digital technologies applied to the provision of financial services – is by far the hottest topic in finance today. Recent advances in computing power, data analytics, cryptography, and machine learning are visibly changing the way financial transactions are conducted and financial products are used. New financial technologies promise to make transacting in financial markets infinitely faster, cheaper, easier to use, and more widely accessible. Reaching across generational and political lines, technology is bringing tech-savvy millennials, utopian anarchists, and computer scientists into the mainstream debate on the future of finance, infusing it with a new sense of excitement about the game-changing potential of the unfolding fintech "revolution." As usual, financial markets translate these expectations into massive and rapidly growing flows of capital into fintech-related ventures.

This is, of course, not the first time in modern history that these market dynamics are being played out.[1] As history keeps teaching us, in such periods of rising investor optimism, it is

especially critical that policymakers and regulators remain cautious, cool-headed and even-handed in their assessment of fintech. On the one hand, there is no doubt that technological progress creates previously unimaginable opportunities for improving the functioning of financial markets and, more broadly, the quality of our financial lives. On the other hand, there is no guarantee that any of these expected benefits will, in fact, materialize – or whether they will generate any real long-term benefits for the nation's economy and society as a whole.

In this context, it is especially commendable that the Committee is taking a closer look at the current state of fintech and the current Administration's strategic priorities in this area laid out in the U.S. Treasury Department's recent report to President Trump, *A Financial System that Creates Economic Opportunities: Nonbank Financials, Fintech, and Innovation* (hereinafter, the "Treasury Report" or "Report").[2]

At this early stage in the development and adoption of many fintech applications, it is difficult to come up with an exhaustive list of specific policy concerns associated with each specific technology use. It is also difficult to identify the full spectrum of changes in the existing legal and regulatory regimes needed to accommodate specific uses of new technologies in financial transactions. It is both possible and necessary, however, to start taking a broader *systemic* view of fintech and identifying key public policy issues arising in connection with the continuing growth of fintech.

A comprehensive analysis of the *macro-level, systemic* implications of fintech is provided in my new working paper, *New Tech v. New Deal: Fintech as a Systemic Phenomenon,* attached separately as an **Appendix** hereto. In this testimony, I will take a broader look at a few overarching themes that arise directly out of the Treasury Report and, in my view, deserve the Committee's special attention.

The key point here is that the Treasury Report understates or even ignores a number of critically important public policy issues and concerns raised by the unfolding digital "revolution" in finance. My testimony identifies a few such high-level public policy concerns that both (1) merit full consideration by the Committee, and (2) are not adequately discussed or acknowledged in the Treasury Report. It is not intended as a detailed critique of the Treasury's conclusions and recommendations, nor does it claim to analyze the full risks and benefits of any particular fintech application discussed in the Report. The purpose of my testimony is to widen the lens beyond the seemingly value-neutral and narrowly technocratic "solutions" – and to introduce the necessary note of caution with respect to potentially crucial *systemic* implications of the Treasury's approach to fintech innovation.

I. THE TREASURY REPORT: THE FINTECH STRATEGY OUTLINED

The Treasury Report addresses a wide range of important trends in today's fintech sector and discusses a long list of legal and regulatory challenges such trends present. The Treasury's numerous conclusions and recommendations span across multiple issues and vary greatly in the

level of specificity. The Report's primary public policy significance, however, is that it outlines the current Administration's strategic approach to fintech – and, more generally, financial sector – regulation. Thus, understanding the Report's programmatic content is the key first step in the process of examining fintech as a public policy challenge.

A. Underlying Narrative: Fintech as a Technical Phenomenon

From the outset, the Treasury clearly states its view of data digitization and the corresponding growth in the use of digital technologies in financial and commercial transactions as the fundamental drivers of innovation and economic growth in the modern economy.[3] The Report asserts that recent advances in core computing and data storage capacity dramatically reduced the cost of transmitting, keeping, and managing financial information – thus greatly increasing operational efficiencies and reducing the overall cost of delivering financial services.[4] It claims further that digitization allows financial institutions to satisfy consumers' and companies' demand for increased convenience and speed of transacting and to scale up their services to reach a greater number of customers.[5]

On the basis of this optimistic narrative, the Treasury concludes that "[t]he availability of capital, the large scale of the financial services market, and continued advancements in technology make accelerating innovation nearly inevitable."[6] Accordingly, the Report defines the Administration's overarching strategic policy priority in terms of actively facilitating the "inevitable" march of fintech innovation.

To the extent this approach conveys a basic recognition of the need to accept and facilitate socially beneficial technological change, the Report's contribution is both timely and important. Technological progress and financial innovation, however, are not "natural" and value-neutral "win-win" phenomena: they have significant long-term distributional and systemic stability-related – and thus political – consequences. Technology is a tool that can be used in socially harmful ways that advance the interests of the few rather than those of the many.

This basic fact makes it especially important to keep in mind that the Treasury's conclusions and recommendations directly reflect, and are shaped by, certain fundamentally *normative* preferences and assumptions. These underlying normative choices are often hidden behind the technical idiom and deliberately technocratic discussions filling the Report's 223 pages. An unbiased evaluation of the Treasury's proposed fintech strategy, therefore, requires a clear understanding of what that strategy actually calls for – and whose economic and political interests it prioritizes.

B. Normative Baseline: Regulatory Accommodation of Private Sector Innovation

Two principal themes run through the long list of Treasury's recommendations: (1) an explicit and strong commitment to promoting *private sector-led* financial innovation; and (2) an implicit but equally strong commitment to minimizing regulatory interference with private firms' efforts to scale up fintech operations. These fundamentally normative choices form the basis of the Treasury's overall fintech strategy.

The Treasury Report envisions financial innovation as both (1) presumptively socially beneficial; and (2) a fundamentally and inherently *private sector-led i*nitiative. The Report consistently emphasizes private firms' leading role in digitization of financial data and services. Even where the Report advocates establishing "public-private partnerships" (PPP), its envisioned PPP model clearly places control over the nature and pace of technological change in private firms' hands. Throughout the Report, the principal role of the federal and state lawmakers and regulators is effectively confined to providing the necessary logistical and infrastructural support for private firms' fintech activities, while otherwise "staying out" of their way.

Accordingly, the Treasury's strategic emphasis is on "modernizing" the existing legal and regulatory regimes in order to *accommodate*, rather than control, the process of privately-led financial innovation. In that sense, the Treasury's normative stance is fundamentally deregulatory.

C. Rhetorical Focus: "All About Consumers"

As a rhetorical matter, the Report justifies this inherently reactive and accommodating regulatory posture by stressing that new fintech products are (1) created in response to consumer demand for better financial services, and (2) offer important benefits to consumers.[7]

These consumer benefits include greater speed and convenience of transacting; easier access to financial markets and services; and greater freedom of consumer choice with respect to financial products and service providers.[8] By offering these benefits, the Treasury's argument goes, fintech serves equally the interests of all segments of America's population, from digitally savvy millennials to the under-served poor, from pragmatic bargain-hunters to ideological libertarians. Put simply, the Treasury's argument is that all of us, ordinary consumers of retail financial services, are the principal beneficiaries of the proposed regulatory unshackling and unfettered fintech innovation.

This is, of course, a well-known mode of arguing consistently employed by the proponents of deregulation in the financial sector. The financial industry and its representatives have a long historical record of justifying their demands for regulatory easing by reference to consumer benefits. As discussed below, in the years before the 2008 crisis, the same rhetoric was widely used to avoid legislative or regulatory "interference" with predatory subprime lending practices that were at the core of the unsustainable speculative asset boom and the resulting economic devastation. It is therefore important to contextualize the Treasury's claims.

D. Practical Focus: Relaxing Bank Regulation to Enable Certain Structural Changes

To operationalize its programmatic goals – promoting private sector-led financial innovation and minimizing regulatory "interference" with that process – the Treasury adopts what may be viewed as a structural approach. Many of the Treasury's various recommendations target, directly or indirectly, the organizational and operational "walls" that currently prevent or slow down fintech companies' full-scale entry into the banking sector.

Thus, the Treasury Report strongly calls for financial regulators to "modernize" – or, more precisely, to relax or remove – some of the key rules and regulations governing banking institutions' relationships with unaffiliated technology companies. The unstated goal of the Treasury's "modernization" strategy is to enable regulated banks to form large-scale *de facto* partnerships with technology companies, without subjecting the latter to bank-like oversight.

Three examples of this deregulatory approach are particularly noteworthy. Thus, the Treasury Report lists a variety of specific recommendations that seek to:

1) enable banking institutions to enter into open-ended, large-scale data-sharing and information-management partnerships with technology companies;
2) enable mutual equity investments and direct affiliations between banks and non-bank technology companies; and
3) facilitate "rent-a-charter" arrangements allowing online marketplace lenders to take advantage of national banks' exemptions from state usury laws.

These recommendations raise a number of potentially significant public policy concerns that do not receive attention in the Report. In broad terms, these policy concerns arise in three interconnected but conceptually separate areas:

1) consumer financial data privacy and safety;
2) market structure and potential concentration of economic power; and
3) systemic financial stability and economic growth

Below, I will examine each of these high-level public policy issues – or systemic concerns – in the context of the three groups of Treasury recommendations outlined above.

II. SYSTEMIC CONCERN NO. 1: CONSUMER PROTECTION

The Treasury Report advocates for a significant relaxation, if not elimination, of the existing rules governing banking institutions' relationships with third-party vendors, in order to make it easier for regulated banks to form large-scale data-sharing and data-management partnerships with data aggregators and cloud service providers.[9]

Data aggregators – or data *miners* – are technology companies that collect and "share" (i.e., sell to interested businesses) vast amounts of online business and personal user data. So far, banking institutions have been reluctant to share their customers' financial information – including personal bank account types and balances, history of late fees and charges, detailed transaction records, and so forth – with unaffiliated data aggregators. Bound by their legal and regulatory obligations to safeguard customer information handled by third-party vendors, banks typically insist on controlling their bilateral relationships with individual data aggregators and often impose unilateral restrictions on their access to banks' customer data.

The Treasury Report views this situation as an example of undesirable regulatory obstacles to financial innovation and, accordingly, calls for a concerted regulatory effort to allow data

aggregators a greater direct access to banking customers' financial data. The Report maintains that it is critical to ease legal and regulatory requirements that currently "hold back" financial institutions from entering in unrestricted data-sharing agreements with data aggregators. In particular, the Report calls for a universal adoption of Application Programming Interfaces (APIs) that would give data aggregators direct access to customer account and transaction data in possession of either any particular bank or all participating financial institutions.[10] Relieving banks from legal liability for third-party service providers' handling of customer data is key to this industry-wide shift to APIs that is, in turn, critical to scaling up the flow of financial information from banks to data aggregators.[11]

The Treasury Report adopts the same approach to promoting large-scale partnering between banks and cloud computing service providers, The Treasury recommends that federal financial regulators "modernize their requirements and guidance (e.g., vendor oversight)" to reduce regulatory barriers to large-scale migration of banks' data and information management activities to the cloud managed by third parties.[12] As the Report emphasizes, facilitating a massive shift to cloud computing would "increase the speed of innovation" in the financial sector.[13] Enabling banks and other regulated financial institutions to outsource their integrated data management and information technology functions to large cloud service providers, without exposing themselves to potentially extensive liability, is critical to this industry-wide shift.[14]

To justify shielding banks from liability – among other things, by relaxing existing bank service provider regulations – the Treasury points to banks' efficiency gains and their customers' greater convenience and freedom of choice. The basic claim is that allowing unaffiliated tech companies to access, host, and manage bank data will (1) render financial services faster and cheaper for all consumers; and (2) give consumers unfettered control over their own financial data and their own financial affairs.

There is no doubt that wholesale outsourcing of banks' customer and enterprise data storage and management to specialized technology companies would greatly reduce banks' operating costs and regulatory compliance headaches – and even enhance banks' revenues by enabling them to charge data aggregators for direct feeds of their customers' account data. It would also potentially enable individuals to access their bank accounts and other financial records via the same device they use for downloading music and rating restaurants. As the Report emphasizes, data-sharing through APIs would create a seamlessly integrated virtual data management space for individuals seeking this kind of click-through convenience.

However, the Treasury Report ignores potentially significant public harms of allowing an industry-wide wholesale migration of core bank activities and highly sensitive financial data to the cloud and/or data aggregation platforms run by third parties. What is breezily portrayed as "financial data freedom" for consumers, in practice, may lead to potentially irreversible erosion of consumer rights and meaningful freedom of choice in the financial marketplace.

While it is difficult to present a comprehensive list of potential harms to consumers likely to result from the proposed data-sharing expansion, two basic issues deserve the Committee's consideration.

A. Privacy and Safety of Bank Customers' Financial Data

One reason for concern is that, despite the attractive rhetoric of "financial data freedom," an easy and direct access to banking institutions' data creates both the opportunity and the incentive for tech platform companies to engage in *unauthorized commercial* uses of bank customers' personal data.

Giving consumers "unfettered" access to their personal financial data, in the way advocated in the Treasury Report, would simultaneously give technology platform operators an equally unfettered access to the same data. These platform operators, however, are not regulated or supervised in the interest of consumer financial privacy as banks currently are.[15] Unlike banks, these companies are not required to maintain any particular levels of liquid assets or equity capital to ensure their safety and soundness. They don't have any explicit legal obligations to make customers whole in case of unauthorized withdrawals of money from customers' accounts. They don't have a corps of dedicated federal and state agency staff – such as bank examiners – monitoring closely their daily operations for compliance with the applicable consumer protection and business conduct standards. In other words, these companies are regular private entities seeking to maximize their own private profits in a free capitalist market, governed by the basic principle of "caveat emptor" ("buyer, beware"). In this sense, they are not fundamentally different from used car salesmen.

Unlike used car salesmen, however, these tech platform companies will now be able to get direct access to your bank account and transaction data – and thus invisibly monitor your earnings and your expenses, your daily Starbucks coffee purchases and your annual political campaign contributions. That will give these professional information merchants an extraordinary advantage over you, the consumer. They will be able to "harvest" a valuable asset – your personal financial information – without paying *you* for it. They can then use it to make you buy the products *they* want to sell you. They can also sell your financial information to other salesmen who can, in turn, use it to make you buy what *they* want to sell you. And all of this "free commerce" can happen without your knowledge or informed consent. In fact, the only action required on the part of an individual to become a captive participant in this spiral of "free commerce" may be as simple as opening a deposit account at a local bank – and perhaps signing a boilerplate "consent" form.[16]

If this is a plausible hypothetical, the Treasury's proposed method of "embracing digitization" by relaxing existing regulatory constraints on banks' data-sharing has to be subjected to the strictest scrutiny. Instead of giving consumers meaningful "financial data freedom," it would give a massive gift of "free financial data" to data aggregators, cloud providers, various fintech companies, and other businesses set up to capitalize on it. This is a deeply troubling prospect. As

a recent study found, "the fintech ecosystem is predicated on little to no privacy protections for consumer data housed outside regulated financial institutions."[17] But it is also intuitively easy to understand the obvious dangers of allowing large tech platform companies such an easy access to bank customers' personal financial data. A strong public reaction to the recent news of Facebook – one of the world's largest and most notorious data aggregators – requesting access to large banks' customer data shows that consumers care deeply about keeping their financial information private, safe, and secure from all manner of unauthorized use.[18]

The Treasury Report does not address the heightened risk of *unauthorized commercial uses* of consumer data by tech platforms allowed to access it. Instead, it confines the discussion to issues of data security, or *unauthorized access* to data.

While acknowledging the importance of data protection in general terms, the Report generally seems content leaving the necessary adjustments to the private sector. Thus, it refers to the fact that the Federal Trade Commission (FTC) imposes certain information security requirements on data aggregators that are "significantly engaged in financial services," and are therefore subject to its so-called Safeguards Rule.[19] In the Treasury's view, that rule "appropriately addresses" all concerns about the security of customers' financial information managed by data aggregators and other fintech firms.[20] Accordingly, the conclusion is that no further legislative or regulatory action is needed in order to bolster consumer data protection. It is not clear, however, to what extent the FTC's Safeguards Rule is sufficiently effective in practice. The Rule may not even apply to giant platform conglomerates whose financial activities do not technically constitute a "significant" portion of their overall operations.[21] Moreover, a recent massive data security breach at Equifax, which affected over 143 million people, is a vivid example of what can happen even on the FTC's watch.[22]

Of course, any meaningful discussion of data security has to address the critical issue of apportioning liability for security breaches. While the Treasury acknowledges the importance of this issue, it does not provide a clear answer to the fundamental question: Who will be liable to the consumer whose bank account is hacked? It seems clear that, as a practical matter, the only way banks would be willing to share their customer data with tech platforms is if they are not held liable for the platform operators' failures to protect the data. But, if banks are not liable, then who is going to make the account holder whole? Unless this question has a clear – and satisfactory – answer, the notion of "facilitating innovation" through unrestricted data-sharing is inimical to the objective of protecting consumers' interests.

B. Predatory and Discriminatory Pricing of Financial Services

The Report's rhetoric of consumer choice and financial data freedom implies the existence of a perfectly competitive and transparent market in which individual consumers have the power to choose the best fintech service provider. Reality, however, is far more complicated and a lot less benign.

In particular, the market for cloud computing and data analytics is both highly concentrated and inherently opaque. Only four mega-tech companies currently dominate the worldwide market for cloud services: Amazon, Microsoft, Alibaba, and Google.[23] These four "hyperscale" service providers hold approximately 73% of the global cloud infrastructure services.[24] Apple, Amazon, Google, Microsoft, and Facebook – five of the largest publicly-traded U.S. companies by market capitalizations – are the pioneers of mega-scale data aggregation and "integral drivers of the digital economy" as a whole.[25] Even though the Treasury Report refers to data aggregators and cloud service providers in generic terms, it is these mega-companies that define the dynamics in the tech sector.

It is no coincidence that today's giant technology conglomerates are aggressively growing, diversifying, and continuously expanding their market shares. As recent studies show, this constant quest for size and market power is the built-in economic imperative in this business so intimately dependent on network effects.[26] These companies' critical reliance on complex proprietary analytical tools renders their business models, and the markets in which they operate, fundamentally non-transparent. Put simply, nobody really knows what exactly these companies can see or what they can do with the data they touch.

In this context, the Treasury's proposed strategy of enabling mega-tech companies to "get inside" banks' customer data raises a number of significant consumer protection concerns. If that happens, the dominant players in the financial data and services market will be perfectly positioned to abuse their enormous market power, among other things, by engaging in predatory or unfair pricing of financial products and consumer discrimination.

The basic blueprint for such abuses is already there. For example, Amazon's unprecedented market power in online commerce and command of digitized consumer data enable it to adjust its prices almost instantaneously, in response to fluctuations in current demand for specific goods.[27] For example, if more people are buying a particular brand of baby food in the morning, Amazon can raise its price by noon.[28] This type of "dynamic pricing" is difficult for any outsider to detect, as only Amazon has control of its algorithms and data. This algorithmic opacity makes consumers extremely vulnerable to predatory or unfair pricing, and not only by Amazon but also by other companies widely emulating its practices.[29]

In the context of financial services, this technical capacity for non-transparent "dynamic pricing" can easily translate into the highly questionable practice of "micro-targeting" consumers. Amazon, Google, and other fintech companies will be able to use the vast amounts of data gained from monitoring consumers' behavioral patterns and commercial transactions – and now the detailed real-time bank account data – to "up-price" financial products and services offered to individual consumers.[30] In essence, they will be able to charge individual borrowers not the fair market price but the *maximum price* each of them is able to pay.

This micro-targeting may be presented to the public under the benign guise of "product customization." In practice, however, it will effectively destroy consumers' ability to make informed decisions and to gauge whether they are being over-charged, under-served, or even

entirely excluded from certain product markets. The opacity of the pricing process, the service provider's control of the customer's data, and the practical difficulty of switching providers will fundamentally skew the balance of power in favor of the service provider.[31]

Importantly, the same factors will also make it difficult, if not impossible, for any regulatory agencies to detect and punish abusive behavior in financial markets. The growing deficit of regulatory capacity is likely to leave consumers to fend for themselves – precisely at a time when they acutely need government protection. This is particularly poignant, given the current efforts to weaken the Bureau of Consumer Financial Protection and to limit its enforcement capabilities.[32]

In sum, simply relaxing existing bank regulations in order to allow wholesale migration of the highly sensitive and valuable financial information currently controlled by banks to data aggregators, cloud providers, and other fintech companies would expose consumers to potentially massive data privacy and safety risks. Rather than gaining meaningful control over their personal financial data, American consumers will be an easy target for unscrupulous salesmen of the digital era. A prudent public policy approach to safe and secure financial data-sharing in the digital age requires a deeper and more balanced analysis of these risks, as well as the means of preempting them.

III. SYSTEMIC CONCERN NO. 2: STRUCTURAL SHIFTS IN THE ECONOMY

Under the headings of "aligning" and "modernizing" the regulatory framework, the Treasury Report makes a number of specific recommendations intended to remove or relax the existing restrictions on permissible business activities and organizational affiliations of banking organizations. While framed as a narrowly technical issue, this effort goes directly to the long-standing U.S. policy of separation of banking from commerce. It also raises a broader spectrum of concerns related to potentially far-reaching structural shifts in the U.S. economy.

The principle of separation of banking and commerce is one of the core principles underlying and shaping the elaborate regulatory regime applicable to all U.S. banking organizations.[33] Under the National Bank Act of 1863, U.S. commercial banks generally are not permitted to conduct any activities that fall outside the statutory concept of "the business of banking."[34] Moreover, under the Bank Holding Company Act of 1956 (the BHC Act), bank holding companies (BHCs) – companies that own or "control" U.S. banks – are generally restricted in their ability to engage in any business activities other than banking, managing banks, or certain activities "closely related" to banking.[35]

Since the 1980s, the scope of banks' and BHCs' permissible activities has been steadily and gradually expanding.[36] The Office of the Comptroller of the Currency (OCC) has been especially aggressive in its interpretations of the statutory term "business of banking" to allow banks to engage, among other things, in data storage and certain software-related activities.[37] In 1999, Congress passed the Gramm-Leach-Bliley Act (the GLB Act), which partially repealed the

Glass-Steagall Act and authorized certain qualifying BHCs to become "financial holding companies" (FHCs) and to conduct a wide range of financial and even some commercial activities.[38]

These developments notwithstanding, however, U.S. banks' and BHCs' activities, investments, and organizational affiliations remain subject to significant limitations. Citing with approval the OCC's aggressively expansive approach, the Treasury Report recommends that all banking regulators interpret banking organizations' scope of activities "in a harmonized manner *as permitted by law wherever possible* and in a manner that recognizes the positive impact that changes in technology and data can have in the delivery of financial services."[39]

The Treasury also recommends that the Federal Reserve "consider how to reassess" the definition of "control" in the BHC Act, in order to make it easier for banking institutions and fintech companies invest in each other's equity.[40] The BHC Act defines "control" in deliberately broad terms: in addition to specifying a quantitative threshold (direct or indirect ownership of 25% or more of any class of voting securities), it grants the Federal Reserve discretion to make the requisite findings of "controlling influence" in a wide range of circumstances.[41] The Treasury Report criticizes the Federal Reserve's accumulated interpretations of "control" as "not sufficiently transparent" and thus discouraging – instead of facilitating – the formation of extensive business partnerships and close organizational relationships between BHCs and fintech companies. The practical worry here is that unregulated technology companies may be deemed either to "control" a U.S. bank or to be "controlled" by a BHC – and thus subject to the BHC Act's activity restrictions and supervisory oversight.[42]

Although the Treasury does not explicitly direct the Federal Reserve to adopt any specific definition of "control," the main thrust of its recommendation is clear: a properly "modernized" definition should be significantly narrowed and uniformly applied. In contrast to the Treasury's usual calls for "tailored" fintech regulation, the Federal Reserve's tailoring of "control" determinations to the circumstances of each individual case is deemed undesirable as hindering bank partnerships with and acquisitions of (and by) non-bank technology companies.

A. Separation of Banking and Commerce

Adopting a systematic policy of aggressively pushing the legal and statutory boundaries of bank-permissible business activities and affiliations, as advocated by the Treasury, will significantly undercut – if not completely incapacitate – the operation of the foundational U.S. principle of separation of banking and commerce. In this sense, it will weaken the overall integrity and efficacy of the U.S. bank regulation and supervision.

It is important to remember why the entire system of U.S. bank and BHC regulation is designed to keep institutions engaged in deposit-taking and commercial lending activities from conducting, directly or through some business combination, any significant non-financial activities, or from holding significant interests in any general commercial enterprise. There are three main public policy reasons for maintaining this legal wall between the "business of

banking" and purely commercial businesses: (1) preserving the safety and soundness of federally insured depository institutions; (2) eliminating potential conflicts of interest and ensuring a fair and efficient flow of credit to productive economic enterprise; and (3) preventing excessive concentration of financial and economic power in the financial sector.[43]

Of course, each of these traditional concerns may be more or less pronounced in the context of a particular commercial activity. It is also clear that banks' involvement in certain non-financial activities may – and often does – produce financial benefits to their clients and, indirectly, to society as a whole. Yet, after decades of unquestioning acceptance of private firms' self-interested depiction of such benefits, it is critical that policymakers fully address and appreciate potential *social costs* of mixing banking and commerce – especially, digital commerce.

The key point here is simple: allowing banks and BHCs to form wide-ranging business partnerships with technology firms – either through global contractual arrangements or through outright combinations – would critically undermine all of the public policy goals at the heart of the U.S. bank regulation.

For example, it would expose banking institutions to a wide variety of non-typical and potentially excessive economic, operational, and legal risks associated with tech companies' rapidly evolving commercial activities. Banks are "special" business actors in that they perform critical public functions, enjoy direct public support, and are inherently vulnerable to runs that can trigger systemic financial crises. For these reasons, banks' safety and soundness remains the cornerstone of bank regulation and supervision.[44] Expanding banking entities' economic activities to encompass global e-commerce, "big data" management, and AI development will diversify and magnify not only their potential revenues but also their potential losses and vulnerabilities. It will also render banking organizations' internal governance and regulatory oversight far more challenging, if not outright impossible, propositions.

Furthermore, it would give rise to new patterns of conflicts of interest, potentially systematic misallocation of credit, and other cross-sectoral abuses of market power. Some of these abuses of market power are discussed above, in the context of consumer protection. However, this type of bank-tech conglomeration would also pose an immediate and tangible threat to all other businesses, especially those competing with banks' technology affiliates or partners. These types of structurally determined distortion in the economy-wide credit flows would critically impede economic growth and cause a host of socio-economic and political problems.

B. Market Structure, Antitrust, and "Too Big To Fail" Concerns

Perhaps the most far-reaching potential consequence of opening the door for direct cross-sectoral acquisitions and affiliations between banking institutions and tech firms is the dangerous increase in the overall concentration of the economic and political power likely to result from it.

The U.S. financial services industry is already heavily concentrated. The passage of the GLB Act, which officially removed the long-standing prohibition on affiliations between commercial and investment banks, has elevated the pace of industry consolidation to a qualitatively new

level.[45] The level of industry concentration increased further in the wake of the global financial crisis of 2008, so that the top five banks in the U.S. now control approximately half of all assets in the sector.[46] Large BHCs control over 80% of all banking assets.[47]

The same trend is strongly evident in the tech sector. Despite the great number and diversity of what we call "technology" companies, a few giants at the core of the tech industry undoubtedly dominate it. Thus, only two companies, Apple and Google, currently provide the software for 99% of all smartphones, the indispensable devices for mobile payments.[48] Facebook and Google capture between 59 and 73 cents of every dollar spent on online advertising in the U.S.[49] Amazon takes 49 cents of every e-commerce dollar in the U.S.[50] This dominance is clearly reflected in the stock markets. Earlier this year, both Apple and Amazon exceeded $1 trillion in market capitalization. And the largest tech companies – including Apple, Amazon, Facebook, and Google – lead the longest stock market rally in decades.[51]

It is against this background that the Treasury Report's seemingly low-key, technocratic recommendation to "correct" or "clarify" a specific regulatory interpretation of the statutory definition of "control" in the BHC Act should be evaluated.

The existing body of the Federal Reserve's interpretations of what constitutes "control" for purposes of the BHC Act is fundamentally fact-driven and thus inevitably complex. While that may complicate private firms' efforts to structure their investments so as to avoid being subject to the BHC Act, it preserves the necessary flexibility enabling the Federal Reserve to safeguard the principles underlying the Act. This is especially critical in light of the fact that the BHC Act was originally designed to operate as an anti-trust, anti-monopoly law.[52]

By contrast, what the Treasury calls "a simpler and more transparent standard to facilitate innovation-related investments" would effectively enable large U.S. financial holding companies to take significant equity stakes in various fintech ventures, alongside large tech companies. It would also enable the tech giants to acquire significant equity stakes in U.S. banks and BHCs of varying sizes, without becoming subject to BHC regulation. The Treasury Report carefully frames its recommendations to create an impression that such a regulatory pullback would make financial markets more efficient and competitive by enabling a myriad of small investments by a myriad of banks in a myriad of competing tech companies – and vice versa. What remains unsaid, however, is that the dominant players in both markets – including JPMorgan Chase, Citigroup, Bank of America, Goldman Sachs, Morgan Stanley, Wells Fargo, Facebook, Amazon, Google, Apple, Microsoft, and IBM – will also be able to take advantage of such explicitly permissive regulatory standards. Given the importance of scale and network effects for both tech platforms and financial institutions, they will be remiss not to.

Thus, in practice, "simplifying" the Federal Reserve's interpretation of the BHC Act's "control" requirements for purposes of "facilitating fintech innovation" is likely to trigger a wave of unprecedented cross-sectoral consolidation. Because of the 25% threshold built into the BHC Act's definition of "control," this new-generation consolidation wave will likely take new transactional forms, potentially resulting in a Byzantine system of corporate ownership and *de*

facto management interlocks. In this web of formal and informal corporate control linkages, detecting and punishing collusive behavior and other abuses of market power will be even more difficult than it is today.

One additional point bears emphasis here. In both sectors, companies' size and market share are key to profitability and success. In the financial sector, the quest for scale and scope is also driven by the presence of the bank public subsidy. The well-known phenomenon of "too big to fail" – a *de facto* suspension of market discipline with respect to systemically important entities – presents one of the greatest public policy challenges in the financial sector.[53] Drastically curtailing the regime of separation of banking from commerce would facilitate a potentially massive transfer of banks' public subsidy to the tech sector. In that sense, it is virtually guaranteed to take the "too big to fail" problem to an entirely different – perhaps even unimaginable – level. In the next crisis, the sheer scale of the government bailouts required to keep the hyper-sized fin-tech conglomerates from failing might make the taxpayer cost of saving Wall Street in the last one look like small change.

Of course, money is not the only thing that matters to the American public in this scenario. The increasing concentration of economic power in a small club of corporate giants is a direct threat to American democracy.[54] It perpetuates and exacerbates deep socio-economic inequality, which inevitably undermines political order premised on ideals of equal participation and voice. Big corporations' ability to "buy" political influence fundamentally corrupts political process and corrodes public confidence in the democratic system as a whole.[55] This is an unacceptably high societal price for the personal convenience of accessing one's bank accounts and digital wallets via a single iPhone click.

In sum, it is critical to keep in mind that, without proactive and appropriately applied public oversight, data digitization, cloud computing, and other seemingly value-neutral and science-driven fintech innovations may operate as hidden channels for the formation of economy-wide fin-tech platform conglomerates.

IV. SYSTEMIC CONCERN NO. 3: FINANCIAL STABILITY AND ECONOMIC GROWTH

The Treasury Report uses a direct reference to the "bank partnership model" in its discussion of marketplace lending. Among other things, the Treasury makes a very specific recommendation for federal legislation overruling the Second Circuit's decision in *Madden v. Midland Landing LLC*, which held that the National Bank Act did not preempt state usury rules with respect to the interest charged by a third-party non-bank purchaser of loans from a national bank.[56]

The *Madden* decision directly affects marketplace lenders operating under the so-called "rent-a-charter" model, in which the online lender markets the loans and runs its proprietary algorithms but the actual loan is initially extended and funded by a chartered bank. The bank typically holds the loan for a few days and then sells it back to the online lender.[57] In effect, the online lender *buys* the originating bank's ability to "export" its home-state's favorable (or non-existent) usury

rate nationwide. In this sense, the bank is "renting out" its bank charter – or, more accurately, *selling* a special legal privilege the government grants exclusively to chartered banks – to an entity that does not qualify for a bank charter and is not entitled to any privileges that come with it.[58]

The "rent-a-charter" model is not a recent invention; it was widely used by predatory payday lenders and subprime mortgage companies in the run-up to 2008.[59] At the time, federal bank regulators did not interfere with this unseemly charter-arbitrage practice in the name of promoting "financial innovation," "freedom of consumer choice," and "access to credit" for high-risk/low-income borrowers. The OCC's aggressive federal pre-emption strategy, the Federal Reserve's laxity, and the absence of a dedicated federal financial consumer protection agency contributed to the rampant growth of subprime debt that ultimately triggered a major financial crisis.[60]

In this context, the Treasury's insistence that Congress legislatively overrule *Madden* brings into bold relief the broader concerns about systemic financial stability and the threat of recurring financial crises. All too often, the familiar rhetoric of "facilitating consumer access to cheap credit" obscures the underlying system-wide dynamics that drive the emergence and growth of specific "innovations." The Treasury Report's normatively inflected rhetoric also diverts attention from the significant potential impact of proposed deregulatory measures on the financial markets as a whole. To avoid repeating the costly mistakes of the pre-2008 period, therefore, policymakers must look behind the Report's technocratic gloss and examine fintech developments from a *systemic*, *public interest-driven* perspective.

A. Financial Asset Speculation in the Digitized Marketplace

Contrary to the Treasury Report's baseline narrative, fintech is not simply a matter of applying computer and information science to financial transactions and finding "win-win" technical solutions to various market "frictions." It is trivially true that new technological tools are designed to make financial transactions faster, cheaper, and easier to use and adjust to transacting parties' individual needs and preferences. But that is only part of the story. The rise of fintech is an integral part, and a logical stage in the development, of the broader *financial system*. Therefore, fintech's overall normative significance cannot be simply postulated on the basis of its intended micro-transactional efficiencies. It has to be assessed in the context of the financial system's stability and ability to perform its core social function: effectively and reliably channeling capital flows to their most productive uses in the real, i.e. non-financial, economy.[61]

From this systemic perspective, the rapid digitization of data and financial services presents a far more complex public policy challenge than the Treasury Report is willing to acknowledge. Fintech innovations are driven not only – and perhaps not even mainly – by the financial institutions' and tech companies' desire to improve *retail* financial services. Despite the consumer-centric rhetoric surrounding fintech, digital technologies are likely to have their greatest systemic impact in the highly volatile and speculative *secondary financial markets* dominated by professional traders, dealers, and institutional investors. Fixing the focus of policy

discussions on the expected benefits of fintech to retail consumers, however, diverts attention from potentially crucial developments in wholesale financial markets. It accordingly creates a dangerous blind spot for policymakers and regulators.

The pre-2008 subprime mortgage and securitization boom provides a vivid illustration of just how dangerous it can be. It is well-known that the rapid growth of risky subprime mortgage lending in the early 2000s – a predominantly retail market phenomenon – was fundamentally driven by the insatiable demand on the part of yield-hungry institutional investors for tradable asset-backed securities. Subprime mortgage loans served as the perfect raw material for the creation of high-yielding yet highly (and wrongly) rated mortgage-backed securities (MBS), collateralized debt obligations (CDOs), and other complex structured products.[62] As speculative demand for these products grew, mortgage lenders used increasingly deceptive and discriminatory tactics to generate greater volumes of such raw material, among other things, by targeting the most vulnerable borrower populations.[63]

Ironically, in the public arena, these predatory subprime loans were often touted as a great benefit for low-income borrowers. This is how a senior executive of now infamous Countrywide Financial described his company's subprime lending activities to Congress in early 2004, a year in which some of the worst subprime mortgages were originated:

> "[…] Countrywide entered the nonprime lending market in 1996 as part of our effort to make homeownership possible for the largest number of American families and individuals. We believed then, as we believe now, that nonprime lending is a natural extension of our commitment to bring Americans who have traditionally been outside mainstream mortgage markets into their first homes. Our nonprime lending programs also have helped these families and individuals build equity and use this equity to send their children to colleges, start their own businesses, and gain control over their financial destiny."[64]
>
> "Nonprime products give borrowers more choices and make credit more readily available, because we and other lenders can price according to the level of risk."[65]

Millions of Americans who either lost their homes in the crisis or are forced to carry the heavy burden of under-water mortgage debt would strongly disagree.[66]

In reality, of course, Countrywide flooded the market with risky loans not because it cared for its poor borrowers' economic rights, but because it was reaping huge profits in the wholesale securitization markets. Its executive's remarkably self-serving statements illustrate how the financial industry used – indeed *abused* – consumers not only as the unwitting captive source of fuel for its high-stakes speculation game, but also as the "sympathetic beneficiary" legitimizing and shielding that game from public scrutiny.

Today, similar consumer-centric rhetoric is being deployed to justify various deregulatory moves, among other things, in the context of fintech innovation. It is, of course, too early to draw definitive conclusions as to what exactly this rhetoric may be obscuring from policymakers' and the broader public's view. The recent history tells us, however, that whenever a powerful private industry demands deregulation in the name of consumers' "freedom of

choice" or "access to credit," something a lot bigger and much less altruistic is driving these demands. It is, therefore, both timely and necessary to start identifying some of the ways in which fintech is likely to impact the "big-picture" issues related to systemic financial stability.

The basic point here is simple: In the current environment of global investment capital glut, the rapid digitization of financial data and transactions is bound to amplify the underlying structural incentives for excessive speculation in secondary markets for financial instruments. By making financial transactions infinitely faster, cheaper, and easier to use and to customize, fintech innovations potentially empower wholesale market participants to engage *in financial asset speculation* on an unprecedented level. Armed with new digital tools, financial and fintech firms will be able to synthesize potentially endless chains of virtual assets, tradable in potentially infinitely scalable virtual markets. This fintech-driven qualitative growth in the volume and velocity of speculative trading, in turn, potentially amplifies the financial system's vulnerability to sudden shocks and cascading loss effects. In short, a fully digitized and frictionless financial marketplace is bound to grow not only much bigger and faster but also more complex, opaque, and volatile.[67]

It is worth emphasizing that advances in technology are increasingly enabling private market participants to create tradable crypto-assets effectively out of thin air. These crypto-assets – digital tokens or bits of data representing some value – can have such an attenuated connection to productive activity in the real economy as to be practically untethered from it. By potentially rendering the financial system entirely self-referential, this type of unchecked private sector "innovation" can fundamentally undermine – rather than promote – the long-term growth on the part of the American economy. On a macro-level, therefore, the key risk posed by fintech lies in its – still not fully known – potential to exacerbate the financial system's dysfunctional tendency toward unsustainably self-referential growth.[68] (For a detailed discussion of these and related issues, see **Appendix** to this testimony.)

B. Regulatory and Supervisory Capacity

Understanding some of the potentially destabilizing systemic effects of unchecked fintech innovation brings into a sharp relief the crucial importance of strengthening the capacity of the relevant regulatory agencies to effectively oversee this process.

Fintech's ability to bring about massive increases in the volume and velocity of speculative trading in financial assets inevitably magnifies the systemic role of – and amplifies the pressure on – central banks and other public instrumentalities charged with ensuring financial and macro-economic stability. Hyper-fast, hyper-expansive financial markets require a hyper-fast and hyper-capacious public actor of "last resort" – one of the central bank's core functions. Similarly, substantial new risks to consumers, posed by the digitization of personal financial data and the rise of the digital platform economy, dramatically elevate the role of government agencies in protecting consumers' data privacy and safety. And, of course, the growing concern with potentially excessive concentrations of economic and political power in the hands of hyper-sized

fin-tech conglomerates underscores the need for a far more proactive approach to government enforcement of antitrust principles.

This, however, runs contrary to the Treasury Report's overall deregulatory strategy and the emphasis on an inherently passive and accommodative regulatory posture. As a general matter, the Report supports, and even insists on, proactive – or "agile" – regulatory action only where such action is necessary to "expedite regulatory relief" under existing laws in order to facilitate private experimentation with new digital technology.

The Treasury's recommendation to form a state and federal "regulatory sandbox" should be read in this normative context.[69] Several foreign jurisdictions, including Singapore and the United Kingdom, have already established such regulatory sandboxes, which essentially refer to the practice of allowing certain fintech companies to operate for a period of time without having to comply with various otherwise applicable laws and regulations. The purpose of this arrangement is to conduct a controlled test of fintech products, which should then help the regulators decide how beneficial and safe these products are for the rest of the market.

The idea of a regulatory sandbox as a way to generate usable empirical data for better regulatory decision-making is not necessarily a bad one. In each particular case, however, the efficacy of this effort depends fundamentally on the specific design features of the "sandbox." Thus, if the specific assessment criteria for fintech products in the "sandbox" are insufficiently capturing potentially problematic effects of these products on consumer interests or systemic financial stability, the resulting data will not be a reliable indicator of how that product will fare outside the "sandbox." Furthermore, some of the most significant systemic implications of a particular product may be inherently impossible or difficult to test in a controlled "sandbox" environment.[70]

In any event, a "regulatory sandbox" is not a substitute for a well-coordinated and well-resourced regulatory apparatus, capable of devising and dynamically implementing a comprehensive and balanced approach to overseeing fintech activities. In this moment of great change in financial markets, the American public needs such an apparatus: it needs capable regulators and supervisors who show their true "agility" by staying in front of, rather than behind or away from, the market.

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For all of the foregoing reasons, I urge the Committee to apply the healthy dose of skepticism to the Treasury Report's and the interested industry actors' consumer-centric rhetoric and deregulatory demands. The systemic significance of fintech innovations must be assessed in the broader public policy context, with a special focus on the need to protect American consumers from abusive market practices on the part of mega-sized corporate conglomerates, to safeguard the structural integrity of the U.S. financial market, and to ensure long-term systemic stability and sustainable growth of the nation's economy. Technology is not an end in and of itself, it is merely a tool: it can be used to improve our collective future or to destroy it. The Committee's task is to ensure that the latter does not happen, while everybody is looking the other way.

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[2] U.S. Department of the Treasury, *Report to President Trump: A Financial System that Creates Economic Opportunities: Nonbank Financials, Fintech, and Innovation* (July 2018), [hereinafter, *Treasury Report*] *available at* https://home.treasury.gov/sites/default/files/2018-07/A-Financial-System-that-Creates-Economic-Opportunities---Nonbank-Financi....pdf.
[3] *Treasury Report,* at 6-8.
[4] *Id*. at 7.
[5] *Id.*
[6] *Id.* at 8.
[7] *See, e.g., id*. at 17-19
[8] *Id*. at 17.
[9] *Id*. at 73-77.
[10] *Id.* at 26-27.
[11] *Id*. at 73-77.
[12] *Id*. at 52.
[13] *Id*. at 49.
[14] *Id.* at 49-50.
[15] *See* Karen Petrou, *The Crisis Next Time: The Risk of New-Age Fintech and Last-Crisis Financial Regulation* (Sept. 6, 2018), *available at* http://www.fedfin.com/images/stories/client_reports/FedFin%20Policy%20Paper%20on%20The%20Risk%20of%20New-Age%20Fintech%20and%20Last-Crisis%20Financial%20Regulation.pdf.
[16] *Treasury Report*, at 26.
[17] Petrou, *supra* note 15, at 3.
[18] *See* Emily Glazer et al., *Facebook to Banks: Give Us Your Data; We'll Give You Our Users*, WALL ST. J. (Aug. 6, 2018).
[19] *Treasury Report*, at 38.
[20] *Id*. at 39.
[21] *See* Petrou, *supra* note 15, at 5.
[22] *See* https://www.ftc.gov/equifax-data-breach.
[23] *Gartner Says Worldwide IaaS Public Cloud Services Market Grew 29.5 Percent in 2017*, Press Release (Aug. 1, 2008), *available at* https://www.gartner.com/en/newsroom/press-releases/2018-08-01-gartner-says-worldwide-iaas-public-cloud-services-market-grew-30-percent-in-2017.
[24] *Id.*
[25] *Treasury Report*, at 23.
[26] *See, e.g.*, John M. Newman, *Digital Antitrust* (June 22, 2018), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3201004; Lina Khan, *Amazon's Antitrust Paradox*, 126 YALE L. J. 710 (2017); Frank Pasquale, *Paradoxes of Digital Antitrust* (2013), *available at* https://jolt.law.harvard.edu/assets/misc/Pasquale.pdf.
[27] Alberto Cavallo, *More Amazon Effects: Online Competition and Pricing Behaviors*, Harvard Business School & NBER (Aug. 10, 2018), *available at* https://kansascityfed.org/~/media/files/publicat/sympos/2018/papersandhandouts/825180810cavallopaper.pdf?la=en.
[28] David Dayen, *Does Amazon Have More Power Than the Federal Reserve?* NEW REPUBLIC (Aug. 28, 2018), *available at* https://newrepublic.com/article/150938/amazon-power-federal-reserve.
[29] *Id;* Rana Foroohar, *Amazon's pricing tactic is a trap for buyers and sellers alike*, FT.COM (Sept. 2, 2018).
[30] *See* Petrou, *supra* note 15, at 4.
[31] *See* Foroohar, *supra* note 29.

[32] *See* Renae Merle, *Trump administration strips consumer watchdog office of enforcement powers in lending discrimination cases*, WASH. POST (Feb. 1, 2018), *available at* https://www.washingtonpost.com/news/business/wp/2018/02/01/trump-administration-strips-consumer-watchdog-office-of-enforcement-powers-against-financial-firms-in-lending-discrimination-cases/?utm_term=.4c83cde19b28.
[33] *See* Bernard Shull, *Banking and Commerce in the United States*, 18 J. BANKING & FIN. 255 (1994); Bernard Shull, *The Separation of Banking and Commerce in the United States: an Examination of the Principal Issues*, 8 FIN. MARKETS, INST. & INSTR. 1 (Aug. 1999).
[34] 12 U.S.C. §24 (Seventh).
[35] 12 U.S.C. §§1841-43.
[36] *See* Saule T. Omarova, *The Quiet Metamorphosis: How Derivatives Changed the "Business of Banking,"* 63 U. MIAMI L. REV. 1041 (2009); Saule T. Omarova, *The Merchants of Wall Street: Banking, Commerce, and Commodities*, 98 MINN. L. REV. 265 (2013).
[37] *Id.*
[38] 12 U.S.C. §1843(k).
[39] *Treasury Report*, at 80.
[40] *Id.*
[41] 12 U.S.C. §1841(a).
[42] *Treasury Report*, at 80.
[43] *See* Omarova, *The Merchants of Wall Street*, *supra* note 36, at 274-278.
[44] *See* E. Gerald Corrigan, *Are Banks Special?* 1982 FED. RES. BANK OF MINN. ANN. REP., *available at* http://www.minneapolisfed.org/pubs/ar/ar1982a.cfm. For a systematic exposition of banks' special function as sovereign public's "franchisees," see Robert C. Hockett & Saule T. Omarova, *The Finance Franchise*, 102 CORNELL L. REV. 1143 (2017).
[45] *See* Arthur E. Wilmarth, Jr., *The Transformation of the U.S. Financial Services Industry, 1975–2000: Competition, Consolidation, and Increased Risks*, 2002 U. ILL. L. REV. 215 (2002).
[46] https://fred.stlouisfed.org/series/DDOI06USA156NWDB.
[47] *See* NAFCU, *Modernizing Financial Services: The Glass-Steagall Act Revisited* (2018), at 14, *available at* http://stilltoobigtofail.org/wp-content/uploads/2018/09/Glass-Steagall-Act-White-Paper_R4.pdf.
[48] *See* Matt Phillips, *Apple's $1 Trillion Milestone Reflects Rise of Powerful Megacompanies*, N.Y. TIMES (Aug. 2, 2018).
[49] *See id.;* Lina M. Khan, *Sources of Tech Platform Power*, 2 GEO. L. TECH. REV. 325, 326 (2018).
[50] *See* David Streitfeld, *Amazon Hits $1,000,000,000,000 in value, Following Apple*, N.Y. TIMES (Sept.4, 2018).
[51] *See* Phillips, *supra* note 48
[52] *See* Omarova, *The Merchants of Wall Street*, *supra* note 36, at 276-277.
[53] *See* Matt Egan, *Too-big-to-fail banks keep getting better*, CNN MONEY (Nov. 21, 2017), *available at* https://money.cnn.com/2017/11/21/investing/banks-too-big-to-fail-jpmorgan-bank-of-america/index.html.
[54] *See* Omarova, *The Merchants of Wall Street*, *supra* note 36, at 349-351; Julie Cohen, *Technology, Political Economy, and The Role(s) of Law* (June 8, 2018), *available at* https://lpeblog.org/2018/06/08/technology-political-economy-and-the-roles-of-law/.
[55] *See generally* Rana Foroohar, *A light shines on the concentration of power in Silicon Valley*, FT.COM (July 22, 2018); Buttonwood, *Political Power Follows Economic Power*, ECONOMIST.COM (Feb. 3, 2016), *available at* https://www.economist.com/buttonwoods-notebook/2016/02/03/political-power-follows-economic-power.
[56] Madden v. Midland Funding, LLC, 786 F. 3d 246 (2d Cir. 2015).
[57] *See* MICHAEL S. BARR *ET AL.*, FINANCIAL REGULATION: LAW AND POLICY 185 (2nd ed., 2018).
[58] For a discussion of why bank charters are special and different from regular corporate charters, see Robert C. Hockett & Saule T. Omarova, *'Special,' Vestigial, or Visionary? What Bank Regulation Tells Us about the Corporation – and Vice Versa,* 39 SEATTLE U. L. REV. 453 (2016).

[59] *See* Consumer Federation of America & U.S. Public Interest Research Group, *Rent-A-Bank Payday Lending: How Banks Help Payday Lenders Evade State Consumer Protections* (Nov. 2001), *available at* https://consumerfed.org/pdfs/paydayreport.pdf.
[60] *See, e.g.*, KATHLEEN C. ENGEL & PATRICIA A. MCCOY, THE SUBPRIME VIRUS: RECKLESS CREDIT, REGULATORY FAILURE AND NEXT STEPS (2011).
[61] For an in-depth analysis of the systemic significance of fintech, see Saule T. Omarova, *New Tech v. New Deal: Fintech As a Systemic Phenomenon*, 36 YALE J. REG. (forthcoming 2019), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3224393.
[62] *See generally* ENGEL & MCCOY, *supra* note 60; FIN. CRISIS INQUIRY COMM'N, THE FINANCIAL CRISIS INQUIRY REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON THE CAUSES OF FINANCIAL AND ECONOMIC CRISIS IN THE UNITED STATES (2011), https://www.gpo.gov/fdsys/pkg/GPO-FCIC.pdf; S. PERMANENT SUBCOMM. ON INVESTIGATIONS, 112TH CONG., WALL STREET AND THE FINANCIAL CRISIS: ANATOMY OF A FINANCIAL COLLAPSE (2011), http://hsgac.senate.gov/public/_files/Financial_Crisis/FinancialCrisisReport.pdf.
[63] *Id.*
[64] Testimony of Sandy Samuels, Senior Managing Director and Chief Legal Officer of Countrywide Financial Corporation and the Housing Policy Council of the Financial Services Roundtable before the Subcommittees on Financial Institutions and Housing, U.S. House of Representatives (March 30, 2004), *available at* https://www.gpo.gov/fdsys/pkg/CHRG-108hhrg94689/pdf/CHRG-108hhrg94689.pdf.
[65] *Id.*
[66] *See* Robert C. Hockett, *Accidental Suicide Pacts and Creditor Collective Action Problems*, 98 CORNELL L. REV. 55 (2013).
[67] For a detailed discussion, see Omarova, *supra* note 61.
[68] *Id.*
[69] *Treasury Report*, at 168.
[70] *See, e.g.*, Hilary Allen, *A U.S. Regulatory Sandbox?* (Feb. 2018), *available at* file:///C:/Users/sto24/Downloads/SSRN-id3056993.pdf.

NEW TECH v. NEW DEAL: FINTECH AS A SYSTEMIC PHENOMENON

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INTRODUCTION

"Fintech," a popular term referring to the wide universe of innovative technology-enabled financial services, is by far the hottest topic in today's finance.[1] Fintech is visibly changing the way we conduct financial transactions and use financial services: volatile cryptocurrencies are becoming a mainstream trading asset, companies are raising capital by issuing digital tokens instead of securities, and robots are advising people on some of the most important financial decisions of their lives.[2] Less visibly, however, fintech is also beginning to change the way we *think* about finance. Increasingly ubiquitous, the fintech phenomenon is gradually reframing our understanding of the financial system in seemingly objective, science-driven terms, as yet another sphere of targeted application of information technologies and computer analytics.

This emerging narrative of finance is seductive in its simplifying elegance. It focuses on concrete *transactional* aspects of finance, rather than its inherently complex *systemic* dynamics. Targeting solutions for identified and isolated frictions in financial market transactions, fintech embodies an inherently micro- rather than macro-level view of the financial system. It deals with clearly functionally defined, programmable (and thus controllable) business processes and tools, rather than difficult normative judgments and policy tradeoffs. Yet, the fintech narrative also has distinct undertones of a *social* revolution in its broader aspirations to rebuild financial markets on principles of mutuality, cooperation, and inclusiveness. In that sense, its implicit promise is to redefine not only how we transact with one another, but also who we are as a community: new technology will succeed where old politics failed.

What should we make of this emerging narrative? Does fintech signify a genuine revolutionary shift in the fundamental dynamics of finance? And, if

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[1] *See, e.g.,* Garrett Baldwin, *The Top 10 Trends in Fintech,* FUTURES MAGAZINE (April 15, 2016), *available at* http://www.futuresmag.com/2016/04/15/top-10-trends-fintech ("No term is more ubiquitous in today's financial media than fintech."); Bob Pisani, *Here's Where Fintech Is Heading Next*, CNBC (June 6, 2016), *available at* https://www.cnbc.com/2016/06/06/heres-where-fintech-is-heading-next.html ("The interaction between finance and technology, or "fintech," remains a hot topic."); Daniel Newman, *Top 5 Digital Transformation Trends in Financial Services*, FORBES (May 9, 2017), *available at* https://www.forbes.com/sites/danielnewman/2017/05/09/top-5-digital-transformation-trends-in-financial-services/#75cd2c1e204c. ("If it feels like this change is fast and furious, you're right.").

[2] For example, in 2017, an influential industry report identified seventeen distinct "fintech services" offered by a wide array of providers in such areas as "money transfer and payments, financial planning, savings and investment, borrowing, and insurance." Ernst & Young, *EY FinTech Adoption Index 2017: The Rapid Emergence of FinTech*, at 6, *available at* http://www.ey.com/Publication/vwLUAssets/ey-fintech-adoption-index-2017/$FILE/ey-fintech-adoption-index-2017.pdf

so, what are the nature and potential implications of this fintech revolution? Is it capable of delivering the ultimate, normatively neutral and politically uncontestable, cure for the financial system's underlying dysfunctions?

The purpose of this Article is not to provide definitive answers to these questions. Rather, it is to propose a general conceptual framework within which they should be addressed. Much has already been, and continues to be, written about the rise of fintech and its growing impact on financial markets and regulation.[3] Legal scholars, in particular, are increasingly interested in various legal and regulatory challenges posed by the new technological advances in finance.[4] Some of the most valuable insights to date have come from the literature examining specific legal, economic, or operational aspects of individual fintech applications.[5] Alongside these targeted legal analyses,

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[3] For a small sample, see U.S. Dept. of the Treasury, *Report to President Trump: A Financial System that Creates Economic Opportunities: Nonbank Financials, Fintech, and Innovation* (July 2018), *available at* https://home.treasury.gov/sites/default/files/2018-07/A-Financial-System-that-Creates-Economic-Opportunities---Nonbank-Financi....pdf [hereinafter, *Treasury Report*]; John Schindler, *FinTech and Financial Innovation: Drivers and Depth*, Finance & Economics Discussion Series Paper 2017-081, Board of Governors of the Federal Reserve System (2017), *available at* https://www.federalreserve.gov/econres/feds/files/2017081pap.pdf; Financial Stability Board, *Financial Stability Implications from Fintech* (27 June 2017), *available at* http://www.fsb.org/wp-content/uploads/R270617.pdf; Financial Stability Board, *Fintech* Credit: Market Structure, Business Models and Financial Stability Implications (22 May 2017), *available at* http://www.fsb.org/wp-content/uploads/CGFS-FSB-Report-on-FinTech-Credit.pdf; WORLD ECONOMIC FORUM, REALIZING THE POTENTIAL OF BLOCKCHAIN: A MULTISTAKEHOLDER APPROACH TO THE STEWARDSHIP OF BLOCKCHAIN AND CRYPTOCURRENCIES (June 2017), *available at* http://www3.weforum.org/docs/WEF_Realizing_Potential_Blockchain.pdf.

[4] For a sample of the rapidly growing legal scholarship on these issues, see Iris H-Y Chiu, *Fintech and Disruptive Business Models in Financial Products, Intermediation, and Market-Policy Implications for Financial Regulators*, 21 J. TECH. L. & POL'Y 55 (2016); Douglas W. Arner, Janos Barberis, & Ross P. Buckley, *The Evolution of Fintech: A New Post-Crisis Paradigm?* 47 GEO. J. INT'L L. 1271 (2016); Douglas W. Arner, Janos Barberis, & Ross P. Buckley, *FinTech, RegTech, and Reconceptualization of Financial Regulation* 37 NW. J. INT'L L. & BUS. 371 (2017); Dirk A. Zetzsche, Ross P. Buckley, Douglas W. Arner, Janos N. Barberis, *From FinTech to TechFin: The Regulatory Challenges of Data-Driven Finance*, EBI Working Paper Series No. 6 (2017); Chris Brummer & Yesha Yadav, *The Fintech Trilemma,* Vanderbilt Law Res. Paper no. 17-46 (2017), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3054770; Tom Baker & Benedict G. C. Dellaert, *Regulating Robo Advice Across the Financial Services Industry*, 103 IOWA L. REV. (forthcoming 2018); William J. Magnuson, *Regulating Fintech*, VAND. L. REV. (forthcoming 2017); Rory Van Loo, *Making Innovation More Competitive: The Case of Fintech,* 65 UCLA L. REV (2017).

[5] *See, e.g.*, John Armour & Luca Enriques, *The Promise and Perils of Crowdfunding: Between Corporate Finance and Consumer Contracts,* ECGI Working Paper No. 366/2017 (2017), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3035247; Jeanne Schroeder, *Bitcoin and the Uniform Commercial Code*, 24 U. MIAMI BUS. L. REV. 1 (2016);

there is a rapidly expanding body of scholarship that attempts to take a broader inventory of issues fintech raises for lawmakers and financial regulators.[6] This literature helpfully identifies certain key considerations the regulators should "keep in mind" as they address such issues in practice and discusses innovative ways for regulators to "stay on top" of technological change. Yet, it stops short of offering a coherent conceptual account of fintech as a systemic phenomenon. As the list of identified regulatory concerns and considerations grows longer and more detailed, however, the need for an overarching conceptual framework within which to analyze the role of technology in finance becomes increasingly pressing.[7]

Aiming to fill this gap in the existing literature, this Article takes a deeper and more encompassing *systemic* view of fintech, both as a financial market phenomenon and as a regulatory challenge. It takes a position that, in order to make real sense of technological changes "disrupting" today's financial markets and regulations, it is necessary to broaden the analytical and normative lens beyond the immediate economic and legal effects of specific fintech applications. At bottom, an inquiry into the nature and dynamics of the "fintech revolution" is, and should be, an integral part of the broader inquiry into the nature and dynamics of *finance itself*. The latter, in turn, is, and should be, a fundamentally normative inquiry into the social function – and, by extension, dysfunction – of modern finance. Therefore, the Article posits, the role of technology in finance cannot be properly assessed, or even understood, without explicitly addressing the underlying questions about the role of today's finance in the broader socio-economic system.

The emerging fintech narrative in its present form, however, tends to mask this underlying continuity. The newly empowered and fashionable notion of "finance as technology" is threatening to eclipse that of "finance as

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Angela Walch, *The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk*, 18 J. LEG. & PUB. POL'Y 837 (2015); Adam J. Levitin, *Pandora's Digital Box: The Promise and Perils of Digital Wallets*, 166 U. PENN. L. REV. (2017).

[6] *See* sources cited *supra* note 4. For analyses focusing on financial regulators' attempts to encourage technological innovation and to develop their own technological capabilities, see Hilary J. Allen, *A US Regulatory Sandbox?, available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3056993; Rory Van Loo, *Rise of The Digital Regulator*, 66 DUKE L. J. 1267 (2017). A somewhat distinct thread in this literature focuses more narrowly on fintech-related changes in the familiar patterns of transactional "intermediation" in various contexts. *See* Benjamin Geva, *Disintermediating Electronic Payments: Digital Cash and Virtual Currencies,* 31 J. INT'L BANKING L. & REG. 661 (2017); Kathryn Judge, *The Future of Direct Finance: The Diverging Paths of Peer-to-Peer Lending and Kickstarter*, 50 WAKE FOREST L. REV. 603 (2015).

[7] For a recent review of the emerging economic research on fintech, see Peter Gomber, Jascha-Alexander Koch, Michael Siering, *Digital Finance and Fintech: Current Research and Future Research Directions*, J. BUS. ECON. (2017). As this review shows, there are presently significant gaps in the economic literature on the subject.

public policy." This Article seeks to reintegrate these two concepts, both as a matter of descriptive accuracy and as a normative matter. Technology enables and drives financial transactions, but so does public policy embodied in financial laws and regulations. On a micro-level, finance often appears primarily, if not purely, transactional: a matter of individualized private exchange among market actors. On a macro-level, however, modern finance is a matter not only of great public importance but also of great public involvement.[8] The rise of fintech throws into sharp relief this essential hybridity of modern finance and exposes some of the deepest normative tensions underlying it.

The Article argues that, from this systemic perspective, the fintech phenomenon has a broader significance than a "disruption" in the prevailing modes of, or institutional channels for, delivery of specific financial services. Its arrival marks a potentially decisive shift in the fundamental political arrangement underlying the operation of the modern financial system, as it currently exists in most advanced markets. Not surprisingly, that arrangement is most easily discernable in the U.S. that, for the most part of the last hundred years or so, has been the world's leader in developing not only large-scale capital markets but also the sophisticated legal and regulatory apparatus for a sustained and systematic oversight of financial markets and institutions. The U.S. system of financial sector regulation took shape during the New Deal era, as part of a concerted government response to the economic and political fallout from the stock market crash of 1929 and the Great Depression that followed it.[9] Today's elaborate scheme of U.S. financial regulation and supervision, directly or indirectly replicated around the world, continues to rest on the fundamental norms and policy principles at the core of the New Deal reforms.[10] These deep underlying norms and principles form what this Article calls the New Deal settlement in the sphere of finance.

As discussed below, the New Deal settlement reflects certain politically derived judgments about the optimal balance of private freedom and public control in the financial market.[11] Under this paradigm, private market actors

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[8] For an in-depth theoretical account of the fundamental hybridity of modern finance as a public-private enterprise, see Robert C. Hockett & Saule T. Omarova, *The Finance Franchise*, 102 CORNELL L. REV. 1143 (2017) [hereinafter, "*Finance Franchise"*].

[9] *See* Saule T. Omarova, *One Step Forward, Two Steps Back? The Institutional Structure of U.S. Financial Services Regulation After the Crisis of 2008*, in ROBIN HUI HUANG & DIRK SCHOENMAKER (EDS.), INSTITUTIONAL STRUCTURE OF FINANCIAL REGULATION: THEORIES AND INTERNATIONAL EXPERIENCES 137 (2014)) [hereinafter, "*Institutional Structure"*] (detailing the institutional legacy of the New Deal in the financial sector).

[10] *See* Saule T. Omarova, *The Dodd-Frank Act: A New Deal for A New Age?* 15 N.C. BANKING INST. 83 (2011) [hereinafter, *"A New Deal for A New Age?"*] (analyzing the key elements of the regulatory philosophy in the financial sector).

[11] For a discussion of the New Deal settlement's core features, see *infra* Part I.B.

retain control over substantive decisions on how to allocate financial capital to various productive uses – and thus the power to determine the overall volume and structure of financial claims in the system. The public, on the other hand, bears the primary responsibility for maintaining the overall stability of the financial system and enabling markets to function smoothly and efficiently. Government regulation is the indispensable mechanism through which the public manages the moral hazard built into this arrangement: in essence, regulation constrains market participants' ability to generate excessive system-wide risks in pursuit of private profits.[12]

An inherently unstable and contestable nature of this balance is the source of the fundamental tension at the core of the New Deal settlement. In an important sense, the entire history of U.S. financial markets and regulation since the New Deal era has been the history of continuous renegotiation and readjustment of this public-private boundary, driven by private market actors' continuous efforts to expand their freedom to create and trade financial claims.

To elucidate these deep-seated systemic dynamics, the Article deliberately shifts the analytical focus from primary markets, in which firms raise capital by issuing financial claims, to secondary markets in which such claims are traded. Despite legislators' and regulators' continuing preoccupation with "capital formation" in primary markets, the financial system's center of gravity has long shifted to secondary markets.[13] Secondary markets in financial assets currently dwarf primary markets in terms of size, complexity, and systemic significance.[14] Secondary markets also operate as the principal sites of relentless financial "innovation" and chronic over-generation of systemic risk.[15] The key to understanding what drives today's complex financial system, therefore, is to understand what drives the continuous growth and proliferation of secondary markets.

Operationalizing this insight, the Article identifies the core mechanisms and techniques that enable private actors to create and grow – continuously and virtually unconstrained – secondary markets for financial risk trading. It argues that the growth of financial markets is best understood by reference to two interrelated system-wide transactional practices: (1) continuous *synthesizing* of new tradable financial assets, and (2) *scaling up* the volume and velocity of trading activity in financial markets. The Article breaks down these phenomena further by showing how private market actors pursue these overarching objectives via four principal mechanisms: pooling and layering

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[12] *See id*.
[13] *See infra* Part II.A.
[14] *See infra* notes 92-93 and accompanying text.
[15] *Id.*

of claims, and acceleration and compression of trades.[16]

System-wide deployment of these transaction meta-technologies – pooling, layering, acceleration, and compression – enables the constant growth and complexification of the financial market. By the same token, it magnifies the extent and urgency of the public's obligation to accommodate privately created claims and to manage macro-financial risks. Critically, however, the public side is not always able to keep up with these increased demands by expanding its regulatory oversight capabilities. In fact, private actors' very success in synthesizing financial assets and scaling up trading activities often depends on the lack or inefficacy of regulatory controls – a familiar story aptly illustrated by financial market developments since the early 1980s and the global financial crisis these developments brought about.[17]

This Article examines the rise of fintech in the context of this decades-long process of gradual erosion of the New Deal settlement. It posits that deciphering the meaning of "fintech revolution" as a *macro*-financial, *systemic* phenomenon requires a deeper understanding of how specific fintech applications impact the public's capacity to maintain the stability of the macro-environment. Fintech may present a unique opportunity to correct the increasingly problematic imbalance between private misallocation of credit and the public's ability to modulate credit aggregates – or it may further intensify that imbalance.[18]

Reframing the inquiry along these dimensions, the Article argues that the more established fintech applications to date are already exhibiting signs of skewing the balance further in favor of private actors' unrestrained freedom to generate – and over-generate – financial risk. While it may be too early to draw definitive conclusions, the recent advances in computing power, cryptography, data analytics, and machine learning appear poised to amplify the long-lasting systemically destabilizing trends in the financial market. As shown below, new technological tools enable private market participants to engage in the continuous synthesizing of crypto-assets that are (a) untethered from, and thus unconstrained by, any productive activity in the real economy, and (b) tradable in potentially infinitely scalable virtual markets. What is commonly seen as the key micro-level advantage of fintech – its ability to eliminate transactional "frictions" and to circumvent traditional market boundaries – also operates to amplify the system's capacity to fuel financial

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[16] *See infra* Part II.B.2.

[17] *See infra* Part I.C.

[18] *See Finance Franchise, supra* note 8. For a detailed theoretical and historically-grounded post-crisis account of the importance of structural, as opposed to individual or firm-level, incentives for financial risk-taking, see Robert C. Hockett, *A Fixer-Upper for Finance*, 87 WASH. U. L. REV. 1213 (2010) [hereinafter, *Fixer-Upper*].

speculation on an unprecedented scale.[19] On a macro-level, therefore, the key risk posed by fintech lies in its – still not fully known – potential to exacerbate the financial system's dysfunctional tendency toward unsustainably self-referential growth.[20]

From this perspective, the onset of the fintech era marks a crucial political moment. Invisibly, the new technology is "disrupting" the New Deal settlement in finance. The nearly century-old arrangement that rigidly separated credit generation and allocation (an exclusively *private right*) from credit modulation and accommodation (an explicitly *public responsibility*) appears increasingly ill-suited for ensuring systemic stability in the emergent world of frictionless crypto-speculation.[21] Accordingly, in trying to make sense of specific technological advances, we must not lose sight of the ultimate systemic challenge rising in their background: the growing need to rethink the current public-private boundary in finance.[22]

The Article is organized as follows. Part I provides a brief overview of recent fintech developments and places them in the context of what I call the New Deal settlement in finance. It outlines the defining features of this political settlement and traces the process of its gradual erosion in recent decades. Delving deeper into this process, Part II advances a novel conceptual framework for understanding the fundamental dynamics of secondary markets in financial instruments. It offers a preliminary taxonomy of principal mechanisms – or system-level transaction meta-technologies – that enable private market actors to engage in continuous synthesizing of tradable assets and scaling up of trading activities. Finally, Part III examines specific fintech applications – Bitcoin, distributed ledger technology, marketplace lending, initial coin offerings (ICOs), and robo-advising – from the perspective of their potential to amplify the operation of these core financial market mechanisms. It concludes by drawing out some of the key systemic implications of these new technologies and, accordingly, redefining fintech as a public policy challenge of the highest order.

I. FINTECH AS A CHALLENGE TO THE NEW DEAL SETTLEMENT

A. Fintech: A Preliminary Overview

"Fintech" is an umbrella term that refers to a variety of digital technologies applied to the provision of financial services and, more generally, developments in the financial sector. Perhaps the most immediately recognizable symbol of the fintech era is the rise of private

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[19] For a detailed discussion, see *infra* Part III.

[20] *See infra* Part III.C.

[21] *Id.*

[22] For a comprehensive theoretical and normative account of the core public-private dynamics in finance, see *Finance Franchise, supra* note 8.

cryptocurrencies, defined generally as "any form of currency that only exists digitally, that usually has no central issuing or regulating authority but instead uses a decentralized system to record transactions and manage the issuance of new units, and that relies on cryptography to prevent counterfeiting and fraudulent transactions."[23] Bitcoin is the first cryptocurrency to date that went mainstream, albeit as an investment asset rather than a viable substitute for fiat money.[24] The Bitcoin network is built on blockchain technology, which uses a complex algorithm to allow decentralized verification and recording of each transaction in a publicly viewable distributed ledger.[25]

Importantly, the blockchain – or, more broadly, distributed ledger – technology potentially allows for a wider range of uses outside simply supporting specific cryptocurrencies. Thus, Ethereum, a blockchain platform designed to host an unlimited number of project-specific third-party applications, enables what is now known as "smart contracts" to automate the execution of a wide variety of transactions, including the ongoing performance of transacting parties' obligations.[26] Among other things, "smart contract" algorithms can automatically disburse payments or transfer title to assets, upon the verified occurrence of specified triggering events.[27] Corporate dividends, interest payments, insurance payouts, and derivatives collateral management are some of the areas in which smart contracts potentially offer the most easily discernable optimization benefits.

Smart contracts also enable so-called "initial coin offerings," or ICOs, in which various firms raise capital online by issuing digital tokens, or "coins," that carry various rights with respect to some future digital product or service the issuing firms intend to finance and develop.[28] An ICO is essentially a new form of crowdfunding that, ideally, enables tech startups to raise funds directly from their user communities.[29] Another form of digital crowdfunding

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[23] Merriam-Webster, *Cryptocurrency*, *available at* https://www.merriam-webster.com/dictionary/cryptocurrency. It is notoriously difficult to draw precise definitional boundaries among different categories of crypto-currencies, crypto-assets, tokens, coins, etc. *See* Hinge, *infra* note 158 (highlighting definitional difficulties).

[24] For a detailed discussion of Bitcoin, see *infra* Part III.A.1.

[25] *See id.*

[26] The term "smart contract" has no clear and uniformly accepted definition. Depending on context, it may refer either to a computer code stored, verified, and executed on a blockchain, or to a specific application of that code as an effective substitute for a legal contract. *See* Josh Start, *Making Sense of Blockchain Smart Contracts*, COINDESK.COM (June 4, 2016), *available at* https://www.coindesk.com/making-sense-smart-contracts/.

[27] *Id.*

[28] Many ICOs are functionally equivalent to securities offerings without the mandatory disclosure and other investor-protection features required under U.S. securities laws. Accordingly, the applicability of federal securities laws and regulations to ICOs has been one of the hottest legal issues in the fintech space since 2016. *See infra* Part III.B.1.

[29] *See infra* note 208 and accompanying text.

is peer-to-peer, or marketplace, lending.[30] The original idea behind today's marketplace lending platforms – LendingClub, SoFi, and others – was to bring together individual and small-business borrowers and lenders, in order to create a truly decentralized and direct credit market.[31] Not surprisingly, marketplace lending is often portrayed as a tool of "democratizing" finance by eliminating the need for banks and other financial intermediaries and by expanding access to credit.

The same "democratizing" impulse is commonly ascribed to the increasingly popular practice of robo-advising.[32] Robo-advising denotes providing online financial advice with minimal or no human participation, using algorithmic asset allocation and trading models.[33] Financial institutions' ability to replace expensive human advisors with cost-effective computer codes is seen as the tool of broadening access to previously exclusive wealth management services: everyone can invest in capital markets with robo-advisors' help.[34]

As this brief overview shows, all of the currently existing fintech applications – cryptocurrencies, blockchain technologies, smart contracts, digital crowdfunding, and robo-advising – explicitly promise to "revolutionize" provision of financial services. New digital technology unlocks new possibilities for a fully frictionless transacting in a completely virtualized world, without the costs and delays associated with the use of professional financial intermediaries operating under multiple jurisdictions' rules. By making financial transactions infinitely faster, easier, and cheaper, fintech also offers new opportunities for financial inclusion and expanded access to financial services. In this sense, new technology seems poised to "revolutionize" finance not only as a matter of *transactional* efficiency but also as a matter of *political* economy.

Yet, built into this narrative is a crucial presumption – sometimes explicit but often implicit – that the unfolding fintech "revolution" is a politically and normatively neutral phenomenon, a "win-win" situation not involving hard public policy choices and trade-offs. The prevailing attitude is to treat most of the problems commonly discussed in connection with fintech – cybersecurity concerns, network governance lapses, legal uncertainty, or

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[30] Marketplace lending is defined broadly as "any practice of pairing borrowers and lenders through the use of an online platform without a traditional bank intermediary." FDIC, *Marketplace Lending*, SUP. INSIGHTS (Winter 2015), *available at* https://www.fdic.gov/regulations/examinations/supervisory/insights/siwin15/si_winter2015-article02.pdf.

[31] For more on the evolution of marketplace lending, *see infra* notes 193-205 and accompanying text.

[32] For a discussion of robo-advising, *see infra* Part III.B.2.

[33] *See infra* note 221 and accompanying text,

[34] For a critical examination of this claim, see *infra* Part III.B.2.

regulatory gaps – much like natural "growing pains" accompanying society's triumphant march to a better future, benign temporary glitches ultimately resolvable through better coding or faster rule-writing.

Finance, however, is not politically or normatively neutral: money and power are two sides of the same coin. Finance is, and always will be, a matter of utmost and direct public policy significance. Financial arrangements are fundamentally shaped by, and in turn shape, broader economic and political structures and choices. "Virtualizing" financial transactions does not change this basic fact, only obscures it from view. Understanding the full significance of the fintech phenomenon, therefore, requires widening the lens beyond the immediate *micro*-transactional effects of new technology to encompass the essential dynamics of the financial system as a whole.

To this end, it is critical to start by reminding ourselves of the core political arrangement that determines the principal structure and operation of today's financial system. In the U.S. context, it may be referred to as the New Deal settlement in finance.

B. The New Deal Settlement in the Financial Sector

The New Deal era was the pivotal moment in the emergence and development of the entire system of modern U.S. financial sector regulation and supervision.[35] It was during this fateful period that Congress created a comprehensive system of disclosure-based federal securities regulation and a federal deposit insurance scheme, institutionalized the separation between banks and securities firms, and established numerous other legal and regulatory principles that continue to shape the operation of the U.S. financial system today.[36] The purpose of this Article, however, is not to recount the specific financial sector reforms of that turbulent era but to distill the overarching principles that informed, guided, and found expression in the multitude of such reforms. This is what I call the New Deal settlement in finance.[37]

The New Deal settlement reflects certain politically derived judgments about the optimal balance of private freedom and public control in the financial market. Several key features of the New Deal political settlement defined the substantive contours of the U.S. regulatory philosophy in the financial sector. At the highest level of generalization, the New Deal reforms institutionalized the broad concept of public interest – including public

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[35] *See* MICHAEL S. BARR, HOWELL E. JACKSON, MARGARET E. TAHYAR, FINANCIAL REGULATION: LAW AND POLICY 47-52 (2016).

[36] *See id.; Institutional Structure, supra* note 9.

[37] It is worth reiterating here that the Article concerns itself with the New Deal settlement only in the context of financial markets and regulation and not as a broader phenomenon in American political history and constitutional development.

representation and public enforcement – as a legitimate factor in the daily operation of financial markets. The new regulatory philosophy explicitly acknowledged the overarching need (i) to protect the public from abusive market practices (as opposed to letting all market participants fend for themselves), (ii) to ensure that private financial markets should strive to serve the public's needs (as opposed to private market participants' needs alone), and (iii) to take the lead role in maintaining the integrity and healthy functioning of financial markets (as opposed to letting markets self-regulate). In pushing the public-private line in finance in this thereto unprecedented way, the New Deal settlement was a political "disruption" of enormous significance.

Yet, it didn't push the line too far into the "public control" territory. The New Deal regulatory reforms left private actors firmly in control over substantive allocative decisions in financial markets, limiting the area of direct public control mainly to procedural and infrastructural support of the financial market's operations. With limited exceptions, the government's principal role was defined primarily as that of an outside regulator, the source and enforcer of the basic rules of fair play in financial markets.[38] It was envisioned as a largely exogenous force with a limited mandate to influence private market actors' decisions on channeling credit and investment flows to specific uses.[39] This principal delineation of public and private roles was reflected in and operationalized through such important regulatory choices as, for example, a deliberate rejection of merit-based financial product approval and a systematic preference for disclosure-based schemes.[40] To put it simply, as long as the risks associated with a particular financial product were adequately disclosed, the government had little power to prevent the risky product from entering the market.[41]

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[38] Of course, the New Deal era gave rise to many forms of direct government action inside, rather than merely outside, the ostensibly private financial markets. Perhaps the best example in this respect was the Reconstruction Finance Corporation (RFC), the once-powerful but now nearly-forgotten federal instrumentality that played a critical role in maintaining the functioning of the nation's financial markets during the Great Depression. The extraordinary nature of this exception, however, only underscores the general rule. For an in-depth analysis of the RFC's role and institutional legacy, see Robert C. Hockett & Saule T. Omarova, *Private Wealth and Public Goods: A Case for a National Investment Authority*, 43 J. CORP. L. 437 (2018) [hereinafter, *National Investment Authority*].

[39] *See* Robert C. Hockett & Saule T. Omarova, *Public Actors in Private Markets: Toward a Developmental Finance State*, 93 WASH. U. L. REV. 103, 113 (2015) [hereinafter, *Public Actors*]; Robert C. Hockett & Saule T. Omarova, *"Private" Means to "Public" Ends: Governments as Market Actors*, 15 THEORETICAL INQUIRIES IN L. 53, 54-55 (2014)

[40] For in-depth discussion of financial product approval as a form of macroprudential regulation, see Saule T. Omarova, *License to Deal: Mandatory Approval of Complex Financial Products*, 90 WASH. U. L. REV. 63 (2012).

[41] *See A New Deal for A New Age? supra* note 10, at 95-97.

As a result of this fundamental line-drawing between the public and private roles in finance, the New Deal regulatory paradigm had an inherently *micro-,* rather than *macro-*, focus. Because private market participants, with their informational advantages and individualized economic incentives, were presumed to be superior decision-makers "on the ground," their judgments on risks and returns of particular financial transactions and products were not to be substituted by those of the regulators. To the extent regulators' judgments are, and expected to be, driven by the generalized public interest considerations rather than by any specific transactional "efficiencies," however, this policy choice set the context for a systematic prioritizing of micro-transactional factors over macro-systemic ones, and of individual action over collective agency. It is implicitly assumed that, if the former is taken care of, the latter will necessarily follow.[42]

Accordingly, the New Deal paradigm focused expressly on regulating individual financial firms, licensed and supervised under clearly identified regimes, based on the types of products they offered and activities they engaged in.[43] The regulatory boundaries among financial institutions (banks, securities broker-dealers, insurers, etc.) and financial products (securities, banking products, insurance, commodity futures, etc.) were drawn in clear categorical terms.[44] The silo-based regulatory architecture, in which separate administrative agencies oversee formally separate financial sub-sectors under different statutory schemes, was an institutional embodiment of this approach.[45]

At the same time, the New Deal reforms have also institutionalized the public's role as an explicit market backstop "of last resort." Perhaps the most readily recognizable example of this public safety net is the comprehensive federal deposit insurance scheme administered by the Federal Deposit

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[42] This is a basic logical error known as the fallacy of composition. For a post-crisis theoretical and historically-grounded account of the importance of macro-, as opposed to micro-, dynamics in financial markets, *see generally* Robert Hockett, *A Fixer-Upper for Finance,* 87 WASH. U. L. REV. 1213 (2010); Robert Hockett, *Bretton Woods 1.0: A Constructive Retrieval for Sustainable Finance*, 16 N.Y.U. J. LEG. & PUB. POL'Y 401 (2013).

[43] *See Institutional Structure, supra* note 9. The canonical example of this regulatory philosophy was the Glass-Steagall Act, which established a system of strict separation between commercial banking and investment banking. Banking Act of 1933, Pub. L. No. 73-66, 48 Stat. 162 (1933).

[44] *See Institutional Structure, supra* note 9*;* GOVERNMENT ACCOUNTABILITY OFFICE, GAO-05-61, FINANCIAL REGULATION: INDUSTRY CHANGES PROMPT NEED TO RECONSIDER U.S. REGULATORY STRUCTURE (OCT. 2004); GROUP OF THIRTY, THE STRUCTURE OF FINANCIAL SUPERVISION: APPROACHES AND CHALLENGES IN A GLOBAL MARKETPLACE (2008); GOVERNMENT ACCOUNTABILITY OFFICE, GAO-13-180, FINANCIAL REGULATORY REFORM: FINANCIAL CRISIS LOSSES AND POTENTIAL IMPACTS OF THE DODD-FRANK ACT (JAN. 2013).

[45] *See id.*

Insurance Corporation (FDIC).[46] Another important example of the public's market-preserving role is the central bank's expanded emergency authority to prop up not only banks but also broader financial markets.[47] These political choices functionally transformed the government from a (presumably) exogenous rule-maker and enforcer into a direct financial market participant.[48] Furthermore, these choices explicitly put the government – the quintessential political actor, the ultimate collective agency – in charge of preserving the stable functioning of financial markets.[49]

In consequence, there was – and still is – deep tension at the heart of the New Deal regulatory paradigm: it vests substantive control over the allocation of risks and returns in financial markets in private actors operating on a micro-level, and assigns the responsibility for ensuring financial stability to public actors operating on a macro-level. Government regulation was designed to counteract and control the obvious moral hazard built into this system. In this sense, effective public oversight of financial markets and institutions was – and still is – critical to maintaining the New Deal political settlement. It is through close regulation and supervision of financial markets and institutions by specialized government agencies that the sovereign public was expected to keep profit-seeking private market participants from abusing their micro-level freedom to generate macro-level risks.

The fundamental problem with this approach is that, in practice, allocation and modulation of credit and money in the financial system are intimately connected: systemically destabilizing asset price booms are the direct effect of socially suboptimal allocative decisions by individual market participants.[50] The superficially neat functional separation of public and private, therefore, is inherently unstable. Beneath an intuitively clear division of functions, there are complex dynamics, conflicting interests, and ambiguous boundaries.

In effect, it may be said that the entire history of U.S. financial markets and regulation since the New Deal era has been the history of continuous

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[46] *See, generally,* 12 U.S.C. § 1811 et seq. The U.S. was the first jurisdiction to establish such a comprehensive deposit insurance regime.

[47] *See, e.g.,* Federal Reserve Act, Sec. 13(3), 12 U.S.C. § 344 (authorizing the Federal Reserve to provide emergency liquidity support to financial markets, subject to specified conditions). *See also,* Fed. Res. Bank of Minneapolis, *Lender of More than 'Last Resort'"*, REGIONS (2002), *available at* https://www.minneapolisfed.org/publications/the-region/lender-of-more-than-last-resort.

[48] *See Public Actors, supra* note 39 (discussing the taxonomy of roles governments perform in their capacities as market actors).

[49] This essential hybridity is especially visible in the structure and operation of the modern banking system, which is best understood as a public-private partnership – or a franchise arrangement. For an in-depth analysis of how this arrangement works in practice, see *Finance Franchise, supra* note 8.

[50] *See id.*

renegotiation and readjustment of this delicate balance. Financial institutions and their clients, searching for higher profits and competitive edge, keep pushing the line toward greater private freedom to transact, to "complete" the perennially "incomplete" markets by creating and trading in new financial instruments.[51] They often do so by exploiting gaps and ambiguities in the existing laws and regulations and by deliberately structuring transactions to escape the application of unfriendly legal rules, a technique widely known under the label of "regulatory arbitrage."[52]

This constant injection of privately created risks into the financial system creates quantitatively and qualitatively new challenges from the viewpoint of systemic stability, predominantly the public's responsibility. Inexorably, the public is in a reactive posture: once capital allocation decisions are made by private actors operating on a micro-level, the macro-level modulation comes into play as a principally *ex post* response.[53] This fundamental logic both implicitly shapes, and is reflected in, the widely-shared assumptions about the basic dynamics of finance: we take for granted that markets "evolve" and "innovate" (the primary, active, positive value-creation side of the public-private equation), while regulators "respond" and "react" (the secondary, passive, negative harm-limitation side). These assumptions define both the policy and the discursive agenda: how financial regulators do, or should, *respond* to privately-driven financial innovation – and *adjust* regulatory tools and objectives to the new context – is one of the perennial questions that

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[51] A "complete system of markets" is one in which there is a market for every good. *See* Mark D. Flood, *An Introduction to Complete Markets*, FED. RES. BANK OF ST. LOUIS REVIEW 32, 32 (March-April 1991), *available at* https://files.stlouisfed.org/files/htdocs/publications/review/91/03/Markets_Mar_Apr1991.pdf. For the original theoretical account, see Kenneth J. Arrow & Gerad Debreu, *Existence of an Equilibrium for a Competitive Economy*, ECONOMETRICA 265 (1954).

[52] The literature on the nature and role of regulatory arbitrage in the financial services sector is too voluminous to cite here. The rise of today's derivatives and repo markets, and the growth of money market mutual funds, for example, were direct products of regulatory arbitrage and financial firms' desire to circumvent specific regulatory constraints on their activities. For a recent book-length account of these dynamics, see ERIK GERDING, LAW, BUBBLES, AND FINANCIAL REGULATION (2013).

[53] This is, of course, a generalization. The point here is not to say that every specific systemic stability enhancing measure is an *ex post* response to a specific transaction. Agency rules are prospective in their application. Banking regulation and supervision, in particular, involve regulatory agencies in private banks' balance-sheet management with the view toward preventing them from failure. Nevertheless, even in that context, the principal posture of the public oversight is not to substitute its own, public-interest based, substantive judgment for that of the bank's management in every instance when the bank is extending a loan or entering into a derivative contract. These types of direct credit-money allocation decisions are left to private bank managers. Regulatory limitations on individual banks' leverage, risk concentration, or liquidity position are designed to shape these choices only indirectly and, in this sense, are fundamentally reactive.

preoccupy scholars of financial markets and institutions.[54] What goes unnoticed, however, is that this seemingly objective description of "how the world works" is itself, to a great extent, a product of a normative choice as to the relative competencies of private and public actors in financial markets.[55]

C. Pre-Fintech Erosion of the New Deal Settlement: A Brief Recap

Technology plays a critical role in this process of continuous renegotiation and resetting of the public-private balance in finance.

It is well known, for example, that advances in computing and communications technology since the 1980s enabled the rapid growth of increasingly diverse and complex derivatives markets. Derivatives are bilateral contracts whose value is "derived" from that of some other underlying, or reference, asset.[56] Though the commonly encountered derivatives are linked to commodities, securities, interest or exchange rates, pretty much any quantifiable – and, importantly, fluctuating – value can serve as a reference asset.[57] Derivatives enable financial market participants both to hedge their existing or anticipated risks and to make essentially speculative bets. While simple derivatives appear to have been in use even in ancient times, it was only in the 1980s that financial firms were able to use their newly acquired technological capabilities to scale up derivatives trades and turn them into one of the fastest growing segments of global financial markets.[58]

A similar story unfolded in the market for securitized products.

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[54] For a recent book-length treatment of this subject, see CRISTIE FORD, INNOVATION AND THE STATE: FINANCE, REGULATION, AND JUSTICE (2017).

[55] For an in-depth discussion and critique of this traditional delineation of roles in finance, see *Public Actors*, *supra* note 39; *Finance Franchise, supra* note 8; *National Investment Authority*, *supra* note 38; Saule T. Omarova, *Bank Governance and Systemic Stability: The "Golden Share" Approach*, 68 ALA. L. REV. 1029 (2017) [hereinafter, *Golden Share*].

[56] *See generally* JOHN C. HULL, OPTIONS, FUTURES, AND OTHER DERIVATIVES (9th ed. 2014); R. STAFFORD JOHNSON, INTRODUCTION TO DERIVATIVES: OPTIONS, FUTURES, AND SWAPS 1–10 (2009).

[57] As a general rule, the more volatile the underlying asset's value, the more lucrative the related derivatives contract. Accordingly, derivatives contracts may be linked to things like inflation rates, natural catastrophes, or even financial market volatility itself.

[58] There is a voluminous body of scholarly and popular literature detailing the history, economic functions, legal status, institutional structure, and financial stability implications of derivatives markets instruments. For a small sample, see Mark J. Roe, *The Derivatives Market's Payment Priorities as Financial Crisis Accelerator*, 63 STAN. L. REV. 539 (2011); Lynn A. Stout, *Derivatives and the Legal Origin of the 2008 Credit Crisis*, 1 HARV. BUS. L. REV. 1 (2011); Dan Awrey, *The Mechanisms of Derivatives Market Efficiency*, 91 N.Y.U. L. REV. 1104 (2016); Saule T. Omarova, *The Quiet Metamorphosis: How Derivatives Changed the "Business of Banking,"* 63 MIAMI L. REV. 1041 (2009) [hereinafter, *The Quiet Metamorphosis*] .

"Securitization" generally refers to the practice of pooling revenue-generating assets, such as mortgage or credit card loans, and using the pooled assets as collateral backing the issuance of debt securities to investors.[59] While not a recent invention, securitization became a major market-driving phenomenon in the 1980s, in large part because the advances in technology enabled originators and securitizers of loans to create much larger and more complex pools of securitizable assets and to manage the risk-return structure of debt securities backed by such assets. By the early 2000s, the market for these "structured" asset-backed products – including highly complex multi-layered schemes such as "collateralized debt obligations" (CDOs) – grew to unprecedented levels.[60] Moreover, the growth of securitization was intimately connected to the growth of derivatives markets, mainly through the use of credit derivatives to structure asset-backed claims.[61]

Both derivatives and structured asset-backed products are heavily dependent on the capacity of their creators to run increasingly complicated computer models.[62] The principal economic function of these and many other complex financial products is to allow for isolating, pricing, and trading specific risk factors embedded in, or constituting, the same otherwise indivisible asset. This process of synthetically constructing tradable financial claims out of deconstructed traditional assets – shares of stock, loans, or commodities – requires sophisticated analytical tools and computing power. As a result, today's highly structured financial products – marketed and used as both risk-management and risk-taking tools – are also, to a great extent, *tech* products.[63]

Importantly, however, the technology that enabled derivatives and other structured finance transactions was proprietary in character, developed and owned by financial institutions dealing and trading in these markets. That rendered the tech component of complex financial products less visible and more subsumed in their overall economic functions and effects. The latter,

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[59] *See* Kenneth C. Kettering, *Securitization and Its Discontents: The Dynamics of Financial Product Development*, 29 CARDOZO L. REV. 1553, 1556 (2009); Jonathan C. Lipson, *Re: Defining Securitization*, 85 S. CAL. L. REV. 1229, 1257 (2012).

[60] *See generally*, FIN. CRISIS INQUIRY COMM'N, THE FINANCIAL CRISIS INQUIRY REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON THE CAUSES OF FINANCIAL AND ECONOMIC CRISIS IN THE UNITED STATES (2011), https://www.gpo.gov/fdsys/pkg/GPO-FCIC.pdf; S. PERMANENT SUBCOMM. ON INVESTIGATIONS, 112TH CONG., WALL STREET AND THE FINANCIAL CRISIS: ANATOMY OF A FINANCIAL COLLAPSE (2011), http://hsgac.senate.gov/public/_files/Financial_Crisis/FinancialCrisisReport.pdf.

[61] *See id.*

[62] *See* Erik F. Gerding, *Code, Crash, and Open Source: The Outsourcing of Financial Regulation to Risk Models and the Global Financial Crisis*, 84 WASH. L. REV. 127 (2009).

[63] Such familiar terns as terms as "financial engineering," "quants," "rocket scientists," and "legal technology" may, on some level, reflect an intuitive recognition of this underlying connection.

of course, were often inseparable from the legal or regulatory functions and effects. Complex financial products are economically attractive not only because they allow for a more fine-tuned, bespoke tailoring of risks and returns of financial investments but also because they often lower the costs of such investments by circumventing specific laws and regulations. Accordingly, regulatory arbitrage is a strong driver of "innovation" in financial markets.[64] Much of such innovation is, in fact, little more than a new way of avoiding regulatory limitations and compliance costs.[65] Deregulatory policy choices, both formal and informal, further magnify and support these strategic shifts of financial activities from the traditionally "well-lit" regulated areas to unregulated "shadows" of the same economic markets.[66]

This is in essence the familiar story of the emergence and growth of the controversial "shadow banking" sector.[67] The term "shadow banking" does not have a firmly defined meaning and refers generally to a variety of financial markets and activities that mimic the economic substance of bank-like credit-money creation without being subject to the same kind of regulatory oversight.[68] Both derivatives and securitization markets are routinely cited as key examples of shadow banking in action: in both of these

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[64] *See supra* note 52 and accompanying text.

[65] *See* FORD, *supra* note 54; Dan Awrey, *Complexity, Innovation and the Regulation of Modern Financial Markets*, 2 HARV. BUS. L. REV. 235 (2012) (discussing supply-side incentives for financial institutions to engage in socially suboptimal "innovation" as a means of generating short-term monopoly-like rents).

[66] For in-depth analyses of the hidden deregulation dynamics, see *The Quiet Metamorphosis*, *supra* note 58 (detailing how the national bank regulator, Office of the Comptroller of the Currency, used informal decision-making tools to expand deposit-taking institutions' powers to trade and deal in derivatives instruments); Saule T. Omarova, *From Gramm-Leach-Bliley to Dodd-Frank: the Unfulfilled Promise of Section 23A of the Federal Reserve Act*, 89 N. C. L. Rev.1683 (2011) (detailing how the Federal Reserve used its informal administrative powers to loosen important statutory restrictions on banks' transactions with affiliated entities). For a broader account of the deregulatory dynamics in financial bubble-bust cycles, see GERDING, *supra* note 52.

[67] There is a huge literature on shadow banking, especially in the post-2008 era when the term became synonymous with excessive systemic risk creation. For a small sample of this literature, see, e.g., Tobias Adrian & Hyun Song Shin, *The Shadow Banking System: Implications for Financial Regulation,* Fed. Res. Bank of NY Staff Report No. 382 (July 2009); Tobias Adrian, Adam B. Ashcraft, Nicola Cetorelli, Shadow Bank Monitoring, Fed. Res. Bank of NY Staff Report No. 638 (Sept. 2013); Gary Gorton & Andrew Metrick, *Regulating the Shadow Banking System*, Brookings Paper on Econ. Activity (2011); GERDING, *supra* note 52, at 395-470; Morgan Ricks, *Money and (Shadow) Banking: A Thought Experiment*, 31 REV. OF BANKING & FIN. L. 731 (2011-12).

[68] The term was coined by Paul McCulley. Paul McCulley, *Teton Reflections*, Global Central Bank Focus (PIMCO) (Sept. 1, 2007) at 2, *available at* http://easysite.commonwealth.com/EasySites/EasySite_Z3263Y/_uploads/Teton%20Reflections.pdf. *See also,* Bryan Noeth & Rajdeep Sengupta, *Is Shadow Banking Really Banking?* THE REGIONAL ECONOMIST, Fed. Res. Bank of St. Louis (October 2011), at 8-13.

markets, various regulated and unregulated financial institutions continuously generated ultimately unsustainable levels of leverage and risk.[69] This excessive risk-creation was at the root of the global financial crisis that began in 2008, when the elaborate system of complex structured products and derivatives sitting on top of risky subprime mortgages collapsed with a frightening speed.

This story is, of course, well known and widely written about. The interplay of "financial innovation" (i.e., technologically-enabled large-scale trading in derivatives and other structured financial products) with pervasive regulatory arbitrage (i.e., using transactional techniques to defy structural boundaries) and gradual deregulation (i.e., formally eliminating or informally loosening risk-limiting rules and conditions) eventually led to the world's worst systemic financial crisis in eighty years, followed by a prolonged global economic recession.[70]

A brief recap of this narrative, however, helps to highlight the more fundamental dynamics manifested in the rise of shadow banking: the gradual erosion of the New Deal settlement, as the contested public-private balance shifted toward an increasingly greater private freedom to make allocative decisions determining the types and levels of risk in the financial system, without the proportionately necessary increase in the public's ability to manage credit-money aggregates. Moreover, while the sphere of public control over financial risk-generation diminished, the scope and scale of public *accommodation* of privately created liabilities in financial markets – both old and new, well-lit and pitch-dark – dramatically increased over the same period.[71] The events of 2008-2009 sharply exposed the practical effects of this fundamental imbalance: privately created allocative distortions in financial markets led to unsustainable accumulations of risk and leverage in the system, and the public had to "clean up" the resulting mess. In this sense, the popular reference to "privatization of gains and socialization of losses"[72] aptly captures the dynamics of erosion of the New Deal settlement in the financial sector.

The Dodd-Frank Act, the most far-reaching legislative reform in the U.S. financial sector since the New Deal, was an effort to curb some of the most

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[69] *See* sources cited *supra* note 67. For a more targeted discussion of the specific mechanisms through which shadow banking amplified credit-money aggregates, see *Finance Franchise, supra* note 8 at 1175-1192.

[70] *See* sources cited *supra* note 67. GERDING, *supra* note 52, provides a comprehensive analysis of these trends in the pre-crisis decades.

[71] For a detailed analysis of this inevitable expansion of public accommodation, see *Finance Franchise, supra* note 8 at 1175-1192.

[72] *See, e.g.,* Joseph Stiglitz, *U.S. Does Not Have Capitalism Now*, CNBC.COM (19 Jan. 2010), *available at* https://www.cnbc.com/id/34921639.

visible manifestations of this imbalance.[73] The Act explicitly sought to reinsert public agency and public interest in finance, among other things, by articulating the overarching policy goal of protecting systemic financial stability and by institutionalizing system-wide oversight of the financial sector.[74] Yet, despite these important measures, the Dodd-Frank Act did not alter the substantive basis of the New Deal settlement, discussed above.[75] Thus, the old silo-based structure of the financial sector oversight remains almost entirely intact.[76] The new macroprudential regulatory regime essentially utilizes scaled up microprudential tools.[77] And, to the extent Dodd-Frank seeks to restrain potential risks posed by derivatives and other structured products, it does so only indirectly, through demanding greater disclosure, encouraging standardization and centralized clearing, and incentivizing more prudent risk underwriting by private parties.[78]

More generally, under the Dodd-Frank Act, the public still does not have any direct involvement in or control over allocation of financial capital, a traditional sphere of private dominance. In fact, by reconfirming this pre-crisis understanding of the relative competencies of private and public actors in financial markets, the Act further exacerbated the deep-seated tension within the New Deal paradigm.

D. Fintech and the New Deal Settlement: Reframing the Inquiry

It is in this context that the fintech "revolution" began to change, or "disrupt," the way financial transactions are conducted and financial services are delivered.[79] Its game-changing potential, however, extends beyond the pure transactional aspects of finance. This Article argues that fintech is emerging as a powerful new tool for resetting the current public-private balance in finance. Does it offer a unique opportunity to correct the structurally destabilizing imbalance between private generation of financial risk, on the one hand, and public accommodation of such privately-generated risk, on the other? Or will it operate to intensify this imbalance? If it is the latter, does that mean that fintech is going to be the proverbial last nail in the

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[73] Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, Pub. L. 111-203, H.R. 4173 (signed into law July 21, 2010).

[74] *See* DAVID SKEEL, THE NEW FINANCIAL DEAL: UNDERSTANDING THE DODD-FRANK ACT AND ITS (UNINTENDED) CONSEQUENCES (2010); *A New Deal for A New Age? supra* note 10.

[75] *See supra* Part I.B.

[76] *See Institutional Structure, supra* note 9.

[77] *See* Robert Hockett, *The Macroprudential Turn: From Institutional 'Safety and Soundness' to Systematic 'Financial Stability' in Financial Supervision,* 9 VA. L. & BUS. REV. 201 (2015).

[78] *See, A New Deal for A New Age? supra* note 10, at 96-97; Awrey, *Mechanisms, supra* note 58.

[79] *See supra* Part I.A.

coffin of the New Deal settlement in finance?

These questions help to reframe the key inquiry into the nature and systemic impact of fintech. Ultimately, understanding fintech as a *systemic* phenomenon – as opposed to a mere collection of discrete finance-related applications of digital technology – requires analyzing whether, and how, specific fintech applications affect the public's capacity to maintain the stability of the macro-environment. This reframing allows to overcome the current fragmentation of the fintech debate by redirecting it away from the familiar but ultimately unproductive themes.[80] It also enables us to situate fintech in the broader analytical and normative context as an integral part of, or the latest phase in, the decades-long process of gradual renegotiation of the New Deal settlement in finance.

The fundamental continuity in this process is hard to miss. Despite its "disruptive" appearance, today's digital technology largely facilitates and amplifies certain long-standing trends in modern finance. In this sense, it is a continuation of the core pre-fintech dynamics in financial markets, whose cumulative effect to date has been the gradual "unsettling" of the New Deal settlement. At the same time, however, qualitatively new technological tools can elevate these built-in tensions to a qualitatively new level, potentially demanding a qualitatively new political settlement.

This means that fintech is properly conceptualized not so much as "revolutionizing" finance as providing new channels for the operation of the fundamental financial market dynamics predating it. From this perspective, it is important to resist the obvious temptation to focus on superficially novel, micro-transactional aspects of fintech. In the final analysis, the systemic significance of the unfolding fitech revolution is in its – not yet fully known – potential to redefine the basic patterns of interaction between the private and the public sides of modern finance.

Accordingly, the first step toward understanding fintech as a *systemic* rather than transactional, or *micro-level,* phenomenon is to re-examine from the new vantage point the underlying drivers of the changing public-private balance in finance. The project of decoding the fintech revolution, thus, begins with reassessing what we already know about the functioning, and *mal*-functioning, of financial markets and institutions, in light of what we are learning about new finance-related technologies.

So, what exactly do we know about the functional dynamics of finance?

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[80] One example of such a familiar theme is so-called "disintermediation" of incumbent financial institutions by fintech entrants. While these types of shift in the structure of specific market segments undeniably raise important regulatory issues, conceptualizing the broader fintech dynamics in terms of "disintermediation" is needlessly reductionist and unhelpful.

II. THE LOGIC OF FINANCIAL INNOVATION AND EROSION OF THE NEW DEAL

A. Focusing the Inquiry: Secondary Markets in Financial Instruments

As discussed above, one of the key features of the New Deal settlement in finance was that it left the critical task of credit- or capital-allocation to private market actors.[81] This is true despite the fact that federal laws and regulations impose limits on the ability of the least sophisticated, and therefore most vulnerable, financial market participants to invest in certain high-risk financial instruments.[82] These investor-protection measures operate primarily to draw the intra-sectoral lines separating more strictly regulated retail markets from institutional, or wholesale, markets subject to much lighter oversight. But they do not – nor were they ever intended to – put the regulators in charge of making specific investment choices on behalf of retail market participants. In retail as well as wholesale financial markets, private investors have the ultimate power to decide which financial instruments to buy – or which risks to take on – and at what price.

Private actors also decide which financial instruments to offer for sale to both retail and institutional investors. Companies issue securities and take out loans, banks offer deposit accounts, insurers sell insurance policies, asset managers set up funds, investment banks create structured products, and derivatives dealers stand ready to take the other side of swaps. The government does not control these decisions, as long as the relevant private parties make required disclosures and otherwise conduct their businesses in accordance with the applicable rules. The U.S. has no system of substantive risk assessment and regulatory pre-approval of individual financial products.[83]

Instead, under the terms of the New Deal political bargain, the government's principal role is to provide macro-stability, not only by regulating but also by directly backing private financial markets.[84] This public backup should not be confused with, or reduced to, what is simply its most visible and concrete manifestation: a government bailout of private firms. As argued elsewhere, public accommodation of privately created risks and liabilities is the defining dynamic in a modern financial system, one that

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[81] *See supra* notes 38-41 and accompanying text.

[82] For example, under the U.S. regime of securities regulation, retail investors are disallowed to invest in privately placed securities pursuant to the SEC Rule 144A, which limits permissible purchasers to institutional investors. *See* 17 CFR §240.144A. Similarly, retail investors cannot invest directly in hedge funds, private equity funds, or other funds exempt from registration and regulation as "investment companies" under the Investment Company Act of 1940. *See* 15 USC §80a-3(c)(7).

[83] *See supra* note 40 and accompanying text.

[84] *See supra* notes 46-49 and accompanying text.

can be traced throughout all of that system's interconnected layers.[85] Public accommodation is what ultimately enables financial flows on the systemic level and underwrites the growth of putatively private capital markets.[86]

Inevitably, however, public accommodation also creates powerful structural incentives for over-generation of financial risks by rent-seeking private parties.[87] It incentivizes the creation and proliferation of financial products – and the related growth of secondary markets in which such financial products are traded. This built-in incentive for constant reproduction and growth of secondary markets is a fundamental, and fundamentally underappreciated, driver of what is routinely understood as financial innovation.

Standard accounts of finance use primary markets as the archetypal setting in which "financial intermediation" takes place: the savers of money extend loans or invest in the equity of the users of funds, with the mediating help of a professional financial intermediary.[88] The intermediary – a bank, a securities dealer, or an investment fund – is said to "transform" all or some of the key risk attributes embedded in the transaction. This is what is typically described as maturity, liquidity, or credit risk transformation: a set of functions typically performed by banks, the quintessential "intermediaries," and replicated in part by non-bank financial institutions.[89]

This narrative, which remains the dominant intellectual framework for analyzing the financial system dynamics, is fundamentally misleading.[90] Among other things, it masks the independent significance, and indeed *de*

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[85] It is this public accommodation – often unseen or taken for granted – that fundamentally enables and underwrites the financial flows in the system: from the banking sector, through capital markets, to the outer edges of the constantly evolving "shadow banking." *See Finance Franchise, supra* note 8.

[86] *See id.*

[87] *See id.*

[88] This is, literally, a textbook understanding of "financial intermediation." *See* ZVI BODIE & ROBERT C. MERTON, FINANCE 22–23 (2000); KENT MATHEWS & JOHN THOMPSON, THE ECONOMICS OF BANKING 33 (2005); BARBARA CASU ET AL., INTRODUCTION TO BANKING 18 (2006); STUART I. GREENBAUM & ANJAN V. THAKOR, CONTEMPORARY FINANCIAL INTERMEDIATION 55–58 (2007); STEPHEN G. CECHETTI & KERMIT SCHOENHOLTZ, MONEY, BANKING, AND FINANCIAL MARKETS 39 (3rd ed., 2008); RICHARD SCOTT CARNELL ET AL., THE LAW OF FINANCIAL INSTITUTIONS 37 (5th ed., 2013).

[89] References to credit, maturity, and liquidity transformation as the core functional features of banking and, by extension, "shadow banking" are too ubiquitous to cite. What is interesting for the purposes of the present discussion is that this conceptual apparatus presupposes a specific purpose behind the intermediated transaction: moving capital from the investor-saver's hands into the hands of a productive user-entrepreneur. While not stated explicitly, an implicit presumption here is that the "user" is seeking funds for some legitimate economic use and not for a speculative financial reinvestment.

[90] For a detailed explanation of why the "financial intermediation" orthodoxy is fundamentally misleading, see *Finance Franchise, supra* note 8.

facto primacy, of secondary-market dynamics in the modern financial system. In primary market transactions, the entrepreneurial "users" of capital issue securities and incur loans primarily for the purpose of funding non-financial economic enterprise, thereby taking capital out of the financial system and putting it to productive use in the real, i.e., non-financial, economy.[91] This feature of primary markets operates as the key "safety valve" that keeps the financial system from outgrowing the economy's capacity to absorb capital at any given moment. In other words, primary markets' ability to generate financial claims, and thus financial risks, is inherently subject to certain externally-determined limits.

In the vast majority of real-life financial transactions, however, market players borrow and issue various financial claims in order to invest in *other* financial claims. Unlike one-off primary-market issuances used to fund companies' investments in *operating* assets, secondary-market transactions fund investments in *financial* assets. This seemingly trivial difference has critical consequences. Thus, largely as a result of the legal and financing technologies developed specifically for this purpose, there is no "natural" (i.e., independent from the operation of the financial market itself) limit on the volumes of financial claims – i.e., financial *labilities* – traded in secondary markets. In principle, an unlimited number of market participants can enter into an unlimited number of secondary-market transactions involving an unlimited variety of financial claims and liabilities. To the extent these privately created claims/liabilities are publicly accommodated, either directly or indirectly, they amplify – potentially indefinitely – both private market participants' rents and the public's aggregate risk exposure.

This basic relationship explains why today's secondary markets in financial instruments are the principal sites of both relentless transactional "innovation" and chronic over-generation of systemic risk. It also explains why secondary markets in financial assets currently dwarf primary markets in terms of size, complexity, and systemic significance.[92] This is both a structural and a functional imbalance. In theory, secondary markets' main function is to support and facilitate primary capital markets by providing liquidity, price discovery, and risk-shifting (including exit) opportunities for primary market participants. In practice, secondary market trading often

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[91] Of course, as business entities, financial institutions also raise capital by issuing securities in primary markets or borrowing money. The point here is that, in the standard picture of how capital markets operate, companies issue equity and raise debt in order to support or expand their "real-economy" business operations that generate jobs and wealth. This is the implicit normative justification for financial intermediation as a socially valuable activity. It is difficult to overestimate the significance of this implicit normative assumption.

[92] *See, e.g.,* World Federation of Exchanges, *2017 Full Year Market Highlights,* file:///C:/Users/sto24/Downloads/WFE%20FY%202017%20Market%20Highlights.pdf (providing statistical breakdown of annual trading volumes on global exchanges).

determines the terms and volumes of primary issuances of financial claims. The rapid rise of unsustainably risky subprime mortgage lending in the early 2000s, in response mainly to the rising demand for such loans as the raw material for MBSs and CDOs, provides a vivid example of these inverted dynamics.[93]

Inexplicably, however, the significance of this shift in the financial system's center of gravity – from capital-raising in primary markets to risk-trading in secondary markets – has not been fully appreciated and examined in the academic and policy discussions. Even in the post-crisis era, the "financial intermediation" discourse effortlessly glides over the fundamental differences between primary and secondary market dynamics, blending them together under the superficially descriptive labels of various balance-sheet "transformation" functions.[94] Within these discursive parameters, the principal focus of the mainstream policy debate is on potential means of fortifying financial intermediaries' balance sheets, whose inherent fragility is presumed to be a necessary feature of a thriving financial system. This normative and conceptual stance, in turn, heavily favors self-consciously technocratic approaches to both analyzing developments in financial markets and framing regulatory responses. Little, if any, attention is being paid to such "big" normative questions as the underlying causes of the persistent – and steadily increasing – tension between the public and private interests, roles, and respective competencies in the financial sphere. As a result, there is currently a conspicuous gap in our collective understanding of the efficacy and social desirability of combining *private freedom* to create tradable financial risk products with *public responsibility* to backstop secondary markets in which such products trade.

To fill that gap, and to develop a fuller and deeper understanding of the systemically destabilizing logic of "financial innovation," it is necessary to refocus the inquiry on the core dynamics in secondary markets for financial products. In doing so, it is important to move beyond the familiar descriptions of maturity or liquidity "transformations" appearing on, or off, various balance sheets. Instead of dissecting how various firms "intermediate" in various transactional contexts, we should shift our efforts toward identifying and examining the principal mechanisms and techniques that enable private actors to create and grow – continuously and virtually unconstrained –

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[93] *See* sources cited *supra* note 60; GARY GORTON, SLAPPED BY THE INVISIBLE HAND: THE PANIC OF 2007 (2008).

[94] "Maturity" or "liquidity" transformation is the same balance-sheet phenomenon in any transactional setting. In the canonic primary-market context of banking, this structural balance-sheet fragility is believed to serve a socially beneficial purpose, thus justifying an explicit public backup for banks. The same logic is then easily extended to the same types of balance-sheet fragility resulting from secondary-market activities.

secondary markets for financial risk trading.

B. The Mechanisms of Secondary Market Proliferation: A Preliminary Taxonomy

As argued above, the fundamental division of roles built into the New Deal settlement creates structural incentives for the disproportionate growth of secondary markets in tradable financial assets.[95] The bulk of these tradable assets are "produced" for reasons that have little to do with "capital formation" – or canonical capital allocation – in primary markets. To put it simply, financial products are bundles of financial risks and returns manufactured by financial institutions for sale to other market participants, mainly portfolio investors or managers.

From a *micro*-level transactional perspective, this is typically viewed as a valuable financial service. We are all familiar with the standard vocabulary that conveys this normative assessment in terms of "providing liquidity," "completing markets," "discovering prices," "enabling diversification and risk management," or "creating portfolio-enhancement opportunities." From a *macro*-level systemic perspective, the principal consequence of this continuous manufacturing of financial products is the continuous injection of privately-created financial risks into the system. Yet, we do not currently have a sufficiently extensive and well-established vocabulary to articulate this systemic perspective as a valid counterpoint to the dominant transactional view of financial markets' operation.[96]

Developing such a vocabulary is no easy task. It requires taking a fresh look at the familiar phenomena in an effort to identify important overarching trends and dynamics that were either unnoticed or unappreciated in previous accounts.[97] It requires a new narrative that helps to explain how, through which mechanisms, secondary markets in financial instruments are able to grow and proliferate.

There is, of course, a well-known (though not entirely uncontested) narrative of how various market "innovations" in recent decades – including money market mutual funds, wholesale derivatives and repo markets, and complex securitized products – emerged in response to, and were enabled by, specific legal and regulatory developments.[98] This Article neither replicates nor challenges that story. Instead, it seeks to take the analysis to a higher level of abstraction by drawing out the broader – more fundamental and unifying

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[95] *See supra* notes 85-93 and accompanying text.

[96] In our previous work, Robert Hockett and I have begun this project of developing a new conceptual vocabulary of modern finance as a systemic phenomenon. *See, e.g., Finance Franchise, supra* note 8; *Public Actors, supra* note 39; *Fixer-Upper, supra* note 18.

[97] *See id*.

[98] *See supra* Part I.C.

– dynamics behind these and many other developments. The purpose of this exercise is to develop a preliminary taxonomy of core dynamics operating in secondary markets for financial instruments.[99]

Inevitably, any attempt to construct such a taxonomy runs into definitional and boundary-drawing difficulties. The constant growth and complexification of financial markets is a multi-level process, with a seemingly infinite variety of "elements" and "factors" interacting in a seemingly infinite variety of ways. It is nearly impossible to isolate any specific such element or factor with surgical precision. It is nevertheless possible, and potentially more informative, to focus on the fundamental logic behind these factors.

1. The Market's *Modus Operandi*: Synthesizing and Scaling Up

At the most abstract level, the growth of financial markets is best understood by reference to two interrelated practices: (1) *synthesizing* financial assets, and (2) *scaling up* transactional activity. To put it simply, both the scope and the scale of financial markets increase when (1) more products can be purchased and sold, and (2) more trades can be made in these markets.

The practice of synthesizing financial assets typically involves creating new types of financial claims out of the existing ones. Some of the most basic and familiar examples include creating tradable stock indices, writing options on gold or shares of common stock, securitizing loans, and even setting up mutual funds. In all of these cases, a relatively small range of traditional financial assets – common stock, corporate bonds, loans, or commodities – serve as the base on which a potentially unlimited number of new types of financial claims are created. Importantly, the standard economic logic of supply and demand does not constrain this process. An increasing supply of tradable assets – or items on the menu of choices available to financial market participants – generates an increasing demand for them, which in turn incentivizes more asset-synthesizing.[100] And leverage plays the critical role in enabling this iterative supply-demand pattern.[101]

The resulting proliferation of tradable financial claims is itself an important measure, and a determinant, of the quantitative growth of financial markets. The concept and practice of "scaling up" – i.e., increasing the

[99] For ease of reference, and unless otherwise specified, I will refer to secondary markets in financial instruments as simply "financial markets."

[100] *See* sources cited *supra* note 65.

[101] In that sense, today's high finance may be said to follow the Starbucks business model, in which the constant invention and marketing of new, intentionally and carefully differentiated, products creates its own demand. Just like the Starbucks designer-beverages, most complex financial products are made using the same basic ingredients. Leverage, of course, functions much like caffeine that keeps everyone coming back for more.

volume and velocity of transacting – is another fundamental determinant of such growth. Scaling up is achieved through a wide variety of means. Market infrastructure and transactional technologies are of special importance in this respect. For example, centralized trading platforms (formally registered exchanges, alternative trading networks, or dealer-run private pools), clearinghouses, and payments systems all enable far greater volumes of trading to take place at greater speeds than would otherwise be achievable. Similarly, greater standardization of financial instruments helps to increase the volume of trading, at times dramatically, as in the case of the International Swaps and Derivatives Association (ISDA) documentation for derivatives contracts.[102] The ISDA example also shows how targeted changes in the applicable legal regimes can effectively unlock the growth of entire markets for financial products.[103] Finally, algorithmic trading is perhaps the most readily available example of rapid rise in the velocity (and, by extension, volume) of transactions as a result of the sheer expansion in technological capacity.[104]

Synthesizing financial assets and scaling up financial transactions are two fundamentally *systemic* practices, universal modes of operation at the very core of financial markets' logical design. Not surprisingly, they both have profound structural implications. Thus, the introduction of new financial products often leads to the emergence of new specialized markets in which they are traded. New actors may enter these newly created markets, both on the sell and the buy sides, while the established financial institutions may assume new roles in them. New patterns of market concentration and systemic interdependencies take shape. Via the multitude of specific transactional channels through which the twin imperatives of synthesizing and scaling up operate, the financial market grows not only bigger and faster but also more structurally complex.

It is, of course, impossible and ultimately unnecessary to enumerate all of these specific channels. It is nevertheless helpful, for analytical purposes, to identify the key mechanisms market participants use to synthesize financial assets and to scale up financial transactions.

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[102] *See* https://www.isda.org/book/complete-isda-documentation-package/.

[103] This refers specifically to ISDA's successful campaign to secure preferential treatment of derivatives under the U.S. Bankruptcy Code, as well as under many other jurisdictions' insolvency laws. *See* Steven L. Schwarcz & Ori Sharon, *The Bankruptcy-Law Safe Harbor for Derivatives: A Path-Dependence Analysis,* 71 WASH. & LEE L. REV. 1715 (2014).

[104] For a general overview of algorithmic trading and issues it raises under U.S. securities laws, see, e.g., Steven R. McNamara, *The Law and Ethics of Algorithmic Trading*, 17 MINN. J. L. SCI. & TECH. 71 (2016); Yesha Yadav, *How Algorithmic Trading Undermines Efficiency in Capital Markets*, 68 VAND. L. REV. 1607 (2015).

2. The Four Mechanisms of Synthesizing Assets and Scaling Up Trading Activity

At first approximation, there are four such mechanisms that may be broadly – and inevitably somewhat imprecisely – termed "pooling," "layering," "acceleration", and "compression." These analytical categories refer not to any particular type of product or transaction but rather to system-level operational principles, or core techniques that enable financial markets' continuous reproduction and expansion. In this sense, each of these categories may be seen as a transactional meta-technology, an embedded system functionality supporting a wide variety of individual applications.

a. Pooling

Pooling and layering are closely related, though conceptually distinct, mechanisms of synthesizing financial assets and scaling up trading. As used here, "pooling" denotes the familiar technique of combining multiple financial assets with certain shared characteristics, for the purpose of creating a new set of financial claims backed by, or determined by reference to, the resulting asset pool. This is perhaps the most ubiquitous technique in finance. Indeed, the very corporate form is a device for pooling of various resources used to back the issuance of corporations' securities in the primary market.[105] Mutual funds and other collective investment vehicles are products of explicit pooling of other financial instruments – corporate stocks, bonds, and other claims issued in primary markets – in a portfolio used to back the issuance of fund shares to investors. Shares issued by individual funds, in turn, can be pooled in a so-called fund-of-funds (FoF) portfolio backing the issuance of the FoF shares.[106]

Benchmarking and creation of indices constitute a similarly ubiquitous, albeit less directly visible, system-level method of pooling securities issued in primary markets for purposes of synthesizing new tradable assets in secondary markets.[107] Among other things, major stock indices, like S&P500 or Wilshire 5000, are used as benchmarks for – and therefore enable the emergence of – a wide variety of mutual and exchange-traded funds that track their benchmark index values.[108]

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[105] For a reminder of the key differences between financial instruments issued, and financial transactions entered into, in primary and secondary financial markets, see *supra* Part II.A.

[106] *See, e g.,* Managed Funds Association, Fund of Funds, *available at* https://www.managedfunds.org/hedge-fund-investors/fund-of-funds/.

[107] For a discussion of the systemic function of benchmark prices and indices, see Robert C. Hockett & Saule T. Omarova, *Systemically Significant Prices*, 2 J. FIN. REG. 1 (2016).

[108] *See* Vladislav Sushko & Grant Turner, *The Implications of Passive Investing for Securities Markets*, BIS QUARTERLY REV. 113 (March 2018), *available at*

b. Layering

The last two examples of pooling – FoF and indices – also illustrate the role of another transaction meta-technology, which may be called layering. I use the term "layering" to refer to the technique of synthesizing financial assets in a manner that creates a chain of hierarchically linked claims, so that the performance of each new asset "layer" is determined by reference to the combined performance of pooled financial assets underlying it.

As this description makes clear, the layering technique often involves pooling, which makes these categories difficult to separate neatly. Nevertheless, as pooling is repeated in several consecutive rounds, the distinct systemic implications of the resulting multi-layered structure built on the same set of underlying claims become increasingly pronounced. It is easy to see, for instance, how shares in a particular investment fund can get bundled with other funds' shares in the first-layer FoF, whose shares in turn get bundled with other FoF shares in the second-layer FoF portfolio, whose shares then get bundled with yet another set of FoF shares in the third-layer FoF, and so on. At each level, an entirely new crop of tradable fund shares is created, regardless of whether or not there are any additional issuances of corporate securities in the primary market.

Securitization provides an even more vivid example of synthesizing new tradable assets via pooling and layering. In a typical securitization, a special purpose vehicle (SPV), which holds a portfolio of loans or other revenue-producing assets, issues tradable asset-backed bonds (ABS).[109] These ABS are then re-bundled with other ABS in the next-layer securitization, such as a CDO, which issues several tranches of its own bonds. These bonds are then used as collateral backing bonds issued in the next-level securitization, so-called CDO-squared, followed by CDO-cubed, and so on.[110]

Derivatives provide yet another canonic example of how the layering mechanism is used both to synthesize new assets and to scale up market trading. Derivatives are contingent claim contracts that determine counterparties' rights and obligations by reference to the changes in the value of specified "underlying" assets.[111] Because the underlying asset is merely a reference point for calculating contractual payouts, there is no theoretical limit on counterparties' ability to enter into as many derivatives contracts as they desire, on any terms they choose.[112] In this sense, derivatives are the ultimate tools for synthesizing a potentially infinite number of tradable

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https://www.bis.org/publ/qtrpdf/r_qt1803j.pdf.

[109] *See supra* notes 58-59 and accompanying text.

[110] *See* sources cited *supra* note 59.

[111] *See supra* notes 56-57 and accompanying text.

[112] In practice, of course, there are various limits on that ability, including regulatory ones.

financial products on top of any single underlying asset.

Indexing and benchmarking, mentioned above in connection with pooling, also allow for layering of tradable assets in a manner similar to derivatives. A major stock or commodity index, for example, enables the creation of a wide range of tradable products tracking it. For instance, the emergence of specialized commodity price indices in the late 1990s-early 2000s has been identified as a major factor behind the surge in financial investors' participation in commodities markets and the related growth of trading in commodity-linked financial instruments.[113]

All of the examples above underscore two key features of layering as an embedded system-level functionality.

First, layering enables a finite quantity of existing financial claims to serve as the base on which potentially infinite quantities of new financial claims can be produced. Thus, layering significantly blunts, if not eliminates, the fundamental structural constraint on the growth of secondary financial markets: the exogenously limited volume of instruments issued in the primary markets.

Second, layering produces highly complex interdependencies among the seemingly discrete assets and markets. Financial assets that constitute a single product chain do not have to be linked other than through value-derivation: they don't have to be issued by the same or similar entities or reference same or similarly sourced cash flows. The many different layers of financial products may be inherently connected, yet the precise patterns of correlation among their values may be difficult to discern.

c. Acceleration

While pooling and layering operate as the essential determinants of financial markets' structural complexity, the most visible and direct role of acceleration and compression is to amplify and sustain the growing *volume* and *velocity* of trading.

Acceleration occurs whenever the speed of transacting is increased (the velocity of trading), thus allowing more trades to be executed (the volume of trading). Perhaps the most easily recognizable example of acceleration as a mechanism of scaling up financial transactions is algorithmic, or high-frequency, trading (HFT). HFT is a trading strategy that uses complex algorithms to execute trades at speeds far exceeding human ability. In essence, HFT uses quantitative investment programs to take extremely short-term positions in equities, currencies, and any other electronically tradable

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[113] *See, e.g.*, Ing-Haw Cheng & Wei Xiong, *The Financialization of Commodity Markets*, NBER Working Paper 19642 (Nov. 2013), *available at* http://www.nber.org/papers/w19642; Scott H. Irwin & Dwight R. Sanders, *Index Funds, Financialization, and Commodity Futures Markets*, 33 APP. ECON. PERSP. & POL'Y 1 (2011).

financial instruments, and to move in and out of such positions as a way of capturing extremely small gains on every trade.[114] By definition and design, HFT strategies dramatically, and successfully, accelerate and amplify trading activity in the relevant markets.[115]

The acceleration mechanism also works in less obvious ways, often in conjunction with the pooling and layering mechanisms. The very act of synthesizing a new tradable asset may, in and of itself, help to increase the aggregate volume and velocity of market transactions. The creation of a new asset eliminates potentially significant transactional costs of placing multiple trades that would otherwise be required in order to achieve the same economic exposure. It makes trading faster and cheaper relative to trading in the underlying assets themselves, which in turn leads to surging levels of trading activity. Indexing, derivatives, securitizations, and many other financial instruments and market practices exemplify these dynamics.

Standardizing tradable instruments and trading practices is another important tool of accelerating financial transactions. The logic of this acceleration tool is simple: eliminating idiosyncratic variations in the key economic terms of a particular category of financial products significantly reduces the amount of time and resources that need to be spent on each individual trade. By establishing a common baseline, it also makes easier and faster to craft bespoke varieties of the same product, if the need be.

As mentioned above, perhaps the best-known example of this kind is ISDA's success in creating an industry-wide set of standard documentation for over-the-counter (OTC) derivatives.[116] A much earlier and equally powerful example comes from the New Deal era, when the newly established Federal Housing Administration (FHA) used its power as the national provider of mortgage default insurance to encourage the adoption of a 30-year fixed-rate mortgage loan as the new industry standard.[117] The FHA's standard-setting actions played a critical role in facilitating the subsequent creation of the national secondary market for home loans.[118] As these examples show, secondary markets need standardization because of its transaction-boosting potential: standardization means faster trades, and more of them.

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[114] *See* Irene Aldridge, *What Is High-Frequency Trading, After All?* HUFFINGTON POST (July 8, 2010), *available at* https://www.huffingtonpost.com/irene-aldridge/what-is-high-frequency-tr_b_639203.html.

[115] *Id*.

[116] *See supra* notes 102-103and accompanying text.

[117] *See Public Actors, supra* note 39, at 133-134. For a fuller account, see Robert C. Hockett, *A Jeffersonian Republic by Hamiltonian Means*, 79 S. CAL. L. REV. 45 (2005).

[118] *Id.*

d. Compression

I use the term "compression" to refer generally to the technique of aggregating and compacting risk exposures and obligations associated with multiple trades in a manner that *de facto* transforms them into a single economic transaction.

In this sense, it is broader than "trade compression," a term of art denoting a common practice in derivatives trading that, quite simply, involves reducing the number of derivatives contracts while keeping the same net economic exposure.[119] In a typical compressed trade, several derivative contracts between the same counterparties are torn up and replaced with a single contract with a reduced (often, quite significantly) notional amount.[120] Compressing simplifies a complex transactional pattern by extracting and operationalizing its aggregate economic effect on the counterparties and reducing their gross risk exposures. By the same token, however, compression effectively hides the actual volume of transacting that took place between these counterparties. While the former is the intended micro-level transactional effect of compression, the latter is its less obvious but significant macro-level effect.

The same basic principle operates in the broader market context through the common practice of *netting*. Generally, netting involves offsetting of mutual payment obligations of transacting parties in order to facilitate the back-office process of clearing and settlement of multiple trades between them.[121] Netting does not directly generate any new financial liabilities or assets: it merely simplifies their ultimate settlement by eliminating unnecessary flows of funds and associated frictions in the process. This optimizing and risk-reducing function of netting is well known and widely acknowledged.[122]

By replacing multiple gross transfers due throughout the day with a single net transfer at the end of it, however, netting also enables a far greater amount of trading to take place. From that perspective, the widespread use of netting and trade compression has an important, and routinely under-appreciated, systemic effect: it empowers financial market participants to engage in secondary-market trading on a far greater scale, and at far greater speeds, than

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[119] *See* https://www.derivsdocu.com/blog/2015/11/20/trade-compression (explaining trade compression in over-the-counter derivatives markets).

[120] Trade compression can also be done on a multi-lateral basis. *Id.*

[121] Netting is also used to offset other obligations, such as those related to posting of collateral under derivatives or repo agreements.

[122] There is a vast literature, both academic and industry-produced, explaining the advantages of netting from the perspective of reducing credit, settlement, liquidity, and other risks. *See, e.g.,* ISDA, *Netting and Offsetting: Reporting Derivatives under U.S. GAAP and under IFRS* (May 2012), *available at* https://www.isda.org/a/veiDE/offsetting-under-us-gaap-and-ifrs-may-2012.pdf.

would be sustainable in the less forgiving world of gross settlement of trading obligations. In this sense, compression is more than simply a risk-reducing micro-level application: it is a system-level functionality for scaling up secondary markets in financial instruments.

To sum up, it is the system-wide operation of these four closely related transactional techniques – pooling, layering, acceleration, and compression – that empowers and sustains continuous quantitative growth and qualitative complexification of modern financial markets. These are also the enabling dynamics of what is routinely labeled "financial innovation." Much of that innovation is attributable to the iterative application of pooling, layering, acceleration, and compression tools in some new context or with the help of some new technology. The "innovative" nature of newly created financial products and market practices, therefore, should not be confused with, or reduced to, their narrowly technical or micro-level transactional aspects.[123]

C. Systemic Implications of Secondary Market Proliferation

Analyzing the process of continuous growth of the financial market through the lens of its core transactional modalities – pooling, layering, acceleration, and compression – allows us to draw several important conclusions about the nature of the financial system.

First of all, as a result of these mechanisms' combined operation, the financial system's macro-dynamics increasingly – and increasingly starkly – diverge from the transactional micro-dynamics in the financial market.[124] Moreover, the macro-level systemic factors play an increasingly important role in determining what happens in financial markets. In other words, focusing on transaction-level micro-factors – such as, e.g., reducing counterparties' transaction costs, information asymmetries, and various other "frictions" – is less and less likely to shed any meaningful light on the behavior of the markets in which these transactions take place. To understand how markets behave, we have to look to the broader modalities of those markets' self-regeneration and growth.

The independent significance and critical role of systemic factors in sustaining the operation of modern financial markets became painfully obvious during the global financial crisis of 2008, which explains the greater focus on macroprudential regulation in the post-crisis era.[125] It has become virtually commonplace to describe the financial system as "complex" and

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[123] This is, of course, an important and complex point that I plan to elaborate in full as part of a separate research project.

[124] For a theoretical and historical analysis of these general dynamics, see *Fixer-Upper*, *supra* note 18.

[125] For more on the post-crisis "macroprudential turn" in financial regulation, see Hockett, *supra* note 77.

"interconnected," almost to the point of making these qualities appear "natural" and even mystical in their omnipresence. By contrast, identifying the core transaction meta-technologies that are used to construct and sustain today's complex and interconnected financial system helps to demystify it.

Understanding how new financial assets and markets are continuously synthesized via pooling and layering, and then scaled up via acceleration and compression, helps us to visualize the logic of structural complexity, internal interconnectedness, and fragility of the system. The financial marketplace appears not as a flat space in which multiple parallel sub-markets operate as largely independent and potentially competing "financial intermediation" platforms, but rather as a fractal universe driven by the unifying logic of self-replication. In this picture of the financial system, the most significant relational dynamics are not horizontal, as it is implicitly postulated in the "disintermediation" or "shadow banking" narratives, but vertical, as in the dynamic patterns of connecting the many layers of financial risk trading.[126] And as this system grows bigger and moves faster, it also becomes increasingly unstable.

Another systemic implication of pooling, layering, acceleration, and compression is that they naturally operate to decrease the levels of transparency and governability of the financial market. It is difficult to "see through" the multiple layers of financial claims in a pyramid-like structure like a multi-layered FoF. It is even more difficult to assess the risks or to predict the behavior of a highly structured bespoke derivative referencing the value of other structured products. Similarly, the structural complexity and the speed of contagion in the financial market often render important market governance mechanisms, designed to resolve various market frictions, potentially ineffective. The failure of Lehman Brothers in October of 2008 provides an apt illustration of these trends. Following the firm's bankruptcy filing, neither Lehman's own management nor its major trading counterparties were able to establish with certainty the value of its derivatives positions and resolve the problem through the "normal" governance mechanisms, thus necessitating government intervention.[127]

This example also highlights the third systemic implication of the current patterns of the growth of financial markets: an increasing importance and intensity of self-amplifying, or recursive, market-wide collective action problems – and the resulting need for a more direct and effective exercise of

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[126] For a full elaboration of this multi-layered architecture of the financial system, see *Finance Franchise*, *supra* note 8.

[127] *See* Michael J. Fleming & Asani Sarkar, *The Failure Resolution of Lehman Brothers*, FRBNY ECON. POL'Y REV. 175 (2014), *available at* https://www.newyorkfed.org/medialibrary/media/research/epr/2014/1412flem.pdf.

market-wide collective agency.[128]

A structurally complex system based on the continuous synthesizing of tradable claims and scaling up trading activity is inherently prone to behaving procyclically. Investors in the fast-moving, contagion-prone, non-transparent financial markets are forced to act swiftly and in unison, whether that means not missing out on a "hot" investment or not being left holding the bag when it turns "toxic."[129] While individually rational, this behavior leads to collectively harmful results, as upward or downward price spirals become entirely divorced from so-called fundamental values.[130] In a market where fundamental value is often hidden at the bottom of a long chain of increasingly virtualized representations of that value, these price spirals are bound to be more violent and destructive, which significantly raises the importance of being able to arrest them as quickly as possible.

Of course, today's financial market looks nothing like the early stock market model that inspired classic *laissez faire* theories. The market that keeps growing bigger, faster, more complex – and therefore, more vulnerable to sudden and contagious shocks – cannot rely on the "invisible hand" to steer it away from trouble. That market needs an effective counterweight to collectively disastrous asset price booms and busts: it needs a collective agent capable of acting not in pursuit of purely profit-making goals but in the collective interest of all market participants.[131] While in theory this type of collective agency may be exercised by certain large private parties, the sheer scale of the modern financial market renders the private option impossible in practice. Only public actors, with their large size and unique risk tolerance, can realistically take on this critically important market-preserving role.[132]

As discussed above, under the terms of the New Deal settlement in finance, this market-preserving function has been explicitly assigned to the government, the quintessential collective agent in a modern polity. The government's role, however, was deliberately limited in order to leave control over capital allocation in private hands.[133] Ironically, the very success of private actors in expanding their freedom to generate financial risks – via continuous synthesizing of tradable financial products and scaling up secondary market trading – is opening the crucial space for a much more

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[128] For introduction and definition of the concept of "recursive collective action problem," or "ReCAP," and analysis of how this phenomenon manifests itself in a variety of contexts, see Robert Hockett, *Recursive Collective Action Problems: The Structure of Procyclicality in Financial, Monetary, and Macromarkets*, 3 J. FIN. PERSP. 1 (2015).

[129] *See id*. at 20-21.

[130] *Id.*

[131] *See id*. at 25.

[132] For a full discussion of public instrumentalities' market-preserving functions, see *Public Actors, supra* note 39, at 134-137.

[133] *See supra* Part I.B.

direct and proactive public involvement in managing the flows of capital in financial markets.[134]

In this sense, the broad systemic implications of modern financial markets' *modus operandi* increasingly push against the basic premises of the New Deal settlement. In the New Deal paradigm, the government's principal role in financial markets is that of a regulator, an exogenous force with a clearly limited mandate to influence private actors' allocative decisions.[135] Private market participants, by virtue of their presumed micro-informational advantages and individualized economic incentives (also presumed to be fundamentally aligned or align-able with the collective good), retain the ultimate control over allocating capital to specific economic uses.[136] Yet, as the above discussion shows, these presumptions do not necessarily hold in the context of increasingly complex, multi-layered, self-referentially growing modern financial markets. The systematic prioritizing of micro-transactional factors over macro-systemic ones, built into the New Deal settlement, is quickly becoming an impediment to its continuing efficacy as the overarching market governance framework.[137]

The rise of fintech in recent years is likely to elevate these existing tensions to a qualitatively new level. Viewed in this context, fintech is emerging as a potentially powerful tool for resetting the current public-private balance in finance.[138] While it is still too early to catalogue all of the specific ways in which the evolving technologies will or might be used to this effect, it is nevertheless both possible and necessary to begin a sustained inquiry into the macro-systemic aspects of key fintech trends.

III. DECODING FINTECH: TECHNOLOGICAL REVOLUTION, MARKET EVOLUTION, OR POWER DEVOLUTION?

The arrival of fintech is often equated with a "revolution" in finance.[139] Recent advances in digital communications, cryptography, data management,

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[134] *See Public Actors, supra* note 39, at 140-144, 147-160.

[135] *See supra* notes 38-41 and accompanying text.

[136] *See supra* note 42 and accompanying text.

[137] The recent growth of interest among the scholars of financial markets and regulation in understanding and adapting various insights from complexity studies and systems analysis reflects a growing recognition of the critical role of macro-systemic factors in finance. *See, e.g.* Robert F. Weber, *Structural Regulation as Antidote to Complexity Capture*, 49 AM. BUS. L. J. 643 (2012). While this is a promising avenue of analysis, it is important to keep in mind that, in contrast to many natural complex systems (such as, e.g., the human body or a particular ecosystem), the financial system is socially and legally constructed. It is fundamentally a product of law, which is itself a product of explicit policy choices. Analyzing the financial market's intra-systemic qualities and functions, therefore, cannot be separated from the analysis of its normative qualities and social functions.

[138] *See supra* Part I.D.

[139] *See supra* Part I.A.

and machine learning promise to revolutionize financial transactions by making them infinitely faster, easier, cheaper, more secure, more widely accessible, and individually tailored to every user's needs. These claims and expectations also shape much of the public discussion on how fintech is "disrupting" financial markets and how it should therefore be regulated.

This Article argues that, in order to decode the meaning of "fintech revolution," we must analyze fintech not as a collection of discrete finance-related *micro*-transactional technologies but as a *macro*-financial, *systemic* phenomenon. This requires, in turn, understanding whether, and how, specific fintech applications are going to affect – or already are affecting – the public's capacity to maintain the stability of the macro-environment. On the one hand, fintech may present a unique opportunity to correct the structurally destabilizing imbalance between private generation and public accommodation of financial risk, built into the existing paradigm of financial regulation. On the other hand, it may further intensify that imbalance, thus raising serious questions about the continuing viability of the New Deal settlement in finance.

This Part examines some of the more established fintech applications – including cryptocurrencies, distributed ledger technology, marketplace lending, ICOs, and robo-advising – from this perspective.[140] While not making any definitive claims, it highlights the degree to which these forms of fintech are poised to facilitate and amplify the pre-existing systemic dynamics of finance, thus further exacerbating the fundamental tensions built into the New Deal settlement.

A. "Eliminating Frictions:" Cryptocurrencies and Distributed Ledgers

To date, arguably the most promising and potentially impactful fintech applications have focused on resolving specific frictions in payments, clearing, and settlement of financial claims and transactions – the key functions performed by financial market infrastructures (FMI).[141] Payments is an area of particular interest in this respect. This is partly the case because of the sheer ubiquity and systemic importance of the payments system.[142] Partly, it is a result of recognizing persistent problems plaguing cross-border payments that typically involve several banks (which increases the costs of making payments) and take several days to clear the hurdles associated with

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[140] For a brief description of these technologies, see id.

[141] See BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM, *Federal Reserve Policy on Payment System Risk* 2 (2017), *available at* https://www.federalreserve.gov/paymentsystems/files/psr_policy.pdf.

[142] Generally, a payments system is defined as "a set of instruments, procedures and rules for the transfer of funds between or among participants. Payment systems include, but are not limited to, large-value funds transfer systems, automated clearinghouse systems, check clearinghouses, and credit and debit card settlement systems." *Id.* at 6.

currency conversions and various other regulatory and administrative issues.[143] Fintech-driven solutions to the problem of slow and expensive payments range from the invention of alternative cryptocurrencies that aim to circumvent official sovereign currency-based payments channels to redesigning the payments platforms on the basis of some new digital technology.

1. Bitcoin: Synthesizing Assets

Bitcoin is the leading example of the first strategy. It is the most established and prominent cryptocurrency currently in use.[144] In simple terms, Bitcoin is a form of electronic money, a decentralized virtual currency that operates through a network of peer-to-peer computers, or nodes.[145] It is an online communication protocol that enables the use of bitcoins – electronic tokens or bits of data – as a means of payment and exchange similar to regular currencies.[146] However, no sovereign backs Bitcoin, and no state or any single private institution controls its creation and use.[147]

At the heart of Bitcoin is an innovative blockchain technology, which allows verification and recording of each transaction within the system in a publicly distributed ledger. Encrypted transactions are solved by the nodes and grouped in blocks (every few minutes), which are recorded one after another in a chain. Each node in the system keeps a copy of the whole distributed ledger, which ensures that the entire record of transactions cannot be altered.[148] Because of these features, Bitcoin users do not need to place trust in any single institution, like a bank or a securities broker, to keep the system secure.[149] Bitcoins are stored in digital wallets, or data files that also contain recorded transactions and private keys necessary to spend or transfer bitcoins.[150] The true identities of the transacting parties are hidden behind

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[143] *Id.*

[144] *See generally* NATHANIEL POPPER, DIGITAL GOLD (2015); PAUL VIGNA & MICHAEL J. CASEY, THE AGE OF CRYPTOCURRENCY (2015).

[145] *See* PEDRO FRANCO, UNDERSTANDING BITCOIN: CRYPTOGRAPHY, ENGINEERING, AND ECONOMICS 4 (2015). Bitcoin was created in 2009 by Satoshi Nakamoto, which is believed to be a pseudonym for an unknown person or entity. Despite the mysterious nature of Bitcoin's creator(s), its current proponents maintain that open-sources software cannot be controlled by its original creator and truly becomes a collective product that can only be altered by consensus arising in the community of peers. For a discussion of the intellectual origins and pre-history of Bitcoin, see id. at 161-169.

[146] JOSE PAGLIERY, BITCOIN AND THE FUTURE OF MONEY 6 (2014). Bitcoin with a capital "B" typically refers to the entire system supporting the virtual currency, while "bitcoin" with a lower-case "b" denotes the actual unit of that currency. *Id*.

[147] FRANCO, *supra* note 145, at 3 (2015).

[148] *Id.* at 15.

[149] *Id.* at 8-9.

[150] Rainer Bohme et al., *Bitcoin: Economics, Technology, and Governance*, 29 J. ECON.

unique Bitcoin addresses.[151] Bitcoin can be used to make payments and transfer value among digital wallet holders within that virtual system, which makes it a superior method of cross-border payments.

Bitcoins are "mined" by solving the encrypted transactions that get added to the blockchain. The software, in effect, creates bitcoins and awards them to "miners" willing to expend their time and effort to verify encrypted transfers from one digital wallet to another. Mining bitcoin requires significant computing power, and the difficulty of solving transaction "puzzles" is programmed to increase, in order to keep the supply of bitcoin from rising too rapidly.[152] Importantly, bitcoins can also be bought and sold for U.S. dollars or any other sovereign currency. Several Bitcoin exchanges allow conversion of bitcoins into non-virtual currencies.[153]

To true Bitcoin enthusiasts, it represents a great vehicle of social good, which can broaden access to faster and cheaper money transfer and payment services for the poor and the unbanked around the globe.[154] Libertarians embrace Bitcoin as an alternative to state-created conventional currencies and, more broadly, government monopoly on money and credit.[155] And many tech-savvy Millennials prefer Bitcoin simply because it combines cost-saving efficiencies with greater privacy and security.[156]

For the majority of financial market participants, however, Bitcoin's main virtue is its value as an investment – or, more precisely, speculative investment – asset.[157] As an asset, bitcoin is extremely volatile. On July 19, 2010, the recorded value of one bitcoin was just $0.06. By December 16, 2017, the value of a single bitcoin reached $19,343.04.[158] According to a respected industry publication, this puts the rate of bitcoin's appreciation relative to the U.S. dollar in those seven years at 32,000,000%.[159] It is, therefore, not surprising that, while Bitcoin has not been able to displace sovereign currencies, it has successfully emerged as a brand new financial asset class.[160]

PERSP. 213, 220-221 ((2015).

[151] FRANCO, *supra* note 145, at 9.

[152] PAGLIERY, *supra* note 146, at 33-34.

[153] Bohme et al., *supra* note 150, at 220.

[154] PAGLIERY, *supra* note 146, at 91-106.

[155] *Id.*, at 129-136.

[156] *Id.* at 115-120.

[157] *See* Rosa M. Lastra & Jason Allen, *Virtual Currencies in the Eurosystem: Challenges Ahead,* ECON Monetary Dialogue Study 24 (July 2018), *available at* http://www.europarl.europa.eu/cmsdata/150541/DIW_FINAL%20publication.pdf.

[158] *See* Daniel Hinge, *The hunt for a crypto taxonomy*, CENTRALBANKING.COM (May 4, 2018) (citing CoinDesk data).

[159] *Id.*

[160] The surprising part, however, is the sheer magbitude of the Bitcoin speculative hype, especially in 2016-2017. Although in the first half of 2018 bitcoin's market value came down

Importantly, bitcoin's high volatility makes it an attractive underlying commodity for derivatives trading. In September 2014, TeraExchange established the first regulator-approved U.S. bitcoin derivatives trading platform.[161] In December 2017, the Chicago Mercantile Exchange (CME) and the Chicago Board Options Exchange (CBOE), the two largest and oldest U.S. commodity futures exchanges, raced to launch Bitcoin futures contracts.[162] As the CME's website proclaims, "Now you can hedge Bitcoin exposure or harness its performance with a futures product developed by the leading and largest derivatives marketplace: CME Group, where the world comes to manage risk."[163] In May 2018, Goldman Sachs announced a decision to establish its own bitcoin derivatives trading desk, in response to its institutional clients' growing interest in holding bitcoin "as an alternative asset," and to create "its own, more flexible version of a future, known as a non-deliverable forward."[164]

Turning bitcoin into the raw material for derivatives trading has several important consequences. It legitimizes bitcoin as a *bona fide* tradable financial asset, rather than merely a virtual token without any tangible value backing it, and incorporates it into the established financial market infrastructure. This instantly transforms the dynamics of bitcoin trading by scaling up its volume and helping to support its price. In short, it makes bitcoin – a digital token, or a bit of encrypted data – part of the same menu of financial assets as U.S. Treasury Bonds and shares in General Electric.[165]

Bitcoin's amazing journey from an obscure techno-utopian experiment to Goldman Sachs' market-making books is fascinating in a deeper sense. It provides a vivid example of how fintech technology can be, and is, used to

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significantly from its peak of nearly $20,000 in late 2017, in May 2018 it was still hovering around $10,000. In his characteristically unsparing manner, Warren Buffett referred to bitcoin as "rat poison squared," a less esthetically pleasing image than that of a tulip bulb. *See,* Tae Kim, *Warren Buffett says bitcoin is "probably rat poison squared,"* CNBC.COM (May 5, 2018), *available at* https://www.cnbc.com/2018/05/05/warren-buffett-says-bitcoin-is-probably-rat-poison-squared.html.

[161] *See,* Michael J. Casey, *TeraExchange Unveils First U.S.-Regulated Bitcoin Swaps Exchange,* WALL ST. J. (Sept. 12, 2014).

[162] *See* Dan DeFrancesco, *FCMs Demand Self-Certification Overhaul After Bitcoin Debacle*, RISK.NET (Jan. 30, 2018). Both CME and CBOE listed their respective Bitcoin contracts through self-certification, which allowed them to avoid submitting the proposed contracts for regulatory approval. They were later criticized for the rushed and non-transparent nature of their actions, given the riskiness of these completely new products. *Id.*

[163] CME GROUP, http://www.cmegroup.com/trading/bitcoin-futures.html.

[164] Nathaniel Popper, *Goldman Sachs to Open a Bitcoin Trading Operation*, N. Y. TIMES (May 2, 2018), *available at* https://mobile.nytimes.com/2018/05/02/technology/bitcoin-goldman-sachs.html; Wolfie Zhao, *Goldman Sachs to Begin Bitcoin Futures Trading*, COINDESK.COM (May 3, 2018), *available at* https://www.coindesk.com/goldman-sachs-to-begin-bitcoin-futures-trading-within-weeks/.

[165] For a predictive analysis of this trend, see *Finance Franchise*, *supra* note 8.

synthesize tradable financial assets effectively out of thin air. In contrast to even the most esoteric traditional (that is, pre-fintech) financial products, the volume of tradable bitcoin is not tied to, and thus constrained by, any financial claims issued in the primary markets. The volume or value of bitcoin bears no relation to the production of any actual goods or services in the non-financial economy. The supply of bitcoins grows as a result of trading and transacting *in bitcoin*: it is, in this sense, an entirely self-referential and self-reproducing secondary-market phenomenon.

The growth of bitcoin derivatives and potentially other bitcoin-linked products – such as, e.g., exchange-traded funds (ETFs) passively tracking bitcoin's value – is a classic example of pooling and layering, two of the core transactional techniques used to synthesize new tradable claims referencing a single underlying asset. The fact that, in this case, the underlying asset is a digital token, as opposed to shares in operating companies or barrels of oil, potentially removes any "natural" limits on the extent of such pooling and layering – and, accordingly, on the ability of market participants to scale up trading in these continuously synthesized crypto-assets.

2. Distributed Ledger Technology: Scaling Up Trading

In recent years, numerous financial institutions and fintech firms have been actively exploring a broader range of potential applications of the blockchain – or, more broadly, "distributed ledger" – technology underlying Bitcoin.[166] Generally, distributed ledger technology (DLT) may be defined as "a set of technological solutions that enables a single, sequenced, standardized and cryptographically-secured record of activity to be safely distributed to, and acted upon by, a network of varied participants."[167] It is important to note that DLT is not new or unique in its ability to allow multiple network participants to share and view data in near real time: it is simply another model within the familiar category of a "distributed database management system."[168] Yet, the blockchain mystique factor – the marketing power of the new fintech lexicon – has catapulted DLT into the very center of the financial sector's digital "innovation" efforts.[169]

Because DLT is said to be "asset-agnostic," in a sense of being able to provide "the storage, recordkeeping, and transfer of any asset," it can potentially be applied to optimizing a variety of processes, including not only

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[166] Technically, blockchain is merely a particular kind of DLT. For purposes of the present discussion, however, these differences are not especially relevant, and these terms will therefore be used interchangeably.

[167] FINANCIAL CONDUCT AUTHORITY (UK), DISCUSSION PAPER ON DISTRIBUTED LEDGER TECHNOLOGY, DP17/3, 10 (April 2017), *available at* https://www.fca.org.uk/publication/discussion/dp17-03.pdf.

[168] *Id.*

[169] *Id.*

payments but also post-trade clearing and settlement of any asset.[170] So-called "smart contracts" that reside on distributed ledgers and distill contractual terms into a self-executing computer code can also be used for ongoing management of collateral and other counterparty obligations.[171]

Given the magnitude, complexity of institutional arrangements, and systemic significance of the payments, clearing, and settlement functions in wholesale financial markets, practical implementation of these concepts is no easy task. Not surprisingly, there are currently several parallel efforts to revolutionize these systems through adoption of DLT or "smart contracts."[172] These include, for example, the IBM-backed HyperLedger Fabric project that seeks to optimize cross-border trade financing and an open-source Corda platform for managing bank-to-bank financial agreements being developed by a large bank consortium, R3.[173]

In 2017, another consortium of major global banks, led by Switzerland's UBS, announced the next phase in the development of so-called "utility settlement coin," or USC.[174] The USC is a digital currency stored on a permissioned blockchain and used by member-banks to make payments to one another to clear and settle securities trades. This new cryptocurrency arrangement will allow for much faster and convenient clearing and settlement of bond and equity trades between the participating banks.[175] In each trade, both the sold-and-bought securities and the payment for them will be "delivered" through the consortium's blockchain system. Instead of using the relevant jurisdiction's official payments system and waiting for traditional money transfers to be completed, these banks will simply transfer the relevant amounts in USC to one another's USC accounts. The payee-

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[170] David Mills *et al., Distributed Ledger Technology in Payments, Clearing, and Settlement*, Fed. Res. Bd., Fin. & Econ. Disc. Paper No. 2016-095 (2016), at 17, *available at* https://www.federalreserve.gov/econresdata/feds/2016/files/2016095pap.pdf.

[171] *See* Luke Clancy & Steve Marlin, *Banks test promise of blockchain as CCP replacement*, RISK.NET (Apr.18, 2016).

[172] For a reminder of what "smart contracts" are, see *supra* note 26 and accompanying text.

[173] *See* Hugh Harsono, *Bank-based blockchain projects are going to transform the financial services industry*, TechCrunch.com (Jan. 28. 2018), *available at* https://techcrunch.com/2018/01/28/bank-based-blockchain-projects-are-going-to-transform-the-financial-services-industry/; Tanaya Macheel, *R3 Makes Code for Financial Agreements Platform Open Source,* AM. BANKER (Nov. 30, 2016), *available at* https://www.americanbanker.com/news/r3-makes-code-for-financial-agreements-platform-open-source.

[174] Michael Del Castillo, *Barclays, HSBC Join Settlement Coin as Bank Blockchain Test Enters New Phase*, COIN DESK (Aug. 30, 2017), *available at* https://www.coindesk.com/hsbc-barclays-join-utility-settlement-coin-as-bank-blockchain-test-enters-final-phase/.

[175] *Id.*

banks will then exchange their USC holdings for the relevant sovereign currency, on a one-to-one basis.[176] This key feature of the proposed closed-universe, blockchain-based interbank payment platform – USC's direct convertibility into major sovereign currencies – requires an explicit commitment on the part of the relevant central banks to support the arrangement.[177] The consortium is reportedly working with several central banks – presumably, the Federal Reserve, European Central Bank, Bank of England, and Bank of Japan – to set up a system for guaranteed exchanges of USC for all major sovereign currencies.[178]

There is very little information available on the USC project or other similar projects currently under way, which makes it difficult to understand how exactly these new DLT-based payments, clearing, and settlement arrangements will work in practice.[179] It is even more difficult to identify and assess their potential impact – both positive and negative – on the financial system's operation, resilience, and stability.

Generally, the most frequently cited potential benefits of using DLT for payments, clearing and settlement include its ability to reduce complexity in cross-border transactions, improve "end-to-end processing speed and thus availability of assets and funds," increase "transparency and immutability in transaction record keeping," improve "network resilience through distributed data management", and reduce "operational and financial risks."[180] In essence, DLT is expected to make trades settle pretty much instantaneously, thus significantly reducing transactional costs and counterparty risk. Some of the most widely cited potential risks of moving payments, clearing, and settlement functions onto DLT platforms include increased cyber-security and operational vulnerabilities, legal uncertainty with respect to ownership of digital tokens or enforceability of smart contracts, and (very importantly) finality of settlement in a distributed system not backed by a central bank.[181] For most of these enumerated problems, however, there appear to be reasonably manageable solutions, some of which involve things like "more nimble" regulatory responses.[182]

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[176] *See* Izabella Kaminska, *What is 'Utility Settlement Coin', Really?* FT ALPHAVILLE (Sept. 18, 2017), available at https://ftalphaville.ft.com/2017/09/18/2193542/what-is-utility-settlement-coin-really/.

[177] *Id.*

[178] *Id.*

[179] The design and operation of USC is especially intriguing in this respect. *See id.*

[180] *See* Mills *et al., supra* note 170 at 17; COMMITTEE ON PAYMENTS AND MARKET INFRASTRUCTURES (CPMI), *Distributed Ledger Technology in Payment, Clearing and Settlement* (Feb. 2017), at 1, *available at* https://www.bis.org/cpmi/publ/d157.pdf.

[181] *See* Mills *et al., supra* note 170 at 28-29; 31-34.

[182] "Regulatory sandboxes," which effectively exempt qualifying fintech firms from otherwise applicable regulations, are often presented as this kind of a nimble response. *See*

From a systemic point of view, however, the prospect of widespread adoption of DLT-based systems for payments, clearing, and settlement of financial transactions may not be quite so favorably balanced. The main concern here is straightforward. If DLT succeeds in making wholesale payments, clearing, and settlement instantaneous, easy, and cheap, it will enable potentially exponential growth in the volume and velocity of trading in securities and other financial assets. To put it simply, in a fully frictionless world of blockchain-powered transaction processing, overtly speculative trading will also be faster, easier, cheaper, and thus more voluminous.

Such system-wide scaling up of trading activity goes far beyond a mere improvement in end-to-end processing speed. Quantitative changes of this magnitude are bound to effect a qualitative change in the nature and behavior of financial markets more generally. This will, in turn, magnify the systemic role of – and amplify the pressure on – central banks and other public instrumentalities charged with ensuring financial stability. Hyper-fast, hyper-expansive financial markets will require a hyper-fast and hyper-capacious public actor of "last resort."[183] Envisioning the specific form – or forms – this collective agency should take is an exercise in bold institutional imagination, bound to raise a host of politically salient questions.[184] Unless we are ready to face these questions, we are not ready for the arrival of frictionless trading in financial assets.

One more point is worth making in connection with DLT and its potential to revolutionize payments, clearing, and settlement infrastructure. Recall that the original Bitcoin payments system is designed to operate on the real-time gross settlement (RTGS) basis: each bitcoin transfer between wallets is assigned a unique identifier and, once added to the immutable public ledger, serves as an objective proof of the coins' ownership. In this "trustless" world, there is no built-in transactional credit function: no specialized intermediaries lending their own balance sheets to transacting parties and, therefore, no native *netting* capability.

This pure RTGS principle at the heart of the Bitcoin system – or, in terms of the market dynamics discussed above, *acceleration without compression* – is the main reason why blockchain in its original form cannot support large-scale trading in financial markets. Without the ability to net, counterparties' liquidity needs impose hard constraints on the volume of trading they can

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generally Allen, *supra* note 6.

[183] For examples of what such a high-capacity public instrumentality might look like, see *Public Actors, supra* note 39, at 140-174; *National Investment Authority, supra* note 38; *Golden Share, supra* note 55.

[184] Among other things, it will directly implicate the recently reignited controversy over central bank powers and independence. For recent contributions to this debate, see PAUL TUCKER, UNELECTED POWER (2018); PETER CONTI-BROWN, THE POWER AND INDEPENDENCE OF THE FEDERAL RESERVE (2016).

sustain. Furthermore, not only does the system have to process great many more individual transactions, it also does not allow for trading on credit. Nor does it allow for using coins as collateral: a verified transfer effects a simple change in ownership recorded in the distributed ledger. Operationally, leverage becomes far more difficult to use in a system that explicitly precludes "double-spending," or spending what you don't fully and exclusively own.

It is this fundamental problem that the financial industry actors – the supposedly "disintermediated" banks and the "disruptive" nonbank challengers alike – are seeking to solve. Characteristically, both the problem and the solutions are couched in purely technological terms as a matter primarily of processing speed or computing power. Among the reported solutions is the Lightning Network,[185] which allows people to sign smart contracts creating "time-locked, two-way payment channels" based on a pre-agreed notional amount and seeded with a single bitcoin payment.[186] The parties can then transfer money to one another within that pre-set balance, as well as to and from third parties' accounts, forming "a network of traced payments that need not be confirmed in the Bitcoin blockchain."[187] By allowing limitless "off-chain" transactions managed via smart contracts, Lightning promises to overcome Bitcoin's processing capacity limits and to allow it to compete with Visa's network.[188]

These efforts, however, aim to deliver far more than simply a technical fix for a technical problem: Lightning and similar programs are potentially creating a crucial system-wide capacity for *levering* and *netting* of financial transactions "off chain." Now, what gets recorded in the publicly distributed ledger can be simply a net result of multiple trades run by dealers: a single ultimate number that provides precious little insight into market activity underlying it. In effect, this off-chain transacting replicates the familiar patterns of margin trading and collateralized borrowing that enable financial asset speculation. The new technology does not alter the economic substance, and public policy implications, of these transactional techniques: it is still all about private parties borrowing to make short-term profits in secondary-market trading. But technology makes these old dynamics much less visible behind the shining veil of scientific progress. What used to be done "off balance sheet" can now be done "off blockchain," and with the same result: potentially excessive financial risk and leverage hidden behind an ostensibly transparent ledger. Yet, focusing on the *form* in which that publicly viewable

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[185] *See* https://lightning.network/.

[186] MICHAEL J. CASEY & PAUL VIGNA, THE TRUTH MACHINE: THE BLOCKCHAIN AND THE FUTURE OF EVERYTHING 75 (2018).

[187] *Id.*

[188] *Id*.

but informationally incomplete ledger exists – whether it is a physical book or a complex piece of software – distracts attention from this basic fact.

B. "Democratizing Finance:" Digital Crowdfunding and Robo-Advising

In addition to its ability to optimize transaction processing and eliminate frictions in the operation of financial market infrastructures, fintech is often praised for its unprecedented potential to make financial markets more inclusive and equally accessible.[189] Bitcoin, for example, is often touted as a tool of financial inclusion, because it makes payments and asset transfers more affordable. Two other fintech trends explicitly credited with this "democratizing" effect on financial markets are digital crowdfunding (including marketplace lending and ICOs) and robo-advising.

1. Marketplace Lending and ICOs: Synthesizing Assets

Crowdfunding is a loose category covering historically varied forms of finance.[190] Today, crowdfunding generally refers to raising funds from a large number of individual investors, typically by using online social networks or specialized funding platforms.[191] These platforms allow start-up companies and individual entrepreneurs to "market" their idea to a wide range of potential investors and, if successful, raise capital at a lower cost.[192]

Marketplace (a.k.a. peer-to-peer, or P2P) lending is simply crowdfunding of debt. It seeks to lower the costs of unsecured borrowing by eliminating the

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[189] *See supra* Part I.A.

[190] Crowdfunding is a form of crowdsourcing, a term that encompasses a broader variety of mass collaborations on a particular project or idea. Crowdsourcing often involves sharing of innovative ideas and soliciting of technical support, feedback, or other resources from the "crowd." Although not officially known as "crowdsourcing," the practice of gathering monetary or in-kind contributions from a dispersed group of people was widely used throughout history, most notably for various charitable purposes. *See*, Craig R. Everett, *Origins and Development of Credit-Based Crowdfunding* (May 28, 2014), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2442897. The advent of the Internet enabled the rapid development of numerous peer-to-peer online transactional platforms (e.g., eBay and Napster) that led to the emergence of the current forms of online crowdfunding. *See* COGNIZANT, MARKETPLACE LENDING: A MATURING MARKET MEANS NEW PARTNER MODELS, BUSINESS OPPORTUNITIES (July 2014), at 2, *available at* http://www.cognizant.com/InsightsWhitepapers/Marketplace-Lending-A-Maturing-Market-Means-New-Partner-Models-Business-Opportunities-codex989.pdf. In this Article, I use the term crowdfunding to refer solely to financial investment-oriented transactions, rather than philanthropically motivated loans or donations.

[191] Joan MacLeod Heminway & Shelden Ryan Hoffman, *Proceed at Your Peril: Crowdfunding and the Securities Act of 1933,* 78 TENN. L. REV. 879, 881 (2011).

[192] For examples of online crowdfunding sites that provide a virtual marketplace for prospective equity investors and capital-seeking entrepreneurs, see Fundable, https://www.fundable.com/landing/crowdfunding?gclid=COX31PXI78cCFQcTHwod_SwGJg; EquityNet, https://www.equitynet.com/how-it-works.aspx.

need for the services of a commercial bank or any other institutional lender. In the U.S., online P2P lending got its official start in late 2005, when Prosper.com launched its online platform.[193] Prosper.com and LendingClub, both of which focused initially on consolidation of consumer debt, quickly became the leading U.S. marketplace lending platforms. Their success spurred rapid growth of online lending platforms specializing in various loan products.[194]

Although individual lending platforms' operational models may differ, they generally share certain basic features. They typically cap the size and maturity of individual loans, limit individual investors' exposure to a particular borrower by breaking up the loan amount among a large number of investors, and use internal and external credit ratings to determine the risk-adjusted interest rate on each loan. The lending platform operators collect transaction and servicing fees.[195] The basic idea is that, by using advanced technology to process information and underwrite loans quickly and at a low cost, marketplace lending sites are able to match individual lenders and borrowers efficiently and transparently.[196]

The proliferation of marketplace financing sites in the last decade led some observers to declare "the beginning of a revolution in how the general public allocates capital."[197] Others welcomed it as a rising tide of ultimate "disintermediation."[198] However, the business quickly attracted sophisticated financial players able to conduct credit analysis and run risk models to tailor higher returns from their marketplace loan investments. Hedge funds, private equity funds, banks, insurance companies, and wealthy individuals became the primary buyers of marketplace loan products,[199] which generally have

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[193] *See* Prosper Marketplace, Inc., https://www.prosper.com/help/general/#protection. The model was pioneered in the United Kingdom by Zopa, which launched the first peer-to-peer lending platform in 2005.

[194] RICHARDS KIBBE & ORBE LLP, 2015 SURVEY OF U.S. MARKETPLACE LENDING, *available at* http://www.rkollp.com/assets/attachments/RKO%20Lender%20Survey.pdf.

[195] *See* Renaud Laplanche, *Five Big Myths about Marketplace Lending,* AM. BANKER (Jan. 28, 2015).

[196] Unlike banks, P2P platforms typically do not make loans using their own balance sheets: they simply find individuals willing to lend money to a particular borrower at a particular rate. In this model, even high-risk borrowers should be able to find potential lenders willing to take a small portion of the risk, if compensated accordingly. Banks and other balance-sheet lenders don't have such flexibility.

[197] C. Steven Bradford, *Crowdfunding and the Federal Securities Laws,* 2012 COLUM. BUS. L. REV. 1, 5 (2012).

[198] Andrew Verstein, *The Misregulation of Person-to-Person Lending*, 45 U.C. DAVIS L. REV. 445, 449 (2011).

[199] *See* Kevin Wack et al., *Innovation of the Year: Online Marketplace Lending*, AM. BANKER (Dec. 17, 2014). Thus, investment management giant BlackRock heavily investied in marketplace lending, while George Soros and former PIMCO CEO Mohamed El-Erian were among the high-profile individual investors. *Id.*

higher interest rates than traditional bank loans.[200] Many of these investments are leveraged and subsequently securitized.[201]

The entry of yield-hungry institutional investors led to increased competition in the sector and pushed marketplace lenders to grow their loan origination volumes, to diversify their loan products, and to consolidate.[202] Marketplace lenders now routinely form partnerships with banks and other institutional investors, pursuant to which banks and other investors commit to buying a certain percentage of whole loans originated by or through the marketplace platform.[203] To satisfy institutional investors' demand for this lucrative asset class, marketplace lenders intensified their borrower-acquisition efforts, partly by extending more high-risk loans.[204]

In short, within a decade, marketplace lending has effectively evolved from an alternative form of peer-to-peer finance into a post-crisis rendition of subprime lending and shadow-banking securitization.[205] In this sense, it functions as a classic channel of continuous synthesizing of tradable assets used to construct multi-layered and interconnected chains of financial claims. Rather than reinventing credit as a truly decentralized and democratic means of mutual self-help, today's marketplace lending operates primarily as a means of scaling up trading volumes in institutionally-dominated wholesale markets.[206]

By 2017, the tech-savvy public's attention had shifted to a new form of digital crowdfunding: "initial coin offerings," or ICOs. In an ICO, a firm planning to develop and produce some form of a digital product – e.g., new software – sells project-specific digital tokens that can be used as units of

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[200] For example, LendingClub has delivered an adjusted annualized return of nearly 8.7% on the first $8 billion of issued loans, and issued over $1 billion in personal loans carrying interest rate above 20%. Todd Baker, *Marketplace Lenders Are a Systemic Risk*, AM. BANKER (Aug. 17, 2015). In 2014, OnDeck, a marketplace platform specializing in small business lending, reportedly issued loans at an average annual percentage rate of 54%. Kenneth A. Posner, *Alternative Lenders Have a Ways to Go to Ensure "Revolution,"* AM. BANKER (Jan. 12, 2015).

[201] *See* Kevin Wack et al., *supra* note 199.

[202] *See* Kevin Wack, *Shakeout Is Coming, Marketplace Lenders Warn*, AM. BANKER (Apr. 16, 2015).

[203] *See* Kevin Wack et al., *supra* note 199; Mike Cagney, *How Marketplace Lenders Will Save Financial Services*, AM. BANKER (Aug. 19, 2015).

[204] *See* Baker, *supra* note 200.

[205] *See Finance Franchise, supra* note 8, at 1207.

[206] In June 2018, SoFi's CEO announced the company's new strategy of making loan decisions, funds disbursements, and securitizations instant. Penny Crosman, *SoFi's CEO Strategy for Success: 'Make every Transaction Faster',* AM. BANKER (June 20, 2018). This aptly underscores the significant potential of marketplace lending as a broad-based platform for the continuous synthesizing of high-yield assets and scaling up of secondary-market trading.

currency in purchaser's hands once the project launches.[207] Depending on the scheme, these tokens may be used for different purposes: some of them simply allow access to an online platform or grant participation and governance rights in a particular online network, others can be used to buy the product or service being funded, and yet others may entitle their holders to an actual portion of profits from the project in question.[208] The vast majority of ICOs to date are done using smart contracts on the Ethereum platform.[209] The key advantage of using Ethereum is that its technology allows for smooth post-ICO trading of the tokens: i.e., it enables the emergence of a secondary market in these new digital "assets."[210]

In 2014, Ethereum itself became one of the first examples of a successful ICO by raising about $18.4 million through pre-sales of ether, its native crypto-currency.[211] As the popularity and use of Ethereum as the platform of choice for various crypto-projects grew, the value of ether increased correspondingly, making it a valuable financial investment.[212] ICOs went mainstream in 2017, which saw hundreds of offerings raise billions of dollars.[213] Notably, the most successful ICOs of the year included ventures promising to improve the existing blockchain infrastructure, to offer a "better" cryptocurrency, or to make existing crypto-assets easier to monetize.[214]

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[207] *See supra* note 28 and accompanying text.

[208] *See* Wilson Sonsini Goodrich & Rosati, *Initial Coin Offerings: An Overview of Regulatory Considerations* (June 30, 2017), *available at* https://www.jdsupra.com/legalnews/initial-coin-offerings-an-overview-of-98251/.

[209] *See* CASEY & VIGNA, *supra* note 186 at 99. Ethereum is designed as a common platform for hosting an infinite variety of so-called "decentralized apps" (or "Dapps") for cryptographically recording and exchanging all manner of digitized data: medical records, land titles, titles to goods, marriage certificates, copyright and other rights, contractual payments, etc. Computers verifying transactions earn ether, Ethereum's cryptocurrency, whose value accordingly increases as the network grows. Ethereum's internal programming language allows third parties to write an unlimited variety of programs, thus enabling an unlimited variety of "smart contracts." *Id.* at 79-81.

[210] Ethereum's standardized set of smart-contract instructions allows various digital tokens to retain a common, consistent format allowing these tokens to be traded on top of Ethereum's blockchain even after the conclusion of an ICO. *Id.* at 102.

[211] *Id*. at 84, 99.

[212] *Id.*

[213] According to some estimates, the total amount raised in ICOs in 2017 exceeded $5.6 billion. Oscar Williams-Grut, *Only 48% of ICOs Were Successful Last Year but Startups Still Managed to Raise $5.6 Billion,* BUSINESS INSIDER (Jan. 31, 2018), *available at* http://www.businessinsider.com/how-much-raised-icos-2017-tokendata-2017-2018-1.

[214] Oscar Williams-Grut, *The 11 Biggest ICO Fundraises of 2017*, BUSINESS INSIDER (Jan. 1, 2018), *available at* http://www.businessinsider.com/the-10-biggest-ico-fundraises-of-2017-2017-12?r=UK&IR=T. The biggest ICO of 2017 was Filecoin, which raised about $257 million from sales of a token entitling its holders to blockchain-based data storage space. *Id*. Perhaps the most interesting case from the perspective of this Article was the SALT

To fintech enthusiasts, ICOs signal a profoundly democratic shift in market power from traditional venture capital firms to users of the relevant digital product or service.[215] Yet, it is undeniable that ICOs are often seen as purely speculative financial plays.[216] Throughout 2017, investors were ready to snap up ICO "assets," often in a matter of minutes, without much due diligence conducted in traditional securities offerings.[217] They didn't appear to worry about whether or not the tokens they were buying were related to an economically viable enterprise, or to *any* economic activity outside the crypto-asset space.[218] Undiscriminating investor demand for tradable tokens drove inflated ICO valuations, a familiar sign of a speculative asset boom.[219]

Predictably, surging ICOs raised alarm among financial regulators concerned with investor fraud and criminally-connected fund-raising.[220] From a systemic perspective, however, ICOs implicate a far more structurally significant shift. Complete virtualization of tradable assets enables – at least in principle, but very likely in practice as well – a virtually complete separation of the financial system from the real economy. Free of any "natural" productivity-related constraints, financial markets will easily morph into sites of pure crypto-speculation. Left unconstrained, this continuous generation of tradable bits of encrypted data will easily transcend the limits of traditional systemic stability regulation, leaving both the financial system and the real economy vulnerable to shocks originating in an increasingly self-referential crypto-space. It will also render regulators' task of protecting investors and capital markets from abuse and misconduct inherently impossible to perform via traditional means.

Lending Platform ICO, with the tokens designed to allow holders of cryptocurrencies to use them as collateral for borrowing in fiat currencies. *Id.*

[215] *See* Richard Waters, *To Coin a Craze: Silicon Valley's Cryptocurrency Boom*, FIN. TIMES (Sept.13, 2017).

[216] *Id.*

[217] *See* CASEY & VIGNA, *supra* note 186 at 103-104 (citing to an ICO by Gnosis, whose platform allows users to create prediction markets for betting on anything, in which the company raised $12.5 million in twelve minutes).

[218] *See* Waters, *supra* note 215.

[219] *Id.* Even high post-ICO failure rates did not dampen this speculative demand. *See* Aaron Hankin, *Nearly half of all 2017 ICOs failed*, MARKETWATCH.COM (Feb. 26, 2018), *available at* https://www.marketwatch.com/story/nearly-half-of-all-2017-icos-have-failed-2018-02-26.

[220] For example, China and South Korea banned ICOs in 2017. *See* Darryn Pollock, *From Gibraltar to Australia: How Countries Approach ICOs*, COINTELEGRAPH.COM (Feb. 16, 2018), *available at* https://cointelegraph.com/news/from-gibraltar-to-australia-how-countries-approach-icos. In the U.S., the SEC announced that certain ICOs may constitute securities issuances subject to federal securities laws. *See* https://www.sec.gov/ICO.

2. Robo-Advising: Scaling Up Trading

Robo-advisors are "automated interfaces that offer investment advice and discretionary investment management services without an intervention of a human advisor, using algorithms and asset allocation models that are advertised as being tailored to each individual's investment needs."[221] Robo-advising is quickly becoming a mainstream financial service. Charles Schwab, Vanguard, and Fidelity offer robo-advising services.[222] Even Morgan Stanley, one of Wall Street's most venerable investment banks, launched a robo-advising unit in December 2017.[223]

Because robo-advisors eliminate expensive human labor and use algorithmic trading to maintain or adjust clients' portfolio allocations, their services are significantly cheaper than those of traditional wealth managers.[224] Robo-advisors are potentially able to offer relatively simple and cost-effective investment options – mainly, index mutual funds and passive exchange-traded funds (ETFs) – to a wider array of clients.[225] The absence of human intervention is also touted as an attractive feature of robo-advising because it promises to eliminate potential conflicts of interest plaguing the fund management industry.[226] For these reasons, proponents of robo-advising routinely portray it as a valuable tool of financial inclusion and "democratizing" wealth management by broadening its availability beyond the exclusive world of wealthy people.[227] Critics, on the other hand, contest these claims as significantly overstating the cost-efficiency and integrity of robo-advice and warn against channeling retirement and retail investors' money into these automated accounts.[228]

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[221] Chiu, *supra* note 4 at 88. Robo-advisors rely on online questionnaires, filled out by prospective clients, to devise asset allocation and trading strategies that most closely track each client's expressed investment goals, preferences, and general risk parameters.

[222] *See* Matthew Frankel, *Robo-Advisers: What They Cost and What You Get*, MOTLEY FOOL (Nov. 13, 2017), *available at* https://www.fool.com/retirement/2017/11/13/robo-advisors-what-they-cost-and-what-you-get.aspx. Charles Schwab and Vanguard are, of course, already well known as pioneers in democratizing access to wealth management.

[223] Maria Terekhova, *Morgan Stanley Launches a Robo-Adviser After 6 Month Pilot*, BUSINESS INSIDER (Dec. 5, 2017), http://www.businessinsider.com/morgan-stanley-launches-a-robo-advisor-after-16-month-pilot-2017-12.

[224] Chiu, *supra* note 4 at 89.

[225] *Id.*

[226] *Id.* For an easily accessible and comprehensive account of pervasive agency problems in the mutual fund industry, see WILLIAM A. BIRDTHISTLE, EMPIRE OF THE FUND: THE WAY WE SAVE NOW (2016).

[227] *See* Deloitte, *The Expansion of Robo-Advisory in Wealth Management* (Aug. 2016), https://www2.deloitte.com/content/dam/Deloitte/de/Documents/financial-services/Deloitte-Robo-safe.pdf.

[228] *See, e.g.*, Melanie Fein, *Robo-Advisers: A Closer Look* (June 30, 2015), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2658701.

It is hardly surprising that the continuing growth of robo-advising invites debate. Replacing humans with algorithms in an area traditionally based on relationships and exercise of professional judgment by trusted fiduciaries is not simply a matter of lowering fees. It raises a host of important legal and regulatory issues, especially with respect to advisors' fiduciary duties and investor protection under securities laws.[229] These issues, however, are beyond the scope of this Article. For present purposes, it is critical to focus on the broader potential systemic significance of robo-advising.

One important factor in this respect is that the lower cost – and thus broader accessibility – of robo-advising is not simply a result of eliminating the expense of hiring a human expert. This cost efficiency is also a product of passive index-tracking strategies typically pursued by robo-advisers. Robo-advice tends to channel clients' money into ETFs and other passive investments, often also determined by algorithms, which are inherently cheaper than actively managed fund products.[230]

In this sense, robo-advising appears to amplify both fundamental patterns of secondary market growth, discussed above: it enables synthesizing of new tradable assets, and it serves to scale up the aggregate trading activity in financial markets.[231] Reaching significant segments of the population previously unable to participate in capital markets potentially improves ordinary people's access to investment opportunities. At least as importantly, however, it also improves the market's "access" to their savings. Through robo-advising, new market entrants' money is used to create new financial products that can then be pooled and layered, potentially many times over. This constant influx of new "base" products is critical for sustaining the financial market's built-in tendency to keep scaling up.

Furthermore, as discussed above, the central role of algorithmic trading in the robo-advising business model has a direct – and potentially massive – acceleration effect on financial asset trading.[232] The fact that, in generating all of this additional trading activity, robo-advisers tend to use similar algorithms raises serious stability-related concerns about potential herding behavior and the possibility of rapid unidirectional portfolio shifts.[233] Not only are there many more super-fast trades being executed via robo-advisors' algorithms, these trades are likely to form potentially highly correlated tidal

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[229] *See, e.g.,* Chiu, *supra* note 4; Melanie Fein, *Are Robo-Advisors Fiduciaries?* (Sept.5, 2017), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3028268.

[230] FINANCIAL STABILITY BOARD, *Financial Stability Implications from Fin Tech: Supervisory and Regulatory Issues that Merit Authorities' Attention* (27 June 2017), at 43-45, *available at* http://www.fsb.org/wp-content/uploads/R270617.pdf.

[231] *See supra* Part II.B.

[232] *See supra* Part II.B.2.c.

[233] FINANCIAL STABILITY BOARD, *supra* note 230, at 45-46.

waves of money moving in and out of the same asset classes.[234]

In fact, there are serious reasons to believe that the real driver behind the rapidly rising popularity of robo-advising is not the commonly touted "democratizing" impulse but the growing appeal of algorithmic trading as a portfolio-enhancing strategy for wealthy investors. Thus, it appears that robo-advisors are increasingly targeting wealthy (or relatively wealthy) investors who are already in the market, rather than the truly "under-served" low-income people.[235] Many large robo-advisors are introducing minimum account balance requirements for access to digital investment services, ranging from $25,000 to $50,000 and possibly higher.[236] For this contingent of wealthy investors, robo-services are a source of new, cost-efficient portfolio diversification opportunities. In line with the same logic, Morgan Stanley's robo-advising unit is said to target primarily the Millennial children of the bank's existing clients.[237]

Tellingly, there are stark parallels between these developments and the dynamics in marketplace lending, discussed above. There, what started as a promise of a peer-to-peer credit system quickly evolved into another rendition of the institution-dominated market for high-yield consumer debt.[238] Here, what started as a promise of opening the world of investment to the poor is quickly evolving into the reality of opening the world of (yet more) speculative trading to the wealthy.

As these examples demonstrate, technology alone cannot make the financial system more "democratic" or "just." Democratizing finance cannot be reduced to a purely technical exercise in decentralizing financial services or making them cheaper through the use of algorithms. It is an inherently *political* exercise, and only a democratic polity can achieve that goal through a coherent and comprehensive program of institutional reforms.[239] The real

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[234] *Id.*

[235] *See* Bryan Yurcan & Suleman Din, *Will Cheap Advice Turn Off Wealthy Clients?* AM. BANKER (June 5, 2018), *available at* https://www.americanbanker.com/news/fifth-third-securities-and-fidelity-partner-on-automated-advice-for-small-investors?utm_campaign=intraday-c-Jun%205%202018&utm_medium=email&utm_source=newsletter&eid=12a6d4d069cd56cfddaa391c24eb7042 (discussing how large financial institutions' robo-advising services target the "mass affluent audience").

[236] *Id.* ("Wells Fargo and U.S. Bank have digital advice account minimums double that of Fifth Third's. And by blending human service with digital platforms, other firms have sought wealthier clients. Schwab's Intelligent Advisory service has a $25,000 account minimum, while Vanguard's Personal Advisor Services (the largest digital advice platform, with over $100 billion in assets under management) has a $50,000 account minimum.").

[237] *See* Terekhova, *supra* note 223.

[238] *See supra* Part III.B.1.

[239] For a comprehensive theoretical and practical analysis and justification of, and specific proposals for implementing, such institutional reform, see, e.g., *Public Actors*, *supra*

question is whether the exciting new technology will be used to aid or to impede this process.

C. Fintech as a Systemic Phenomenon: Unsettling the Public-Private Balance

This brief overview of certain key developments in the rapidly evolving fintech sector is not meant to be an exhaustive catalogue of everything that this sector has to offer. Nor does it claim to present a full analysis of specific legal, technical, and policy issues these developments raise.[240] Instead, the purpose of the present discussion is to trace the fundamental continuity behind the fintech "disruption," in search of a new conceptual and normative perspective for understanding fintech as a systemic phenomenon.

Standard accounts of the systemic implications of fintech activities tend to present lengthy sets of fintech-related factors that are likely either to reduce various systemic risks or to amplify them. Some of the commonly listed financial stability enhancers include, for example, systemic risk-reducing effects of making transacting faster and easier (i.e., eliminating market "frictions") and greater competition in the financial services industry.[241] Potential systemic risk amplifiers, on the other hand, include the heightened tendency toward herding behavior and procyclicality, greater vulnerability to technical glitches and operational failures, and the rise of systemic importance of non-financial firms.[242]

Although these are valid and serious arguments worthy of attention and study, the focus of this Article is on the deeper – and broader – dynamics within the financial system. As argued above, the New Deal political settlement established the fundamental balance of public and private roles, competencies, and responsibilities in the financial sphere.[243] Under its terms, private market participants are primarily in control of allocating financial capital, while sovereign public is primarily responsible for maintaining the macro-financial stability.[244] From this perspective, the emerging fintech technologies and activities are not merely recreating some of the familiar sources of systemic risk or rearranging the familiar institutional landscape of financial services. At the higher level of magnitude, fintech's systemic impact has to be assessed in terms of its potential to cause a decisive shift in the currently existing public-private balance in finance.

While it is difficult to generalize across the evolving and varied fintech

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note 39; *National Investment Authority, supra* note 39.

[240] For recent analyses of these issues, see sources cited *supra* notes 3-4.

[241] *See* FINANCIAL STABILITY BOARD, *supra* note 230, at 16-17.

[242] *Id.* at 20-21.

[243] *See supra* Part I.B.

[244] *Id.*

space, the new technologies' self-proclaimed unifying *raison d'être* is qualitative transformation and optimization of transactional capacity in financial markets. Importantly, that refers primarily, if not exclusively, to *private* transacting capacity.[245] In some instances, this goal of directly empowering the private, as opposed to the public, side of the financial market is quite explicit. Bitcoin enthusiasts, for example, openly tout that cryptocurrency's ambition and ability to do away with sovereign governments' control over money.[246] In most instances, however, the rhetoric of fintech consciously emphasizes its potential to yield significant *public* benefits: financial inclusion, greater financial autonomy, and greater convenience, among other things.[247]

Yet, even a brief examination of these new technologies reveals the sense in which they systematically tip the scale in favor of the *private*, as opposed to the public side of the New Deal settlement. By making transacting in financial markets infinitely faster, cheaper, and easier to accomplish, fintech critically augments the ability of private actors to synthesize tradable financial claims – i.e., private liabilities – and thus generate new financial risks on an unprecedented scale. Moreover, as the discussion of Bitcoin and ICOs shows, new crypto-technology enables private firms to synthesize tradable financial assets effectively out of thin air.[248] This may be thought of as the crucial last step in the decades-long process of virtualization of financial claims – e.g., through creation of derivatives and other highly structured financial products – which will finally render financial markets *entirely* self-referential.

It is difficult to overestimate the significance of this leap for the financial – and, more broadly, economic – system. Making financial trading explicitly divorced from the production of any actual goods or services in the real, or non-financial, economy will have enormous consequences both for financing and organizing the entire economic system and for managing the financial sector.

Among other things, it will make it increasingly difficult, if not impossible, for the sovereign public to continue safeguarding and guaranteeing macro-financial stability. The sheer scale and complexity of the financial market effectively "liberated" from exogenously imposed constraints on its growth will make it inherently more volatile and unstable –

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[245] This is, of course, natural, given that most fintech applications are being developed by profit-seeking private market participants. Governments may and do participate in fintech projects, especially as they explore potential for issuing sovereign cryptocurrencies, but they have not yet commandeered any particular technology for principally public use.

[246] *See* Lastra & Allen, *supra* note 157 at 18-20.

[247] *Id*. *See also, Treasury Report*, *supra* note 3, at 17.

[248] *See supra* Part III.A.1.

and, consequently, both far more dependent on public support and requiring far greater quantities of such support. The same factors, however, will also make it increasingly difficult, if not impossible, for the public to control, or even track, new technology-driven proliferation of risk in the financial system. Moreover, the underlying policy rationale for the public accommodation of privately created financial liabilities – i.e., the publicly salient role of financial markets in channeling investments in the real economy – will effectively disappear. In short, in this new environment, the public will be forced to bear a vastly greater (and difficult to quantify in advance) burden of stabilizing an increasingly unstable and uncontrollable financial system that keeps growing for the sake of its own growth.

The key point here is not to assert the inevitability of this, or any other, specific scenario. My purpose is to show why fintech as a *systemic* phenomenon cannot be reduced to a mere collection of specific transactional friction-solving tools. Fintech has to be appreciated for its potentially game-changing effect on the existing balance of public and private power to define the fundamental purpose and direction of the financial system. Even at this early stage, it is increasingly apparent that various forms of "disruptive" fintech technologies, in fact, operate in tandem with and amplify the same long-standing financial market dynamics – pooling and layering of financial assets and acceleration and compression of financial transactions – that have been gradually eroding the New Deal settlement. If (or when?) fintech delivers on its promise to make these mechanisms virtually frictionless, thus taking their operation to a qualitatively different level, the financial market will completely forsake the frail confines of the New Deal settlement. We need to start thinking seriously about what should replace it. In this sense, fintech is ultimately a matter of public policy of the highest order.

CONCLUSION

Fintech is visibly "disrupting" traditional methods of delivering financial services and conducting financial transactions. Less visibly, it is also changing the way we think about finance and envision its future trajectory. The rise of fintech is gradually recasting our collective understanding of the financial system in seemingly objective – science-driven and normatively neutral – terms, as simply another sphere of applying advanced information technologies and computing power to eliminate specific transactional "frictions" in financial markets. By making transacting faster, easier, cheaper, and instantly adjustable to individual parties' needs and preferences, new technology seems to promise a "win-win" solution to the financial system's many ills.

This Article has presented an alternative account of fintech as a systemic, as opposed to merely transactional, phenomenon. Grounding the evolving

fintech trends in the broader institutional context of the financial markets' operation, the Article exposed the normative and political significance of the current fintech moment. The arrival of these new-generation technologies enables a potentially decisive shift in the underlying balance of the sovereign public's and private actors' relative powers, competencies, and roles in the financial system. By making transacting faster, easier, cheaper, and instantly adjustable to individual parties' needs and preferences, new technology is empowering private actors to engage in virtually unconstrained financial speculation. Unless the public side proactively counters new technologies' potentially destabilizing systemic effects, it may soon find itself in an impossible position of having to back up an uncontrollable and unsustainably self-referential financial system.

To be clear, the purpose of this Article is not to over-dramatize potential dangers, or to deny potential benefits, of fintech. Far from it. New technology opens a wide range of previously inconceivable possibilities for improving our shared financial lives and for creating fuller, more capacious forms of financial citizenship.[249] At this relatively early stage, it would be premature to issue any definitive conclusions as to what fintech's ultimate impact on society is going to be, or what specific risks individual technologies are going to pose to financial stability. It is vitally important, however, to take an informed systemic view of the unfolding fintech "revolution" well before these risks materialize. Only by doing so can we begin harnessing the transformative power of fintech for our collective long-term benefit. This Article takes a critical first step toward that goal.

[249] For a fascinating, and fascinatingly optimistic, account of these possibilities, see CASEY & VIGNA, *supra* note 186.